Board of Directors Meeting Agenda

Date:	June 16, 2022
Time:	5:30 p.m.
Location:	Virtual Meeting (online)

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AGENDA

SACRAMENTO MUNICIPAL UTILITY DISTRICT
BOARD OF DIRECTORS MEETING

Pursuant to Government Code section 54953(e) and the Emergency Board Meeting Procedures adopted by the SMUD Board of Directors, the regular Board meeting and other public meetings are currently conducted solely via virtual (online/teleconference) meeting to align with state, local, and federal guidelines for the containment of the coronavirus.

Live video streams and indexed archives of meetings are available at:
http://smud.granicus.com/ViewPublisher.php?view_id=16

Members of the public may register to provide verbal comments at an upcoming Board or Committee meeting by e-mailing a request to speak to PublicComment@smud.org. Please include the date of the meeting, name, and topic or agenda item the requestor wishes to speak on. The request may also be submitted while the meeting is in progress during the standard time for the agenda item or topic. **Pre-registration is strongly encouraged by no later than 3:00 p.m. on the day of the meeting.**

Members of the public may provide written public comments on a specific agenda item or on items not on the agenda (general public comment) by submitting comments via e-mail. Comments may be submitted to PublicComment@smud.org and will be placed into the record of the meeting.

Members of the public that are listening to or watching the live stream of a Board meeting and wish to submit written comments on a specific agenda item as it is being heard may submit their comments, limited to 250 words or less, to PublicComment@smud.org, noting the agenda item number in the subject line. The Board President may read comments for items on the agenda into the record, in his discretion, based upon such factors as the length of the agenda or the number of e-mail comments received. General public comment for items not on the agenda will not be read into the record but will be provided to the Board and placed into the record of the Board meeting if it is received within two hours after the meeting ends.

June 16, 2022 – 5:30 p.m.

Zoom Webinar Link: **Join SMUD Board of Directors Meeting Here**
Webinar/Meeting ID: 160 958 9044
Passcode: 833834
Phone Dial-in Number: 1-669-254-5252 or 1-833-568-8864 (Toll Free)

Call to Order.
a. Roll Call.

1. Approval of the Agenda.

2. Committee Chair Reports.

   a. Committee Chair report of June 7, 2022, Strategic Development Committee
   b. Committee Chair report of June 8, 2022, Policy Committee
   c. Committee Chair report of June 15, 2022, Energy Resources & Customer Services Committee

Item 5 was reviewed by the June 8, 2022, Policy Committee. Items 6 through 10 were reviewed by the June 15, 2022, Energy Resources & Customer Services Committee.

Comments from the public are welcome when these agenda items are called.

Consent Calendar:

3. Approve Board member compensation for service rendered at the request of the Board (pursuant to Resolution 18-12-15) for the period of May 16, 2022, through June 15, 2022.

4. Approval of the minutes of the meeting of May 19, 2022.

5. Accept the monitoring report for **Strategic Direction SD-4, Reliability**. **Policy Committee 6/8. (Frankie McDermott)**

6. Make findings pursuant to Government Code section 54953(e) to continue holding meetings virtually during proclaimed state of emergency (recurring item, every 30 days). **Energy Resources & Customer Services Committee 6/15. (Laura Lewis)**

7. Adopt SMUD's **2030 Zero Carbon Plan** as SMUD's **Zero Carbon Integrated Resource Plan (IRP)** to meet **California Energy Commission (CEC)** IRP regulatory filing requirements. **Energy Resources & Customer Services Committee 6/15. (Scott Martin)**

8. Adopt an update to SMUD's **Renewable Energy Resources Procurement Plan (RPS Procurement Plan)** as required by Public Utilities Code section 399.30(a) and by the *Enforcement Procedures for the Renewables Portfolio Standard for Publicly Owned Utilities* **(CEC RPS Regulations)** section 3205(a), reflecting updated renewable procurement as included in SMUD's **2030 Zero Carbon Plan** and latest RPS regulations. **Energy Resources & Customer Services Committee 6/15. (Scott Martin)**

9. Adopt an update to SMUD's **Renewables Portfolio Standard (RPS) Enforcement and Compliance Plan**. **Energy Resources & Customer Services Committee 6/15. (Scott Martin)**

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Discussion Calendar:

10. Certify the **California Environmental Quality Act (CEQA) Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan (HCP) Final Environmental Impact Report (FEIR)**, including adoption of the **Findings**; adopt the **Mitigation Monitoring and Reporting Program**; and approve the project. **Energy Resources & Customer Services Committee 6/15. (Frankie McDermott)**

    Presenter: Emily Bacchini

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<u>Informational Items</u>:

11. Provide the Board with the financial results from the four-month period ended April 30, 2022.

    Presenter: Kathy Ketchum

12. Provide the Board with the summary of SMUD's current Power Supply Costs.

    Presenter: Kathy Ketchum

13. Audit Reports: Green-e® Energy Annual Verification and Data Sharing.

    Presenter: Claire Rogers

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<u>Public Comment</u>:

14. Items not on the agenda.

<u>Board and CEO Reports</u>:

15. Directors' Reports.

16. President's Report.

17. CEO's Report.
    a. Board Video

<u>Summary of Board Direction</u>

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ANNOUNCEMENT OF CLOSED SESSION AGENDA

1. **<u>Conference with Labor Negotiators</u>**.

    Pursuant to Section 54957.6 of the Government Code:

    SMUD Designated Representatives:
    Cheryl Spector, Manager, Employee Relations
    Jennifer Dibble, Principal Employee Relations Analyst

    Employee Organization:
    Public Safety Officers' Association (PSOA)

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<u>Board Committee Meetings and Special Meetings of the Board of Directors are held at the SMUD Headquarters Building, 6201 S Street, Sacramento</u>

The SMUD Board of Directors is currently operating under Emergency Board Meeting Procedures. In accordance with findings made by the Board pursuant to Government Code section 54953(e), these meetings will be held virtually (online).

June 15, 2022	Energy Resources & Customer Services Committee and Special SMUD Board of Directors Meeting	Virtual Meeting (online)	5:30 p.m.

<u>Regular Meetings of the Board of Directors are held at the SMUD Headquarters Building, 6201 S Street, Sacramento</u>

The SMUD Board of Directors is currently operating under Emergency Board Meeting Procedures. In accordance with findings made by the Board pursuant to Government Code section 54953(e), these meetings will be held virtually (online).

July 21, 2022	Virtual Meeting (online)	5:30 p.m.

Pursuant to Resolution No. 20-06-08 adopted on June 18, 2020, Emergency Board Meeting Procedures are in effect:

Members of the public may make either a general public comment or comment on a specific agenda item by submitting comments via email. Comments may be submitted to PublicComment@smud.org. Comments will be provided to the Board and placed into the record of the Board meeting if it is received within two hours after the meeting ends.

Members of the public that are listening or watching the live stream of a Board meeting and wish to comment on a specific agenda item as it is being heard, may submit their comments, limited to 250 words or less, to PublicComment@smud.org. The Board President may read the comments into the record, in his discretion, based upon such factors as the length of the agenda, the number of email comments received, and whether the Board is in danger of losing a quorum. Comments will be provided to the Board and placed into the record of the Board meeting if it is received within two hours after the meeting ends.

Members of the public may register to provide verbal comments at an upcoming Board or Committee meeting by emailing a request to speak to PublicComment@smud.org. Please include the date of the meeting, name, and topic or agenda item the requestor wishes to speak on. The request may also be submitted while the meeting is in progress during the standard time for the agenda item or topic. <u>Pre-registration is strongly encouraged by no later than 3:00 p.m. on the day of the meeting</u>.

ADA Accessibility Procedures: Upon request, SMUD will generally provide appropriate aids and services leading to effective communication for qualified persons with disabilities so that they can participate equally in this virtual meeting. If you need a reasonable auxiliary aid or service for effective communication to participate, please email Toni.Stelling@smud.org, or contact by phone at (916) 732-7143, no later than 48 hours before this virtual meeting.

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DRAFT

RESOLUTION NO. ________________

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

That this Board hereby approves Board member compensation for service rendered at the request of the Board (pursuant to Resolution 18-12-15) for the period of May 16, 2022, through June 15, 2022.

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DRAFT

Sacramento, California

May 19, 2022

The Board of Directors of the Sacramento Municipal Utility District met in regular session via virtual meeting (online) at 5:32 p.m.

Roll Call:

Presiding: President Rose

Present: Directors Bui-Thompson, Fishman, Herber, Kerth, Tamayo, and Sanborn

Present also were Paul Lau, Chief Executive Officer and General Manager; Laura Lewis, Chief Legal & Government Affairs Officer and General Counsel and Secretary, and members of SMUD's executive management; and SMUD employees and visitors.

Director Tamayo shared the environmental tip.

President Rose called for approval of the agenda. Director Herber moved for approval of the agenda, Director Kerth seconded, and the agenda was unanimously approved.

President Rose announced that the winning team from the Youth Energy Summit was on hand to provide their presentation.

Kaelin Sherrel, an Education Specialist on the Community Education & Technology Center team, provided a brief overview of the Youth Energy Summit where local students learn from industry professionals and were tasked with designing and implementing a community service project that reduced carbon emissions, considered equitable outcomes, and left a positive impact on the community. She stated that the projects were of a three-month duration and had several deliverables culminating with a 10-minute presentation by each of the nine team, with each project being scored on concept, impact, viability, execution, creativity, and reflection. She then introduced the winning team, Team Soteria.

Team Soteria from Vista Del Lago High School in Folsom, comprised of team members Anishka Venkatesh, Yena Kim, Audrey Do, Alisha Mark, Christina Lu, and Paige Thionnet, presented their project, Team Soteria

Tackles Food Waste in Folsom. A copy of the slides used in their presentation is attached to these minutes.

Directors Sanborn, Herber, Bui-Thompson, Fishman, Tamayo, and Kerth commended the team on their project, creativity in tackling a tough problem, and demonstration of leadership skills. President Rose praised the team for their effective use of social media and expressed the Board's support. Mr. Lau commended the team and thanked them for their presentation.

Director Bui-Thompson, Chair, presented the report on the Strategic Development Committee meeting held on May 10, 2022.

Director Tamayo, Chair, presented the report on the Policy Committee meeting held on May 11, 2022.

Director Fishman, Chair, presented the report on the Energy Resources & Customer Services Committee meeting held on May 18, 2022.

Director Herber, Chair, presented the report on the Finance and Audit Committee meeting held on May 17, 2022.

President Rose then called for public comment for items on the agenda, but none were forthcoming.

President Rose then addressed the consent calendar consisting of Items 4 through 12. Vice President Sanborn moved for approval of the consent calendar, Director Fishman seconded, and Resolution Nos. 22-05-01 through 22-05-08 were unanimously approved.

RESOLUTION NO. 22-05-01

BE IT RESOLVED BY THE BOARD OF DIRECTORS
OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

That this Board hereby approves revised Board member compensation for services rendered at the request of the Board (pursuant to Resolution 18-12-15) for the period of March 16, 2022, through April 15, 2022.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

RESOLUTION NO. 22-05-02

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

That this Board hereby approves Board member compensation for service rendered at the request of the Board (pursuant to Resolution 18-12-15) for the period of April 16, 2022, through May 15, 2022.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

RESOLUTION NO. 22-05-03

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

This Board accepts the monitoring report for **Strategic Direction SD-8, Employee Relations**, substantially in the form set forth in **Attachment A** hereto and made a part hereof.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

Attachment A
to Resolution No. 22-05-03

SACRAMENTO MUNICIPAL UTILITY DISTRICT

OFFICE MEMORANDUM

TO: Board of Directors **DATE:** May 2, 2022

FROM: Claire Rogers CR 5/2/22

SUBJECT: **Audit Report No. 28007424**
Board Monitoring Report; SD-8: Employee Relations

Audit and Quality Services (AQS) received the SD-8 *Employee Relations* 2021 Annual Board Monitoring Report and performed the following:

- A review of the information presented in the report to determine the possible existence of material misstatements;
- Interviews with report contributors and verification of the methodology used to prepare the monitoring report; and
- Validation of the reasonableness of a selection of the report's statements and assertions.

During the review, nothing came to AQS' attention that would suggest the SD Board Monitoring report did not fairly represent the source data available at the time of the review.

CC:

Paul Lau

Board Monitoring Report 2021
SD-8, Employee Relations

1. Background

Strategic Direction 8 (SD-8) states that:

Developing and maintaining a high quality, diverse and inclusive workplace that engages and inspires employees to commit to SMUD's purpose, vision and values is a core value of SMUD.

SMUD is committed to diversity and inclusion and will foster and support a workplace that values employees representing a variety of backgrounds, including but not limited to, race, ethnicity, gender, gender identification and/or expression, sexual orientation and identification, national origin, age, physical abilities, veteran status, socio-economic status, life experiences, talents, and thinking styles.

Therefore:

a) SMUD shall attract and retain a highly qualified and diverse workforce.
b) SMUD shall promote inclusion and diversity and engage its workforce in activities that demonstrate and support inclusion and diversity across the organization.
c) SMUD shall engage its workforce in personal and professional development.
d) SMUD's percentage of engaged employees as measured through the Engagement Index shall exceed 80%.
e) SMUD shall use a broad mix of communication and outreach channels to ensure its recruitment activities reflect the diversity of the communities it serves.
f) SMUD shall maintain and communicate written policies that define procedures and expectations for staff and provide for effective handling of grievances.
g) Annually, and consistent with State and Federal law, the Board shall receive a report detailing the demographics and trends of the SMUD workforce, the available workforce, and the Sacramento region. The report shall also provide information on veterans as a part of SMUD's workforce.

2. Executive Summary

SMUD is in full compliance with SD-8, Employee Relations.

In 2021, our forward-focused approach to work resulted in many successful initiatives, including a substantial organizational realignment to support the 2030 Clean Energy Vision and increase focus on diversity, equity, and inclusion; the groundbreaking of a 17,000 square foot child development center; a Caldor Fire Care Team to support impacted employees; successful IBEW negotiations; a streamlined New Employee Orientation process; and more. We continue to see an increase in shared goals and collaboration across the business to establish meaningful methods for enhancing the employee experience at SMUD.

SD Requirement	SD Support (Program, Policy, Procedure or Initiative)	Purpose	Outcome	Notes
a)	Career Ambassador Program	Early outreach & connection with future pipeline (K-12, college, and community) to increase future workforce talent while simultaneously engaging employees	Reached 3,441 students and community members	In-person event requests continued to be low due to COVID-19 precautions.
b)	Employee Resource Groups	Contribute to an inclusive work culture by creating a sense of community and promoting education and awareness in alignment with SMUD's mission and values and our Inclusion Policy	95 ERG events supported business initiatives	Increase in virtual collaborations between ERGs and local organizations helped foster meaningful community connections
	Leader Inclusion Goals	Facilitate a demonstrated commitment to SMUD's inclusive culture	100% of all leaders completed the actions identified in their inclusion goals by Dec. 31, 2021	Themed analysis of goals is underway to improve understanding of the employee experience
c)	Corporate Learning & Development Curriculum	Develop skills and leadership competencies that will support SMUD's current and future business strategy	2,440 employees averaged 25 hours of training throughout 2021	Average training hours increased from 20 hours in 2020
	Internal & External Leadership Programs	Provide experiential learning opportunities to develop leadership, and support collaboration and philanthropy in the community	20 employees completed or graduated from eight different local and regional leadership development programs	22 employees participated in 2021 leadership programs, where a few were pushed out due to COVID and completion cycles changed; one employee dropped out of the United Way program and another from WEI

c)	Education Assistance	Support employee continued education to attract & retain a highly qualified workforce	131 employees utilized the program; 22 employees self-reported that they either completed a certificate program or graduated with a college degree	2.96% decrease in participation from 2020; anticipate participation will increase in 2022 with employees returning to pre-pandemic work routines
d)	Engagement Survey	Understand the employee level of engagement and support leaders in sustaining high levels of engagement while identifying continuous improvement opportunities	Commitment to culture demonstrated with 91% employee participation rate, the highest in SMUD's history	Participation exceeded target by 3%, providing a very strong data set for reporting engagement at the team, business unit and enterprise levels
e)	Workforce Outreach & Partnerships	Promote job opportunities, grow diversity of talent pipeline and talent pool, raise awareness of SMUD's employer brand	Participated in female (1), LGBTQ (1), culture & ethnic focused (45), low income (3), and veteran (2) employment-related events	2022 outreach focus on women and Hispanic populations
	Internships	Strengthen talent pipeline by immersing students of varied backgrounds in SMUD's culture and careers	1,666 college intern applicants, 65 college interns hired; 6 summer high school interns	Internship program was scaled in response to COVID-19 and SMUD's hiring strategy
	Powering Futures Scholarships	Support diverse talent pipeline in community and STEM disciplines	21 scholarships awarded	The scholarships ranged from $2,000 (for Community College students) to $4,000 for 4-year University students)
	CSUS Powering Hornets and UCD Powering Aggies Scholarships	Support talent pipeline and STEM disciplines in community	1 scholarship awarded to each university	These contributions are in the form of endowments managed by each university

e)	Hornet Leadership Program - SMUD cohort	Support talent pipeline and STEM disciplines in community	The sponsorship was allocated as a HLP Conference Sponsor, funded 3 scholars (engineering and computer science students), and 1 Facilitator	SMUD donated to this program at the $25,000 sponsorship level, used to fund scholarships and assist with program administration
f)	Code of Business Ethics and Employee Conduct	Provide an easy-to-read explanation of SMUD's values and expectations for employee behavior	100% compliance	Code supplements SMUD's state law-mandated Conflict of Interest Code
g)	Workforce Demographics Reporting	Provide informational update on workforce demographics	Identify and report on trends and ongoing efforts for a high quality, diverse and inclusive workforce	See SD-8 appendix for detailed reporting

3. Additional Supporting Information

Please see attached Appendix for additional information related to the SD-8 metrics.

4. Challenges

The COVID-19 pandemic required that SMUD continue to modify its services and strategies for attracting, retaining, and developing employees. While we saw a downward trend in areas such as in-person outreach events and tuition assistance program participation, we anticipate these numbers will increase in 2022 with the launch of SMUD's re-entry effort. Alongside many other organizations, we are also exploring new ways to measure the impact of virtual events and programs and expect to see that learning reflected in future reporting.

5. Recommendations

As reflected in this report, SMUD has achieved the goals set forth in SD-8 for ensuring SMUD develops and maintains a high quality, inclusive workplace that engages and inspires employees to commit to SMUD's purpose, vision, and values.

It is recommended the Board accept the monitoring report for Strategic Direction 8.

Appendix

a) SMUD shall attract and retain a highly qualified and diverse workforce.

Attracting and Retaining our Workforce
Talent Management continues to partner with stakeholders – both internal and external to SMUD – to increase pipelines, such as via apprenticeships and internships. As SMUD realized the impacts of labor shortages spanning multiple critical industries, Classification and Compensation rapidly pivoted to benchmark trending market data to support increased retention strategies for existing staff while enticing new talent to enter our workforce. The Talent Management team partnered with internal hiring management and panel members in a continued commitment to removing unconscious bias from our end-to-end hiring processes. In addition, Pay Equity analysis continues to ensure internal alignment and equity in pay practices throughout the organization.

Career Ambassadors – Talent Pipeline
SMUD Career Ambassadors shifted their approach from representing SMUD at in-person events such as career fairs, career exploration, and mock interviews, to attending and hosting virtual career events. Career Ambassadors attended 52 events in total -- 45 virtual and 7 in-person. Career Ambassadors invested 116 hours in 2021 and reached 3,441 members of the community.

Wellness
For 2021, we launched a reimagined Wellness/HAP program focused on the 4 pillars of Wellness: Social, Mental, Physical, and Financial. A much broader range of activities were provided virtually in support of this holistic approach. Emphasis was placed on mental wellness including family wellness during the pandemic and work/life balance as employees found themselves navigating the confines of the pandemic. We offered greater flexibility and options to participants to achieve their Wellness/HAP goals by collaborating with our Wellness partners (SMUD ERGs, Kaiser, Sutter Health, United HealthCare, SAFE Credit Union, Wells Fargo Bank, Fidelity Investments, and OptumHealth). We also offered weekly virtual yoga classes and stretch breaks to our employees.

Benefits
Open enrollment in 2021 consisted of 6 meetings for employees and retirees. We continue to utilize a Virtual Benefit Fair platform to provide our employees and retirees with an easy to use and fun web portal, accessible from any device (i.e. mobile phone, desktop/laptop and iPad). This platform provided for all their benefit needs including benefit guidebooks, plan summary documents, and the ability to send questions to our benefit providers. Additionally, Benefits staff in Total Rewards and key leadership members from People Services & Strategies (PS&S) and Procurement worked to address the rising cost of health care and were able to negotiate a reduction of 2.8% from the medical carrier's initial proposal to their final premium rates.

Retention
SMUD's turnover increased in 2021, from 5.3% in 2020 to 7.7%. This increase can be attributed to delayed Retirements in 2020 due to the Global Pandemic, as well as an economic trend in the United States, in which employees voluntarily resigned from their jobs en masse in 2021. Retirements increased to 92 in 2021, from 66 retirements in 2020. SMUD's turnover continues to rank below the industry benchmark of 13.1%. In addition to SMUD's Baby Boomer workforce entering retirement eligibility, this data also aligns with the cyclical pattern we've seen in retirements over time. Historically, we see these numbers rise in small waves that crest every three to four years.

b) SMUD shall promote inclusion and diversity and engage its workforce in activities that demonstrate and support inclusion and diversity across the organization.

Employee Resource Groups
The 8 ERGs at SMUD include:
- Black Employee Resource Group (BERG)
- Asian Pacific Islander (GRAIN ERG)
- Latinos Unity Network for Action (LUNA)
- Military Employee Resource Group (MERG)
- People Reaffirming Inclusion Diversity and Equality (PRIDE)
- Women's Employee Resource Group (WERG)
- Young Professionals Employee Resource Group (YP)
- Parents ERG

Employee Resource Groups (ERGs) helped foster inclusion among our hybrid workforce by hosting several virtual interactions and programs to keep employees connected, including several collaborative events co-hosted with community organizations in SMUD's service territory.

DEI Leadership
An enterprise realignment in 2021 restructured areas of SMUD to prepare our organization to support the 2030 Clean Energy Vision and diversity, equity, and inclusion. It elevated responsibility for DEI to the senior leadership team by way of establishing two significant positions: Chief Diversity Officer and Diversity, Equity, and Inclusion (DEI) Director. These leaders oversaw several priority areas in 2021, including SMUD's DEI strategy, council, and data transparency strategy.

DEI and Mandatory Training
Culture underpins everything we do at SMUD, and all employees play a role in shaping it. To help prepare our staff to take a more active role in evolving our culture toward greater diversity, equity, and inclusion, a course called *Confronting Bias: Thriving Across Differences* was assigned to everyone's mandatory training in 2021. The 40-minute course was designed to:

- Share ways to better interact with others who have different backgrounds, perspectives, and communication styles
- Help create inclusive environments where everyone is heard and can thrive
- Better counter bias using words and actions; and
- Improve well-being and productivity

Diversity, Equity, Inclusion and Belonging (DEIB) Council
Significant progress was made to begin developing SMUD's Diversity, Equity, Inclusion, and Belonging Council in late 2021. A 5-person Tiger Team was selected to craft the council's charter and define its role, creation, and operation in August and September. Afterward, council applications from a wide cross-section of employees, including every business unit and Employee Resource Group, were solicited, reviewed, scored, and nominated by a cross functional team. The council will convene starting in Spring of 2022.

Workforce Demographics Dashboard
People Services & Strategies; Diversity, Equity & Inclusion; and Business Intelligence & Analytics teams collaborated to successfully launch SMUD's first Workforce Demographics Dashboard in November 2021 where employees can now see data about SMUD's workforce broken down by gender, age, ethnicity, tenure, and salary. This tool was developed to educate and inform staff, help identify potential barriers to equitable outcomes, foster a workplace culture of inclusion, and broaden recruitment and outreach to underrepresented persons.

c) SMUD shall engage its workforce in personal and professional development.

Learning and development teams across SMUD design and deliver training courses and programs that support employees' on-the-job and professional development needs. Learning goals are connected to SMUD's Strategic Directives, and course offerings are reviewed at least quarterly to ensure alignment to business strategy and include a mix of classroom, online, and self-directed learning. In 2021 we saw a major training emphasis on Speed of Trust training. By mid-year, 100% of supervisors and managers completed the "Leading at the Speed of Trust Key Concepts" class through a virtual offering of the program. Leaders also leveraged Speed of Trust concepts and a huddle guide with teams to help model trust-building language and behavior throughout the organization.

With the additional availability of online training courses via the LinkedIn Learning platform, 2021 LinkedIn course completions increased by over 180% from the prior year. This significant growth in utilization is attributed to increased user comfort and adoption of the virtual learning platform and meeting custom learning path needs related to business goals and objectives (i.e., technical skills, project management, health and wellness, coaching and feedback, DE&I, and leading in a remote environment).

There were 2,440 employees who received virtual-classroom and computer-based training in 2021, with an average of 25 training hours per individual. Mandatory training ranged from 7.25 to 35.25 hours depending on the employee's position and included enterprise-wide, cross-functional, and department-specific requirements. We saw 472 employees leverage the LinkedIn Learning platform and complete courses totaling more than 1,307 hours. Content included subjects such as project management, leadership development, Microsoft products, managing virtually, communication, customer service skills, diversity & inclusion, and IT skills.

Leadership Development
To complement the ongoing internal development opportunities afforded SMUD leaders, an external leadership development selection process is conducted annually to match applicants with a program that effectively meets their development needs and SMUD's business objectives. In 2021, we sent 20 employees to several local and regional leadership development programs including Nehemiah Emerging Leaders, WEI Business Acumen for Emerging Leaders, Asian Pacific Chamber Catalyst program, Leadership Rancho Cordova program, Leadership Elk Grove, Leadership Sacramento, Leaders United, Nueva Epoca, and SMUD's (internal) Building Leadership Talent program.

Education Assistance
The education assistance benefit supports employees who are pursuing college degrees and developing their SMUD careers by completing certificates or taking individual classes that support our business. We offer up to $5,000 per calendar year for qualified, regular full-time employees to partake in eligible programs, and up to $2,500 for part-time employees. Many employees use the program to pursue an Associate's, Bachelor's or Master's degree in areas as wide-ranging as accounting, law, finance, human resource management, information technology, project management and energy efficiency.

d) SMUD's percentage of engaged employees as measured through the Engagement Index shall exceed 80%.

SMUD fielded an employee engagement survey in October 2021 to better understand the employee experience and level of engagement. Engagement is an emotional state where employees feel passionate, energetic and committed to their work. When engagement is high, research shows organizations have higher productivity, lower turn-over and absenteeism, and improved safety. In short, our employees' engagement is highly correlated with the results SMUD can achieve for our customers and community.

While we continued to measure many items from previous surveys, in this survey we expanded the set of DEI questions we ask from five to ten to more fully understand and improve employees' experiences of diversity, equity, and inclusion. We also included two new items about innovation and well-being.

We were pleased that we exceeded our participation goal of 88% with 91% of employees participating, which is a testament to our level of commitment to feedback and continuous improvement. These are notable highlights of the data:

The percentage of all questions on the survey that employees responded to favorably (Strongly Agree or Agree) was 73%, up 2 points from the 2019 Pulse Survey. The overall score was up 4 points for the 10 questions we asked in both this survey and the 2019 Pulse survey.

The overall engagement score, which is composed of four anchor questions, was 84%, down 3 points from the 2019 Pulse Survey. Our engagement score is 7% higher than DecisionWise's global benchmark and 4% higher than their utilities benchmark.

We made notable improvements in 4 key areas we've been focused on: 1) building a culture of high-trust, inclusion and belonging; 2) open communication; 3) supervisor recognition; and 4) respect which increased by 8, 6, 6 and 5 points respectively. While trust and communication remain low scoring questions, the improvement is encouraging, and we'll continue to build on this positive momentum. Changes of +/- 5% points are considered significant at the organization level.

The greatest declines were in the 4 questions that make up the engagement index. The greatest loss was 5 points for the question "It is easy to become absorbed in my job." While employees' experiences vary, the impact of the ongoing pandemic and the significant amount of change internally and externally since the last survey could be driving this result.

Employee feedback shows that we have opportunities in:

- Employee Voice (employees believe they can speak up freely and their opinions will be considered);
- Communication (transparency and openness across levels, especially with non-remote employees); and
- Perceptions of senior leadership accountability and care for the employee experience

Leaders at all levels of the organization were responsible for discussing their team's data to understand what is going well and what positive steps can be taken to improve. Senior leaders are also each responsible for taking action to address themes around accountability, trust, and care for the employee experience that require action at the organizational level, rather than the team level. Throughout 2022 we will communicate actions we've taken with our employees and plan to repeat our survey in Q1 of 2023 when we can assess our impact.

e) **SMUD shall use a broad mix of communication and outreach channels to ensure its recruitment activities reflect the diversity of the communities it serves.**

Employment Outreach and Partnerships

Outreach in 2021 continued to thrive as we strengthened existing and established new partnerships within local and distant communities to build greater awareness of SMUD as a top employer and to help build a diverse talent pipeline, including La Familia Counseling Center; California Conservation Corp Foundation; GRID Alternatives; Improve Your Tomorrow; JUMA; Salvation Army; Women's Empowerment; Greater Sacramento Urban League; Community Resource Project and more. We participated in the Equal Pay Pledge Roundtable sessions sponsored by the California Commission on the Status of Women and Girls, where statewide employers committed to the furtherance of pay equity shared best practices and networked. It is in these relationships that SMUD experiences the most success in attracting a diversity of candidates aligned with the community. Talent Management also leveraged our existing social media followership to further promote employment opportunities, this year piloting a revamped Customer Service Representative examination process virtually to ensure maximum accessibility. We continue to conduct employment outreach with educational institutions and consistently partner and collaborate with SMUD's Sustainable Communities and Community Engagement.

Internships

With consideration given to the community impact and talent pipeline, SMUD proceeded with offering its internship programs in a limited capacity in 2021 by inviting students to join its remote workforce. Whereas we've traditionally hosted in-person showcases for employees and community partners to learn about intern work, we continued to illustrate the student accomplishments and projects on the SharePoint site in 2021.

While surveying former interns, we learned of their desire for more opportunities for collaboration. In 2020, we launched two projects in 2020 created collaborative opportunities for all interns: a collage showcasing SMUD's D&I commitment; and a campaign to support and market Clean Air Day pledges from SMUD employees. We continued these projects in 2021. However, we also collaborated with organizations in our community: an industry workshop with California ISO and their interns; and a financial workshop with Golden 1 and their interns. We also invited community organizations to speak with the interns including the Museum of Science and Curiosity (MOSAC), NxtGov, and Metro EDGE.

SMUD was also awarded the APPA DEED Scholarship to hire an intern to conduct a research project on how to build a better relationship with our college and university partners in order to attract more talent to SMUD. From this project, our team conducted our first ever virtual Open House event aimed at college and university students to learn more about SMUD and different career opportunities. This event was attended by 140 people.

Interns tackled a variety of important initiatives for the organization, including but not limited to:

- Assisted in developing a SharePoint page to help communicate cybersecurity awareness, training and education topics to the organization.
- Drafted a powerplant lesson plan for 8th graders to effectively advertise SMUD's Zero Carbon 2030 plan
- Conducted outreach to community colleges and universities to advertise the following opportunities: College Internships, Powering Futures Scholarships, Charge Up Change Scholarships, and the 2022 Solar Regatta
- Led a project in establishing communication with colleges in Sacramento to donate battery storage systems to be utilized for student learning
- Constructed Linux bash and PowerShell scripts to automate manual application monitoring procedures
- Analyzed voltage violation data to help make sure that SMUD could deliver high quality power to its customers
- Conducted environmental reviews to determine if sensitive species and habitats are present at project location
- Improved productivity by creating a program that gathers, compresses, and archives logs generated by GIS software and G/Technology

Impressive efforts like those outlined above have resulted in SMUD's internship program being recognized by the Interns 2 Pros organization one of the top 5 finalists for the 2021 Virtual Internship Program alongside with Microsoft, PwC, NASA, and ViacomCBS.

Powering Futures scholarships
Twenty-one recipients were awarded up to $4,000 each and included local students registered in a degree program. Those with a demonstrated financial need pursuing majors related to careers in SMUD received preference. Along with the scholarships, students were also presented with an opportunity to receive a paid internship.

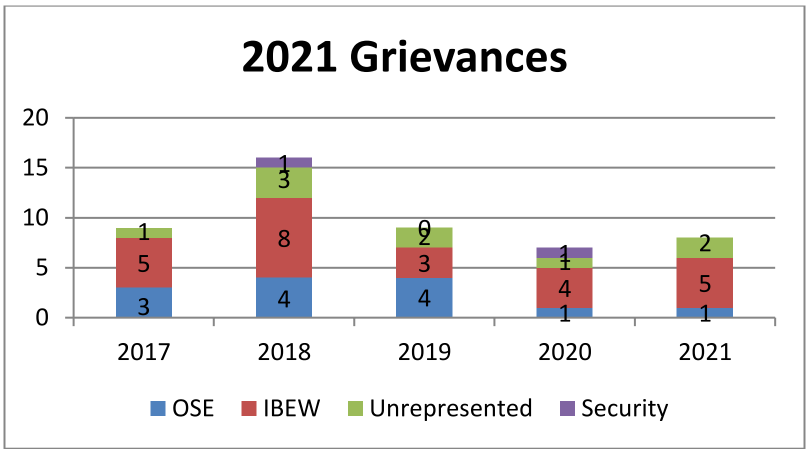
Powering Aggies and Powering Hornets Scholarship Programs
The Powering Aggies and Powering Hornets Scholarship programs were set up in 2018 to provide a scholarship for 1 student each from UC Davis and Sac State. Eligible students who majored in a SMUD-related career field (UC Davis) or Electrical Engineering (Sac State) were selected by their respective universities. In 2021, SMUD awarded the Powering Aggies winner $1,500 and the Powering Hornets winner $1,000.

Hornet Leadership Program (HLP)
This two-year, extra-curricular program, launched in Fall 2018, introduces students to an array of vital training. Students completing the program will have demonstrated leadership skills commensurate with industry requirements. The sponsorship of $25,000 for HLP for the 2021-22 academic year will be used towards being an HLP Conference Sponsor; HLP Scholar Sponsor for 3 scholars; and Peer Assisted Learning (PAL) Sponsor for 1 Facilitator. The seminars hosted by the HLP program are also open to all Computer Science career planning students which makes up a total of 160+ students.

f) SMUD shall maintain and communicate written policies that define procedures and expectations for staff and provide for effective handling of grievances.

In addition to SMUD's Code of Business Ethics and Employee Conduct, its Employee and Labor Relations teams provided daily advice, guidance and counsel to employees on employee relations issues. Staff worked to ensure all employees (represented and unrepresented) understand SMUD policies and procedures, and that employees know and understand what their responsibilities are with respect to the Code of Ethics.

A total of 8 grievances were resolved in 2021.



g) Annually, and consistent with State and Federal law, the Board shall receive a report detailing the demographics of the SMUD workforce, the available workforce, and the Sacramento region. The report shall also provide information on veterans as a part of SMUD's workforce.

The following tables provide demographic information about SMUD's workforce (excluding "casual" positions and members of the Board of Directors), compared to external benchmarks for the Labor Force in the United States, California and select counties in California.

Workforce Demographics

Calendar Year	Male	Female	Caucasian	African American	Hispanic	Asian	Native American	2 or more Races
2021	66%	34%	57%	7%	15%	15%	1%	5%
2020	66%	34%	58%	7%	15%	15%	1%	4%
2019	66%	34%	59%	8%	14%	15%	0%	4%
2018*	66%	34%	60%	8%	14%	15%	0%	4%
2017*	67%	33%	61%	7%	13%	14%	1%	3%
2016	67%	33%	62%	7%	13%	14%	1%	3%
2015	67%	33%	63%	8%	12%	13%	1%	3%
2014	68%	32%	65%	8%	11%	13%	1%	2%

2018 American Community Survey, 5-Year Estimates EEO*								
	Male	Female	Caucasian	African American	Hispanic	Asian	Native American	2 or more Races
U.S. (Civilian)*	53%	47%	63%	12%	17%	6%	1%	2%
California (Civilian)*	54%	46%	39%	5%	37%	15%	0%	3%
Sacramento, El Dorado & Placer Co. (Civilian)	52%	48%	55%	7%	20%	14%	0%	4%
Sacramento Co. (Civilian)	52%	48%	48%	9%	22%	17%	0%	4%
2020 United States Census (April 1, 2020)								
Sacramento Co. (Total Population)	51%	49%	41%	9%	24%	19%	0%	7%

** Percentages may not add up to 100% due to rounding.*
*** Civilian labor force represents residents aged 16 and older. These numbers exclude houseworkers, unpaid volunteers, institutionalized individuals, and U.S. Armed Forces Active Duty.*

We saw a shift in SMUD's 2021 workforce demographics with Caucasian employees representing 57% of the workforce, down from 58% in 2020. This shift occurred as the representation of Hispanic employees increased by 0.3%, and Asian employees increased by 0.3% in 2021. Employee turnover, which creates opportunities to hire, and the demographic makeup of qualified applicants are the likely drivers for this change as SMUD continues to develop its talent pipeline and build a workforce that reflects the diversity of the communities we serve.

2021 Workforce Demographic by Employee Level

Employee Level	Male	Female	Caucasian	African American	Hispanic	Asian	Native American	2 or more Races
Executives	56%	44%	56%	22%	0%	22%	0%	0%
Directors	68%	32%	71%	10%	3%	13%	0%	3%
Managers*	63%	38%	65%	4%	6%	15%	1%	9%
Supervisors	63%	37%	64%	7%	12%	15%	0%	2%
Staff	67%	33%	55%	8%	16%	15%	1%	5%

With the rollout of our Workforce Demographics Dashboard and various informational sessions throughout 2021, we worked to create awareness of employee demographics at each level in the organization. This awareness, in turn, creates an opportunity to explore potential influences and opportunities in our job postings, outreach, and hiring processes.

SMUD Separation History
(Full-Time Employees Only)

	Male	Female	Caucasian	African American	Hispanic	Asian	Native American	2 or more Races
2021	66%	34%	75%	4%	9%	9%	0%	3%
2020*	72%	28%	66%	7%	8%	17%	0%	3%
2019*	69%	31%	70%	9%	9%	11%	0%	2%
2018*	62%	38%	67%	8%	10%	11%	1%	2%
2017*	71%	29%	68%	5%	14%	8%	1%	3%
2016*	75%	25%	72%	6%	5%	14%	1%	3%

**Percentages may not add up to 100% due to rounding*

SMUD's Talent Technology Transformation project currently underway will combine 9 disparate systems to more efficiently manage people processes at SMUD, including employee separation. Teams in People Services & Strategies are actively working to enhance our process for obtaining exit data so that we can make correlations to the above demographics, identify trends, and take action as needed.

Military Veterans in SMUD's Workforce

Veterans are a small but important part of SMUD's workforce. According to our records, Veterans comprised 5.1% of SMUD's workforce in 2021, up from 4.8% in 2020. This increase is the result of our enhanced focus on Veteran self-reporting and partnership with the Military Employee Resource Group.

Veteran Demographics

	Male	Female	Caucasian	African American	Hispanic	Asian	Native American	2 or more Races
SMUD Veterans 2021*	91%	9%	58%	6%	13%	13%	0%	9%
SMUD Veterans 2020	91%	9%	58%	7%	14%	13%	0%	8%
SMUD Veterans 2019	92%	8%	55%	8%	16%	14%	0%	7%
SMUD Veterans 2018*	92%	8%	56%	8%	15%	14%	0%	6%
SMUD Veterans 2017*	91%	9%	59%	8%	14%	14%	0%	6%
SMUD Veterans 2016	92%	8%	60%	9%	11%	13%	0%	6%
CA Veterans	90%	10%	59%	10%	19%	7%	1%	4%

**Percentages may not add up to 100% due to rounding*   *Source: va.gov/vetdata(09/30/21)*

RESOLUTION NO. 22-05-04

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

This Board accepts the monitoring report for **Strategic Direction SD-12, Ethics**, substantially in the form set forth in **Attachment B** hereto and made a part hereof.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

Attachment B
to Resolution No. 22-05-04

SACRAMENTO MUNICIPAL UTILITY DISTRICT

OFFICE MEMORANDUM

TO: Board of Directors **DATE:** May 2, 2022

FROM: Claire Rogers CR 5/2/22

SUBJECT: **Audit Report No. 28007425**
Board Monitoring Report; SD-12: Ethics

Audit and Quality Services (AQS) received the SD-12 *Ethics* 2021 Annual Board Monitoring Report and performed the following:

- A review of the information presented in the report to determine the possible existence of material misstatements;
- Interviews with report contributors and verification of the methodology used to prepare the monitoring report; and
- Validation of the reasonableness of a selection of the report's statements and assertions.

During the review, nothing came to AQS' attention that would suggest the SD Board Monitoring report did not fairly represent the source data available at the time of the review.

CC:

Paul Lau

Board Monitoring Report 2021
SD-12, Ethics

1. Background

Strategic Direction 12 states that:

Maintaining the public trust and confidence in the integrity and ethical conduct of the Board and SMUD employees is a core value. Therefore, to ensure the public interest is paramount in all official conduct, the Board shall adopt and update, as necessary: a Conflict of Interest Code as required by State law. SMUD shall also maintain and enforce a code of conduct applicable to all employees.

Among other things the code of conduct shall:

a) Require high ethical standards in all aspects of official conduct;

b) Establish clear guidelines for ethical standards and conduct by setting forth those acts that may be incompatible with the best interests of SMUD and the public;

c) Require disclosure and reporting of potential conflicts of interest; and

d) Provide a process for (i) reporting suspected violations of the code of conduct and policies through multiple channels, including an anonymous hotline, and (ii) investigating suspected violations.

2. Executive Summary

SMUD is in compliance with the requirements of SD-12.

Strategic Direction 12 requires SMUD to have a process to report potential conflicts of interest and a process for reporting and investigating suspected violations of the Code of Conduct. Compliance is foundational for acting in the best interests of our customers and community. Several SMUD policies and procedures support the requirement of high ethical standards in all aspects of official conduct.

SD Requirement	Supporting Process/Procedure
a) Require high ethical standards	SMUD's Ethics policy (AP 05.02.03) sets the requirements and expectations for ethical behavior, including communication, training and other resources.

b)	Establish clear guidelines for ethical standards and conduct	SMUD's Code of Business Ethics and Employee Conduct were updated and approved by the CEO & General Manager in 2020. SMUD's Ethics procedure (MP 05.02.03.100) was adopted in 2008 and updated in January 2021. SMUD's Conflict of Interest policy (AP 05.02.02) includes Board revisions adopted in 2018 and was approved by the FPPC (Fair Political Practices Commission) in 2018.
c)	Require disclosure and reporting potential conflicts of interest statements	Notice of filing requirements was sent to employees in March. 99% of the annual conflict of interest statements were received by the time this report was finalized.
d)	Provide a process for reporting and investigating suspected violations of the code of ethics	SMUD's Whistleblower Anti-Retaliation policy (AP 05.01.03) was approved in 2014. SMUD's Complaint Process Policy (AP 05.01.04) was approved in 2006 and updated in October 2018 (administrative update only). SMUD's Ethics and Compliance Hotline has been in place since 2008.

3. Additional Supporting Information

Ethics Policy

In accordance with Board Policy SD-12 Ethics, SMUD developed the Code of Business Ethics and Employee Conduct, approved by the CEO & General Manager in 2020. This document supplements SMUD's State-law mandated Conflict of Interest Code and provides an easy-to-read explanation of SMUD's values and expectations for employee behavior. It also identifies various staff resources to obtain further guidance, as well as alternative methods to report suspected violations of SMUD's Code of Business Ethics. The Code provides a framework for how employees should act toward customers, vendors and each other. It also emphasizes that as a publicly-owned utility, SMUD and its employees must adhere to the highest ethical standards.

All new employees receive a copy of SMUD's Code of Business Ethics prior to or during new employee orientation and are required to review and submit a signed acknowledgement to People, Services & Strategies within 30 days of orientation. In addition, all contractors with unescorted access receive a copy of the Code when their background check is conducted. PS&S verifies Code acknowledgements on a quarterly basis to ensure signed acknowledgments are received from all new employees and contractors.

Ethics Training

Ethics training is a mandatory requirement for all SMUD employees. They are required to complete the training every 2 years on a fixed rotating schedule. New and returning employees have one year for completion while newly promoted leaders are required to take Ethics training within 90 days of promotion into their role. Course completion is tracked using SMUD's Learning Management System (LMS) and reported as part of SMUD's mandatory training statistics. The 2021 completion rate for employees with 2021 due dates is 99%.

For the 2021-2022 course cycle, as of April 6, 2022, a total of 2,384 employees have been assigned the training since January 1, 2021. In 2021, 2249 employees completed the training, 15 employees are in-progress with 2022 due dates, and 2 are past due to leave purposes. The employees with 2022 completion dates are either 2021 new hires or recently promoted leaders.

The 2022 numbers show 118 employees have been assigned training that includes new employees and recently promoted leaders. As of April 6, 2022, the completion status shows 58 complete, 58 in progress, and 2 are past due. The past due numbers were caused by a system assignment error. The due date was not set correctly for these two employees, and they have been notified.

Disclosure and Reporting of Potential Conflicts of Interest

The Political Reform Act (Cal. Gov. Code §§ 81000, et seq.) requires certain government officials and employees to publicly disclose certain financial information relevant to the scope of decision-making for their positions with SMUD.

To maintain compliance, all employees in positions designated by the SMUD Board must complete and submit an annual Statement of Economic Interests, FPPC Form 700 (Conflict of Interest Statement). Incumbents of designated positions shall file an Assuming Office Statement within 30 days of starting their employment or beginning the new position. Employees in designated positions who leave SMUD shall file Leaving Office Statements within 30 days of their final dates of employment.

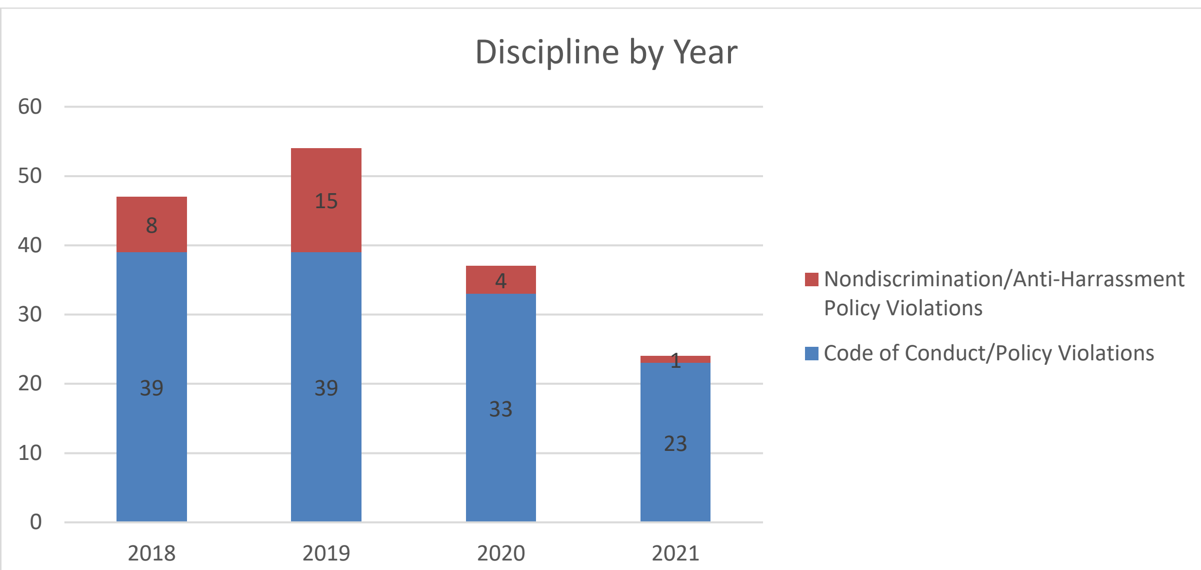
The annual Conflict of Interest Statements are public documents filed with Corporate Records or in the designated record repository. PS&S sent financial disclosure materials electronically to designated employees in February and successfully met the FPPC filing deadline of April 1. At the time of this report, 99% percent of the annual Conflict of Interest Statements from SMUD officials and designated employees were received. PS&S staff follows up to ensure total compliance. In the rare event that full compliance is not achieved, SMUD is obligated to report violations to the FPPC for enforcement. This has occurred only two times in the last decade.

Process for Reporting and Investigating Suspected Violations

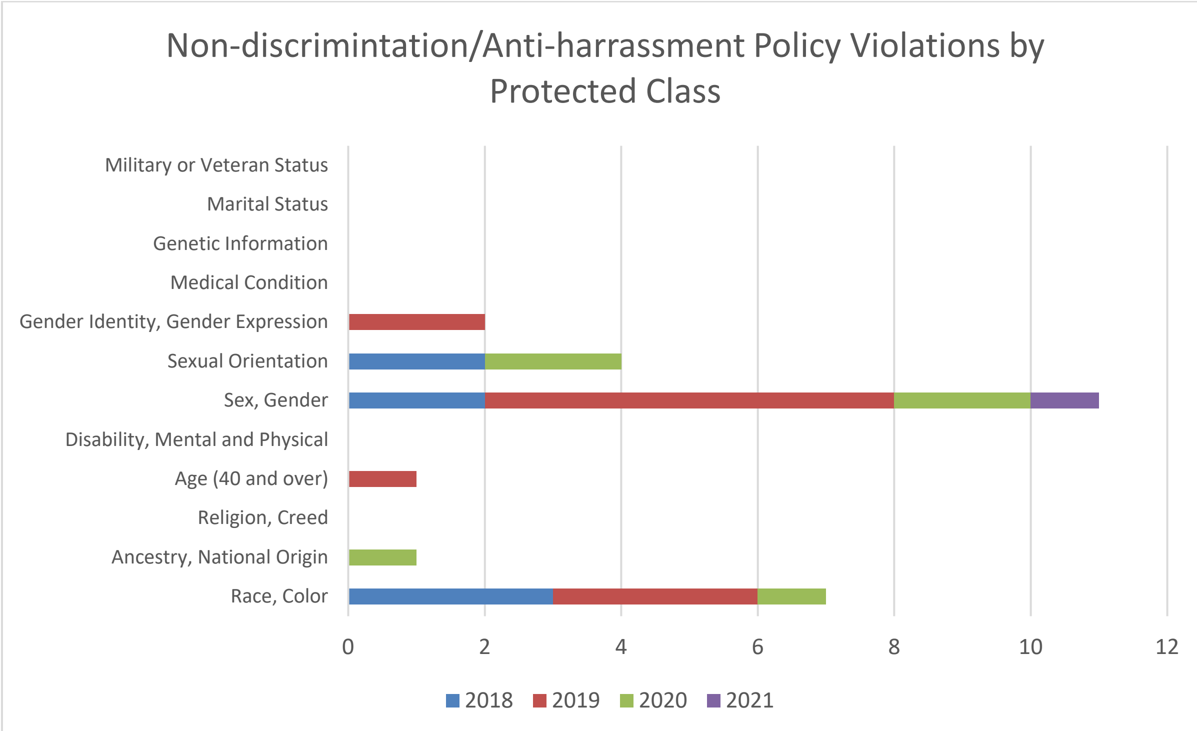
SMUD holds its employees to a higher standard than that required by law and is committed to providing a work environment in which all individuals are treated with dignity and respect. SMUD encourages employees to bring concerns about potential legal violations or violations of SMUD policies to the attention of a SMUD leader. All SMUD leaders are required to immediately report all complaints they receive regarding suspected policy violations to the Fair Employment Office. An employee who believes that they are unable to make a complaint through their management reporting line may report complaints directly to the Fair Employment Office, Labor Relations, Internal Auditor's or General Counsel's Office. Additionally, SMUD has contracted with Navex Global Compliance since November 2008 to operate an anonymous Ethics and Compliance Hotline. This hotline can be used by employees to file complaints anonymously should they so choose, either online or by calling Navex Global Compliance directly. As part of SMUD's Complaint Process and Whistleblower Anti-Retaliation policies, a Whistleblower Committee was established to review and act, when appropriate, on hotline/whistleblower complaints. The committee is comprised of representatives from the General Counsel's office, Audit & Quality Services and PS&S, including members of our Fair Employment Office and Labor Relations team.

In addition to investigating potential violations of SMUD's Nondiscrimination, Anti-Harassment and Non-Retaliation Policy (AP 05.01.01) and Code of Ethics, Labor Relations and Fair Employment analysts also advise, consult with and support leaders on recommended action and coaching to address problematic behaviors and attitudes among the workforce that are not necessarily prohibited by law. This includes working with a leaders' leader or senior leadership when improved leadership skills would benefit relationships. These proactive measures play a critical role in a culture where all employees are respected and valued.

The following chart illustrates discipline issued to employees between 2018-2021. Summarized below are the disciplines issued for violations of SMUD's Nondiscrimination, Anti-Harassment and Non-Retaliation Policy (AP 05.01.01) as well as discipline for misconduct/policy violations under SMUD's Positive Discipline Policy (AP 05.02.09) including dishonesty, bullying, discourteous behavior, unprofessional conduct, driving policy violations, insubordination, conflicts of interest and unethical behavior. The below reporting does *not* include discipline related to safety incidents (e.g. preventable vehicle accidents), attendance (tardiness and/or absences) or work performance unless there was a conduct component covered by SMUD's Code of Business Ethics & Employee Conduct, such as willful negligence or dishonesty.



The chart shown next indicates violations of SMUD's Nondiscrimination, Anti-Harassment and Non-Retaliation Policy (AP 05.01.01) as they relate to protected categories for FEO investigations that occurred in the past four years.



4. Challenges

Completing training and obtaining necessary documents can be a challenge for employees on any type of extended leave. Broad or anonymous complaints are sometimes filed without supporting and/or contact information to allow for follow-up and further investigation. We recognize there are opportunities to increase awareness of the integrity of the process and are looking at various ways to engage with employees to explore their concerns in this area.

5. Recommendations

As reflected in this report, SMUD has achieved the goals set forth in SD-12 for maintaining the public trust and confidence in the integrity and ethical conduct of the Board and SMUD employees. The policies, guidelines, staff training and monitoring and reporting components have played a part in ensuring high ethical standards in all areas of conduct and in operations.

It is recommended the Board accept the monitoring report for Strategic Direction 12.

6. Appendices

N/A

RESOLUTION NO. 22-05-05

WHEREAS, Senate Bill 901 (2018) and Assembly Bill 1054 (2019) revised the California Public Utilities Code section 8387 (PUC § 8387) to require that before January 1, 2020, and annually thereafter, every publicly owned electric utility (POU) prepare a **Wildfire Mitigation Plan (WMP)**, present it in a noticed public meeting, and accept comments; and

WHEREAS, PUC § 8387 also requires that the POU contract with a qualified independent evaluator experienced in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of the POU's **WMP**, who shall issue a report and present the report at a public meeting; and

WHEREAS, PUC § 8387 also requires that each POU update its plan annually and submit the update to the **California Wildfire Safety Advisory Board (WSAB)** by July 1 of each year; and

WHEREAS, by Resolution No. 19-10-09, adopted on October 17, 2019, this Board adopted SMUD's **WMP** and authorized the Chief Executive Officer and General Manager to make future changes to the SMUD **WMP** that further the primary purpose of the SMUD **WMP** and provide a net benefit to SMUD; and

WHEREAS, by Resolution No. 20-11-04, adopted on November 19, 2020, this Board adopted SMUD's 2021 **WMP**; and

WHEREAS, by Resolution No. 21-06-02, adopted on June 17, 2021, this Board adopted, as supplement to SMUD's 2021 **WMP** adopted on November 19, 2020, the **2021 Informational Response** and the **Wildfire Mitigation Plan Recommended Metrics**; and

WHEREAS, on June 30, 2021, staff submitted the 2021 **WMP** and supplemental documents to the **WSAB**; and

WHEREAS, in accordance with PUC § 8387, staff completed its annual update of SMUD's **WMP**, conducted public outreach to solicit comments on the draft **WMP** update, and contracted with **Brown & Kysar Inc. (BKI)** to assess the comprehensiveness of the **WMP** update; and

WHEREAS, on March 2, 2022, the **WSAB** issued its Guidance Advisory Opinion for the 2022 Wildfire Mitigation Plans of Electric Publicly Owned Utilities and Cooperatives which commended SMUD for an "exemplary description of comprehensive wildfire mitigation strategies"; and

WHEREAS, the draft 2022 **WMP** was made available for public review and comment from March 18, 2022, to April 18, 2022; and

WHEREAS, SMUD received no public comment on the draft 2022 **WMP** update; and

WHEREAS, **BKI** completed its independent evaluation and issued its report dated April 18, 2022, concluding that the SMUD 2022 **WMP** is comprehensive and meets all plan requirements set forth in PUC 8387(b); and

WHEREAS, the SMUD 2022 **WMP** and independent evaluator's report prepared by **BKI** were presented to the SMUD Board of Directors Policy Committee at a duly noticed public meeting on May 11, 2022, at which meeting opportunity for public comment was provided; **NOW, THEREFORE,**

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

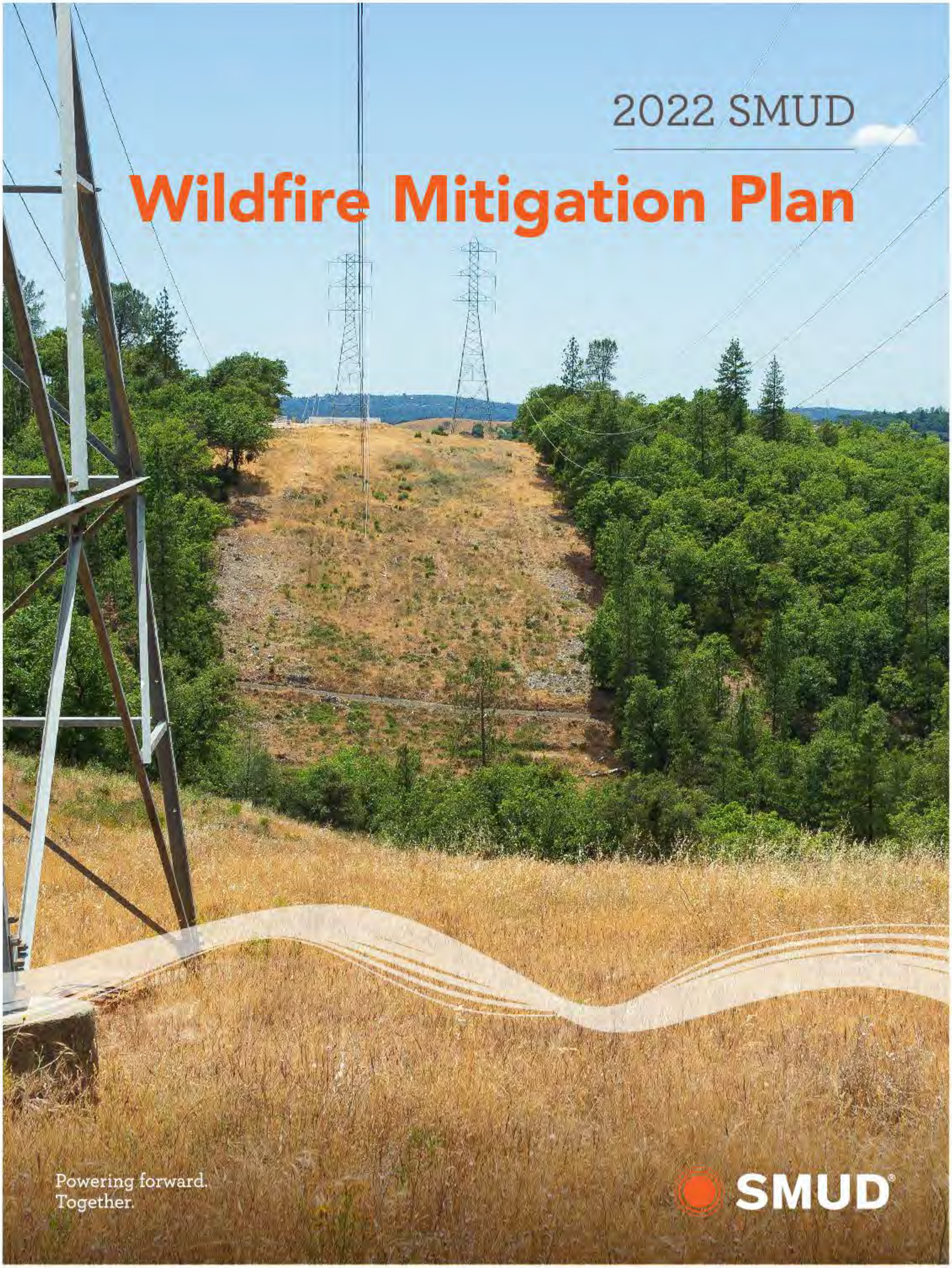
Section 1. This Board adopts the SMUD **2022 Wildfire Mitigation Plan (WMP)** substantially in the form set forth in **Attachment C** hereto and made a part hereof.

Section 2. The Chief Executive Officer and General Manager, or his designee, is authorized to make future changes to the SMUD **WMP** that, in his prudent judgment: (a) further the primary purpose of the SMUD **WMP**; and (b) are intended to provide a net benefit to SMUD.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

Attachment C
to Resolution No. 22-05-05



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1 Introduction

Over the last several years California has seen some of its most devastating and destructive wildfires. Climate change is recognized to be a large contributing factor (long hot spells, low moisture, etc.). This is the new (ab)normal, requiring a new way of thinking about wildfire mitigation planning.

In response, Senate Bill (SB) 901 authored by Senator Dodd, was enacted in 2018. SB901 requires all electric utilities to prepare a wildfire mitigation plan (WMP).

SB 901 amended Public Utilities Code (PUC) section 8387. Assembly Bill (AB) 1054 (Holden, 2019) further amended this statute. Section 8387 generally requires every publicly owned utility to construct, maintain, and operate its electrical facilities to minimize the risk of wildfire posed by those facilities. As amended by SB 901 and AB 1054 section 8387 more specifically requires every publicly owned utility to prepare a WMP and update it annually, with a comprehensive revision of the WMP not less than every three years.

The Sacramento Municipal Utility District (SMUD) Board of Directors adopted the initial WMP on October 17, 2019.

WMPs must include vegetation management (VM) programs, inspection and maintenance programs, protocols for deactivating automatic reclosers and for de-energizing power lines in severe weather conditions. The plans are required to identify priority customers, such as first responders and local agencies, health care providers, water and telecommunication facilities, groups that assist children, elderly, mobility impaired and other vulnerable populations, and include communication programs for those customers. The plans need to describe how service will be restored after a wildfire and include processes for (i) measuring the performance of the plan measures, (ii) identifying and correcting any deficiencies in the plan and (iii) auditing implementation of the plan.

This document outlines SMUD’s activities in accordance with these requirements.

SMUD

As one of the largest publicly owned, locally governed, electric utilities in California, SMUD serves over 640,000 customers in its 900 square mile service area in the Sacramento County area and operates a federally licensed hydroelectric project in El Dorado County known as the Upper American River Project (UARP). Based on a mutual agreement with PG&E, SMUD serves five PG&E customers from its UARP facilities and thirteen PG&E customers in Northern San Joaquin County.

SMUD has never experienced a catastrophic wildfire involving its facilities. SMUD's service area has a much lower wildfire risk profile than other areas in the State that have suffered destructive wildfires in recent years. When ignition events occur, they have historically been limited in scope. This is largely due to its more urban environment, flatter terrain, grasslands and other fuel sources outside forested areas and fewer wind events. Even in the UARP area SMUD is fortunate to have a lower risk environment.

Table 1 provides summary information to highlight SMUD's unique characteristics impacting its low wildfire risk. This information changes minimally each year and will be updated during SMUD's comprehensive plan review which occurs no less than every three years.

Table 1 Context Setting Information

Utility Name	SMUD	
Service Territory Size		
Owned Assets	X Transmission X Distribution X Generation	
Number of Customers Served		
Population Within Service Territory	Approximately 1.5 million people	
Customer Class Makeup		
	88.3% Residential; 1.5% Government; 0.4% Agricultural; 8.6% Small/Medium Business; 1.3% Commercial/Industrial	46.8% Residential; 6.6% Government; 0.7% Agricultural; 6.8% Small/Medium Business; 39.1% Commercial/Industrial
Service Territory		

Location/Topography[1]	29.5% Herbaceous 0.1% Shrub 37.9% Urban 2.3% Water
Service Territory Wildland Urban Interface[2] **(Based on total area)**	4.5% Wildland Urban Interface. 8.4% Wildland Urban Intermix:
Percent of Service Territory in CPUC High Fire Threat Districts (based on total area)	
Prevailing Wind Directions & Speeds by Season	☐ Includes maps CalFire provides the following description it its 2020 Unit Strategic Fire Plan Amador-El Dorado Unit (AEU): "Fire weather for AEU is typically dominated by three general weather phenomena; the delta push influence, north wind events, and east foehn winds caused by high pressure development in the Great Basin. All three weather conditions cause potential increases in fire intensity and size. The delta influence is the most common and surfaces frequently throughout summer. Typically, high pressure systems will dominate Northern California in the summer months bringing extremely hot and dry conditions *over* much of the region. As these systems develop, they will tend to yield near the Delta and Sacramento areas bringing the marine influence to the Unit. This is generally considered a good thing for fire behavior; slightly cooler afternoon temperatures and increases in relative humidity. The downside is the strong winds that typically accompany these patterns can override any benefit that may come from marine air. Typically, this type of wind will subside after sundown causing fire behavior to drop off dramatically. The other critical wind patterns that are difficult to predict for AEU are the Northerly and Easterly winds. They are relatively rare, and often are forecasted only the day before. Northerly or Easterly winds are typically warmer and drier than most other wind patterns due to air compression. These conditions provide the perfect environment for increased fire intensity and large fire growth. Fire growth is typically wind driven, however as these events recede, fire immediately returns to fuel/topography driven in opposing directions to the wind driven direction. This type of wind event is commonly referred to as a

[1] This data is based on the California Department of Forestry and Fire Protection, California Multi-Source Vegetation Layer Map, depicting WHR13 Types (Wildlife Habitat Relationship classes grouped into 13 major land cover types) *available at*: https://www.arcgis.com/home/item.html?id=b7ec5d68d8114b1fb2bfbf4665989eb3.

[2] This data is based on the definitions and maps maintained by the United States Department of Agriculture, as most recently assembled in *The 2010 Wildland-Urban Interface of the Conterminous United States*, *available at* https://www.fs.fed.us/nrs/pubs/rmap/rmap_nrs8.pdf.

	Santa Ana Wind in Southern California, and a foehn wind in the Sierra/Cascade Region." 2020 Unit Strategic Fire Plan Amador-El Dorado Unit, https://osfm.fire.ca.gov/media/j0zbdecg/2020-aeu-fire-plan.pdf]
Miles of Owned Lines Underground and/or Overhead	Overhead Dist.: 3,871.0 miles Overhead Trans.: 461.9 miles Underground Dist.: 6,663.6 miles Underground Trans.: 17.3 miles
	Explanatory Note 1 - *Methodology for Measuring "Miles":* [e.g., circuit miles, line miles.] Circuit miles.
	Explanatory Note 2 – *Description of Unique Ownership Circumstances:* None
	Explanatory Note 3 – *Additional Relevant Context:* [e.g., percentage of lines located outside service territory] See Table 4 on page 27 in SMUD's WMP.
Percent of Owned Lines in CPUC High Fire Threat Districts	*Overhead Distribution Lines as % of Total Distribution System*
	Overhead Transmission Lines as % of Total Transmission System (Inside and Outside Service Territory)
	Tier 2: 18.6% Tier 3: 11.4%
	Explanatory Note 4 – *Additional Relevant Context:* No Tier 2 or Tier 3 areas exist within SMUD's Service Area. SMUD's overhead facilities in the High Fire Threat District are part of its Upper American River Project (UARP) as described in the WMP (see, e.g., pages 26-28, including Table 4).
Customers have ever lost service due to an IOU PSPS event?	☐ Yes X No
Customers have ever been notified of a potential loss of service to due to a forecasted IOU PSPS event?	☐ Yes X No
Has developed protocols to pre-emptively shut off electricity in response to elevated wildfire risks?	X Yes ☐ No
Has previously pre-emptively shut off electricity in response to elevated wildfire risk?	X Yes ☐ No If yes, then provide the following data for calendar year 2020: *Number of shut-off events*: 0 *Customer Accounts that lost service for >10 minutes:* N/A *For prior response, average duration before service restored:* N/A

Note: Data collected in 2020/2021

1.1 Policy statement

SMUD's overarching goal is to provide safe, reliable, environmentally sustainable, and affordable electric service to its local community. In order to meet this goal, SMUD constructs, maintains and operates its electric system in a manner that minimizes any risk of catastrophic wildfire posed by its electrical lines and equipment.

1.2 Purpose

This WMP describes the range of activities that SMUD is taking to mitigate the threat of powerline- ignited wildfires, including its various programs, policies, and procedures. This plan is subject to direct supervision by SMUD's Board of Directors and primary responsibility for its implementation resides with the Chief Operating Officer (COO).

This plan meets or exceeds the requirements of PUC section 8387 for publicly owned electric utilities to prepare a WMP. Table 2 references relevant PUC sections that address each requirement.

Table 2 Plan compliance with Public Utilities Code 8387(b)

PUC 8387 Requirement	Description	Plan Section Number
b (2) (A)	An accounting of the responsibilities of persons responsible for executing the plan.	9.1.1
b (2) (B)	The objectives of the wildfire mitigation plan.	1.3
b (2) (C)	A description of the preventive strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	3
b (2) (D)	A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.	9.2
b (2) (E)	A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.	9.2.1
b (2) (F)	Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.	6.1.1, 7.2

b (2) (G)	Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities and operators of telecommunications infrastructure. The procedures shall direct notification to all public safety offices, critical first responders, health care facilities, and operators of telecommunications infrastructure with premises within the footprint of potential deenergization for a given event.	7.1, 7.2
b (2) (H)	Plans for vegetation management.	6.4
b (2) (I)	Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.	6.3
b (2) (J)	A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility's or electrical cooperative's service territory. The list shall include, but not be limited to both of the following:	4.3
b (2) (J) (i)	Risks and risk drivers associated with design, construction, operation and maintenance of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.	4.3
b (2) (J) (ii)	Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.	5.1
b (2) (K)	Identification of any geographic area in the local publicly owned electric utility's or electrical cooperative's service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire threat district based on new information or changes to the environment.	5.1
b (2) (L)	A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.	4.3
b (2) (M)	A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.	8
b (2) (N)	A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:	
b (2) (N) (i)	Monitor and audit the implementation of the wildfire mitigation plan.	9.3
b (2) (N) (ii)	Identify any deficiencies in the wildfire mitigation plan or its implementation and correct those deficiencies.	9.3.2

b (2) (N) (iii)	Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes or commission rules.	9.2.1
b (3)	The local publicly owned electric utility or electrical cooperative shall present each wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies and interested parties, and shall verify that the wildfire mitigation plan complies with all applicable rules, regulations, and standards as appropriate.	10
C	The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on the internet web site of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility's or electrical cooperative's governing board.	10

1.3 Objectives

The primary objectives of this WMP are to:

1. Minimize the probability that SMUD's transmission and distribution (T&D) system may be the origin or contributing source for the ignition of a wildfire;
2. Implement a wildfire mitigation plan that embraces safety, prevention, mitigation and recovery as a central priority for SMUD; and
3. Create a WMP that is consistent with state law and objectives.

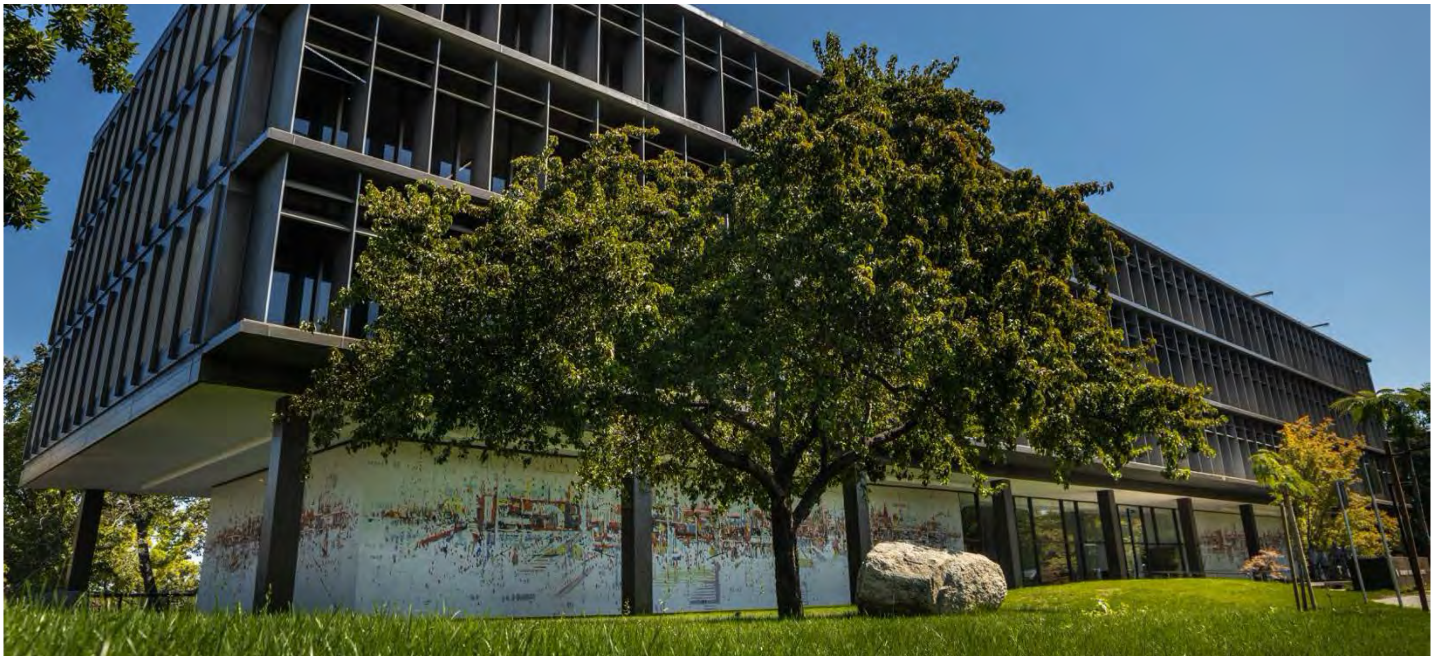
SMUD has evaluated prudent and cost-effective improvements to its physical assets, operations and training that help meet these objectives.

The secondary objective of this WMP is to improve the resiliency of SMUD's line construction standards and practices. As part of developing this plan, SMUD assesses new industry practices and technologies that will reduce the likelihood of an interruption in service and improve restoration. In addition, SMUD reviews available fire investigation reports for fires throughout California to understand root causes that can be addressed.

This WMP outlines the actions SMUD is taking, including exploring new technologies, to reduce the risk of potential wildfire-causing ignitions associated with SMUD's electrical infrastructure, with the objective of. enhancing public safety and improving grid reliability.

This WMP also outlines customer outreach and communication programs for customers that may be impacted in the unlikely event of a wildfire related de-energization. SMUD's long standing and continued cooperation with local agencies are also outlined.

This WMP provides methodologies to measure the effectiveness of specific wildfire mitigation strategies and how those strategies measurably reduce the risk of catastrophic wildfire. Where a particular action, program component, or protocol is determined to be unnecessary or ineffective, SMUD will assess whether a modification or replacement is merited. This plan will also help determine if more cost-effective measures would produce the same or improved results.

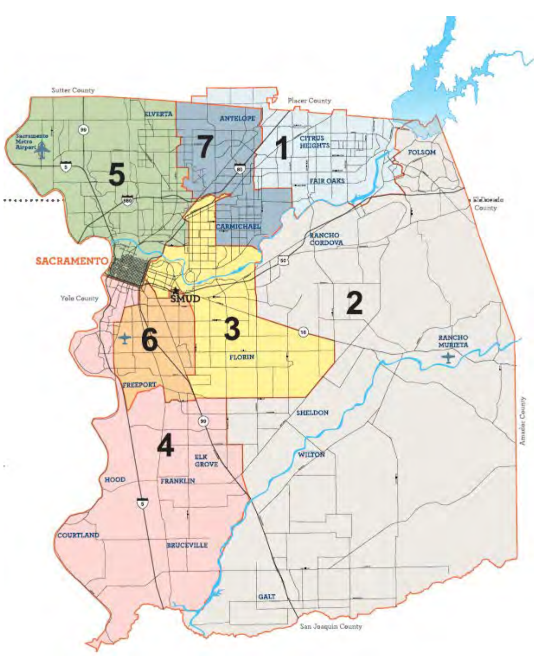


2 SMUD

2.1 SMUD profile

Headquartered in Sacramento, California, SMUD owns and operates an electric system that has provided retail electric service since 1946. SMUD generates, transmits, and distributes electricity within a 900-square-mile territory that includes the principal parts of Sacramento County, and a small adjoining portion of Placer County (see Figure 1).

Figure 1 Map of SMUD's service area



SMUD is one of the largest community-owned electric utilities in the nation, recognized internationally for its innovative energy efficiency programs and use of renewable power technologies. As a publicly owned utility, SMUD is governed by a seven-member popularly elected Board of Directors that determines policy and appoints the Chief Executive Officer and General Manager who is responsible for SMUD's overall management and operations.

SMUD owns, operates, and has ownership interests that are critical to maintaining the flow of power from generating facilities through the transmission lines to SMUD's service area. These assets are located in the geographic areas of Sacramento, El Dorado, Solano and Placer counties.

2.2 The service area

SMUD is the primary electric distribution service provider within an area of approximately 900 square miles in central California. The service area includes the State Capital, Sacramento, the populous areas principally to the northeast and south of the City of Sacramento and the agricultural areas to the north and south.

SMUD's electric system supplies power to a population of approximately 1.5 million. As the capital of the nation's most populous state, Sacramento benefits from the historically stabilizing influence of a large government sector. Sacramento is home to the State government headquarters, the Sacramento County seat, the city government and various special districts that combine to make government the largest single employment sector in the Sacramento area. Information technology, transportation, education and health services, leisure and hospitality, and construction serve as the other major sectors of employment and industry in the area.

2.3 The electric system

SMUD owns and operates a vertically integrated electric system that includes generation, transmission and distribution facilities.

SMUD supplies power to its bulk power substations through 230 kilovolt (kV) and 115 kV transmission systems. This system transmits power from SMUD's generation plants and interconnects with Pacific Gas & Electric (PG&E) and the Western Area Power Administration (WAPA). Power is distributed throughout Sacramento County via a 69 kV sub-transmission system except for the City's downtown area, which is served from the 115 kV transmission systems. The downtown area is served from 115/12 kV and 115/21 kV substations. The distribution system serving the remainder of SMUD's service territory is comprised of 69/12 kV and 69 kV substations with overhead and underground distribution circuits.

SMUD's record peak load of 3,299 MW occurred on July 24, 2006. Current and historical load statistics can be found at our website: www.smud.org/en/Corporate/About-us/Company-Information/Reports-and-Statements

2.4 Company purpose and vision

SMUD's Board of Directors has established the following mission and vision statements: "SMUD's purpose is to enhance the quality of life for our customers and community through creative energy solutions. SMUD's vision is to be the trusted partner with our customers and community, providing innovative solutions to ensure energy affordability and reliability, improve the environment, reduce our region's carbon footprint, and enhance the vitality of our community."[3]

2.5 Goals and objectives

For more than seventy years, SMUD has provided safe, reliable, and affordable electricity, excellent customer service, community value, innovation and environmental leadership to its customers.

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[3] https://www.smud.org/en/Corporate/About-us/Company-Information/Strategic-Direction, July 15, 2019.

The Board has adopted a set of Strategic Directions (SD) with related metrics, which it considers essential in the continued success of the organization and its service to its customers. These include safety, reliability, competitive rates, enterprise risk management (ERM), access to credit markets, customer relations, environmental leadership, and resource planning. SMUD's Board SDs are used as a guide in the decisions made about SMUD's policies and operations. The Board continually reviews and refines these guidelines to make sure it meets its customer's energy needs both now and in the future.
Some of the general elements in SMUD's business strategy are[4]:

- Safe and reliable energy and environmental protection: Developing and maintaining a sustainable and reliable power supply to meet peak demand growth consistent with state mandates for renewable energy and reduced carbon emissions.
- Customer and community services: Working closely with customers to provide the information, tools and incentives to assist them to manage energy use more efficiently, which will contribute to meeting greenhouse gas (GHG) emission targets and managing peak demand requirements.
- Long term financial stability: Managing price, volumetric and credit risks associated with energy and natural gas procurement and SMUD's finances to meet funding needs and maintain fair and reasonable energy rates.
- Workforce planning & development: Attracting, developing and retaining an inclusive, skilled and engaged workforce that reflects SMUD's values and is committed to achieving SMUD's mission.
- Operational independence and local control: Retaining local decision-making authority and operational independence.
- Community and Collaboration: Collaborating regionally to attract new businesses and grow existing business to diversify and strengthen the Sacramento economy.
- Long-term infrastructure investment: Maintain and improve SMUD's infrastructure in a cost-effective manner to ensure sustainable delivery of reliable energy and address economic and environmental concerns.
- Risk management: Maintain an ERM program designed to act as an early warning system to monitor changes in, and the emergence of, risks that could impact SMUD's business objectives.

[4] https://www.smud.org/en/Corporate/About-us/Company-Information/Strategic-Direction, July 15, 2019.

3 Overview of preventive strategies and programs

This WMP addresses the preventive strategies and programs adopted by SMUD to minimize the risk of its electrical lines and equipment causing a catastrophic wildfire. The strategies and programs included in the WMP are evolving and are subject to change. As new technologies, practices and networks develop, and other environmental influences or risks are identified, changes to address them may be incorporated into future iterations of the WMP which is, in effect, a living document.

This WMP integrates and interfaces with various operating policies and asset management and engineering principles which are themselves subject to change. As appropriate, the current version of documents are incorporated either as appendices to this WMP or by reference.

The following is a summary of SMUD's programs and activities that support wildfire prevention and mitigation.

Table 3 Mitigation programs/activities

Design and construction
Ester-based insulating fluid in transformers
Non-expulsion equipment in Pole Clearing Area (PCA) and UARP 4kV
Light Detection and Ranging (LiDAR) Ortho, Oblique Imagery
Potential installation of fire monitoring cameras on towers in the UARP transmission corridor
Increase overhead wire spacing to reduce wire to wire contact
Pole loading and placement
Pole replacement and reinforcement
Construction fire prevention program
UARP 4kV circuit breaker upgrade
Inspection and maintenance
Transmission line ground patrols
Transmission line splice assessment program
Transmission and distribution vegetation right-of-way maintenance
Distribution detailed line inspections
69 kV and Pole Clearing Area 12 kV IR inspections (helicopter)
LiDAR inspection of transmission for Vegetation Management
IR inspection of energized overhead T&D facilities and equipment
Detailed inspection of T&D facilities and equipment
Supplemental inspections of high fire risk areas
On-ground routine inspection

Operational practices
Disabling reclosing during fire season
Transmission and distribution system vegetation management maintenance patrols and work (tree pruning & removal) as needed for safety and reliability
De-energization protocols and notifications
Hotworks procedures
Work procedures and training for persons working in locations and conditions of elevated fire risks
Safety and physical security protection teams
Existing relationship with local government and fire safe councils
Provide liaison to county office of emergency services' (OES) during fire event
Targeted communications plan
Shade Tree Program
High fire threat district vegetation management inspection strategy (annual)
Expanded subject pole clearing
Patrol and pruning/Tree removal, quality control
Situational/conditional awareness
Coordinate and collaborate with Fire Safe Councils and County Office of Emergency Services throughout the year to prepare for RFW and high fire risk events
Monitor daily California Department of Forestry and Fire Protection website and active fires in California
Response and recovery
Critical event communications process and procedures
Emergency response plan
Field operations recovery procedures
California Independent System Operator (CAISO) coordination

4 Risk analysis and risk drivers

SMUD uses its existing ERM framework to identify and assess enterprise level risks. SMUD's ERM framework takes into consideration both quantitative and qualitative factors to determine the level of inherent and residual levels of a particular risk. An inherent risk level refers to the risk before any mitigations or controls are in place while the residual risk level refers to the risk after all mitigations and effective controls are considered.

4.1 Enterprise risk assessment

The ERM framework has a strong governance structure stemming from SMUD's Board of Director's Strategic Direction and overseen by an executive body, the Enterprise Risk Oversight Committee (EROC). The framework requires that all enterprise risks be owned by an Executive and managed at the Director level.

The ERM framework is a 5-step process and is integrated with SMUD's internal audit process to check for assurance of proper control implementation. The framework requires continuous communications and consultation throughout the life of the risk. The 5-step ERM process is shown in Figure 2 below. Figure 3 describes the objective of each step.

Figure 2 SMUD's enterprise risk management process

SMUD Strategy & Objectives

Figure 3 ERM 5-step process

Identify	• Find, recognize and describe risks • Identify all hazards, threats and opportunities
Analyze	• Comprehend the nature of risk and determine the level of risk • Bow-tie analysis
Plan & Evaluate	• Compare results of risk analysis with criterias • Prioritize risks
Respond	• Modify risk by developing control plans • Implement control plans
Monitor & Review	• Continue to monitor risks and contros • Review and improve ERM framework • Risk reporting

During a risk evaluation, the Director, manager, stakeholders, and subject matter experts (SMEs) are consulted. ERM staff gathers pertinent information to conduct the evaluation which includes a root cause analysis. Information gathered includes key risk drivers, key risk impacts, mitigations, processes, procedures, controls, and internal/external risk trend. SMUD uses a commonly used framework called the bow-tie method for its root-cause analysis. This method allows easy visualization of the relationship between the risk event, its drivers, and impacts, as well as preventive and mitigation activities. In addition, the method also allows for a structured risk analysis where quantification is not possible or desired. SMUD's ERM framework takes into consideration impacts to SMUD's finances, legal, regulatory and compliance, operations, reputation, public safety, and workforce.

4.2 Climate change

The National Aeronautics and Space Administration (NASA) defines climate change as the change in the usual weather conditions and patterns found in a region.[5] More specifically, it is a change in the average weather conditions such as temperature, rainfall, snow, ocean, and atmospheric circulation, or in the distribution of weather around the globe. According to NASA, scientists think that the Earth's temperature will keep increasing for the next 100 years. "This would cause more snow and ice to melt. Oceans would rise higher. Some places would get hotter. Other places might have colder winters with more snow. Some places might get more rain. Other places might get less rain."[6]

California has already been experiencing the impacts of climate change including prolonged droughts, increased coastal flooding and erosion and tree mortality. The state has also seen increased average temperatures, more extreme heat days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level and precipitation patterns, the intensity of extreme weather events is also changing. Extreme weather events and resulting hazards, such as heat waves, wildfires, droughts, and floods are already being expected.[7]

California's Fourth National Climate Assessment issued in November 2018 says that "climate change is expected to increase the frequency and intensity of wildfires," consistent with many expert predictions that climate change would increase the risk of large and severe wildfires, including a potential increase in the total area burned.[8]

A number of climate-related factors have contributed to the increasing risk of wildfires. The severity of wildfires is generally a function of the condition of the combustible vegetation material involved, terrain or setting and weather conditions. Tree stress and mortality, including damage due to insect infestations such as the bark beetle exacerbate fire hazards creating a tinderbox, providing an environment for catastrophic fires. In addition, as air temperatures rise, forests and land are drying out, also increasing fire risks, and creating weather conditions ripe for fire ignition and expansion.

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[5] Source: https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html
[6] Source: https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html
[7] California's Fourth Climate Change Assessment, January 16, 2019. http://www.climateassessment.ca.gov/state/
[8] California's Fourth Climate Change Assessment, January 16, 2019. http://www.climateassessment.ca.gov/state/

Fire season in much of California has historically extended from early spring through the late fall, due to the dry and hot nature of these months. As a result of the extreme weather conditions and other impacts from climate change as well as the increase in population density and development in the wildland-urban interface (WUI), there's a growing need for year-round fire prevention and preparedness.

4.3 Enterprise safety and wildfire risk

Following SMUD's ERM assessment process, Subject Matter Experts (SMEs) were consulted in conducting a bow-tie analysis for wildfires which could potentially involve SMUD equipment. The SMEs focused on potential causes of powerline sparks that could start a fire. The bow-tie analysis was conducted to identify SMUD's vulnerabilities, exposure to and impacts from a wildfire as well as to identify current controls and mitigations to prevent wildfire occurrence, velocity, and impact.

Figure 4 provides the risk bow tie, which summarizes the assessment process.

Figure 4 SMUD's wildfire risk bow tie. Drivers and impacts are indicators that a risk event could occur, not a reflection of actual or threatened conditions

Key Risk Drivers	Triggering Event	Key Risk Impacts
Contact from object		
Animal		
Mylar balloons		
Unspecified		Reliability
Vegetation		
Vehicle		Financial
Equipment/Facility Failure		
Capacitor Bank		Compliance
Conductor		
Crossarm	**Wildfires** involving SMUD equipment	Infrastructure/property damage
Fuse		
Insulator		Local agency
Splice/Clamp/Connector		
Transformer		Environmental and ecological
Unspecified		
Wire to wire contact/contamination		Reputational
Weather		
Other		Customer and community
Unknown		
Third party acts/vandalism		
Acts of SMUD		

4.3.1 Fire risk drivers

Powerline equipment is generally the same across the utility industry, where a small niche of manufacturers and suppliers are used to procure equipment for construction of facilities. Slight variances in design and construction may be expected between utilities. SMUD staff evaluated other utilities' fire causes and applied its own field experience to determine the potential risk drivers. Four categories were identified as potential for causing powerline sparks and ignitions:

- Contact from objects
- Equipment/facility failure
- Wire-to-wire contact/contamination
- Other

SMUD staff identified the following drivers associated with each category. These are discussed below but may not be limited to the following.

4.3.2 Contact from objects

Most overhead powerlines throughout the world are installed as bare wire on top of insulated poles and structures. Overhead powerlines are kept at a certain distance from the ground and from adjacent objects, based on the voltage level and applicable design criteria, to prevent contact and faults. However, with thousands of miles of overhead powerlines, contacts from objects are anticipated by utilities and can occur throughout the year.

Animals and highly conductive mylar balloons are some of the objects that can contact powerlines, resulting in possible sparks and arcs. While protection equipment such as circuit breakers, reclosers and fuses are installed to isolate the faults, there are time delays (within fractions of a second or seconds) associated with when the equipment senses the fault and proceeds to isolate (or "trip") the faulted section. The time delays are instant to the human, but not quite fast enough to prevent all sparks prior to tripping. Emitted sparks, molten metal or burnt foreign objects can fall on -- and potentially ignite -- any fuels underneath or near the powerline.

Vegetation such as trees, branches, palm fronds, etc., from inside and outside of powerline pathways can contact powerlines at any time, also resulting in possible sparks or arcs. Sometimes, the stress of contact is large enough to cause a connector or pole to fail, which will lead to wires falling and touching the ground. In some instances, the tree or branch may continue leaning on the powerline and continue sparking or catch on fire due to resulting sparks.

Additionally, vehicles contacting poles or supporting guy wires can damage or break the pole. The heavy, broken pole in turn can put too much stress on connectors or crossarms and cause wires to break and fall to the ground potentially emitting sparks and arcs.

4.3.2.1 Equipment failure

All man-made equipment fails at some point or another during its life. Failure modes can be discrete (internal) or destructive (materials ejected). Failure components such as hot line clamps, connectors and insulators can result in wire failure and cause the wire to fall to the ground. The energized conductors can emit sparks prior to breaker or fuse tripping/isolating. Transformers and capacitor banks can have internal shorts that can potentially be destructive and eject materials which could create a spark, leading to a fire.

4.3.2.2 Wire-to-wire contact/contamination

When two or more energized conductors contact each other, they will cause sparks and possible material to be ejected. There are many factors that could lead to such an occurrence. Any type of shaking of the pole or high winds may cause the powerlines to sway and touch. A shaking pole can be caused by vehicle contact or livestock rubbing against a pole or supporting guy wires. Certain types of faults (shorts) down the line can cause powerlines to gallop (bounce and buck).

Contamination on insulators can create a path for electricity to flow. This unintended path can track and cause a fault. Typical causes are ash, dust, debris and bird excrement on the insulator. These causes can usually be determined by burn marks along the insulator.

4.3.2.3 Other

SMUD's powerlines traverse through many parts of its service territory, including residential properties, along road rights-of-way (ROW), within business parking lots, etc.

Non-SMUD equipment and construction projects could be a possible cause of ignition. Even though property owners and contractors take precautions, their equipment can contact powerlines and cause sparking triggering fires in the vicinity. Although unintentional, these contacts may cause damage to powerlines, poles and supporting equipment which may cause sparks and trigger fires in the vicinity.

SMUD equipment can also be vandalized and damaged, which may cause sparks and fires.

SMUD takes pride in a properly trained and well-informed workforce. Crews perform switching, construction, and maintenance on facilities daily. However, the tools and vehicles they use can be sources of sparks or ignition. For example, driving a truck over dry grass/brush can cause the dry grass/brush to ignite. As such, SMUD trucks are equipped with fire suppression equipment and staff are properly trained to respond to an ignition and in the use of the fire suppression equipment.

During RFW periods in the UARP, crews working in remote sites limit hot-work (such as welding, grinding, cutting etc.) to prevent an ignition. As a precaution, designated staff assigned as a fire-watch, may stay behind after work completion for up to thirty minutes to ensure a fire does not start after work crews leave a remote site. In particular, SMUD's VM contract crews have on-site fire suppression equipment, ex. fire rake, water backpack and shovels. On remote sites where a masticator is being used, crews have a 200 gallon or greater water tank on hand for fire suppression and perform a one-hour fire watch after work is complete.

4.4 Key risk impacts

If one of the risk drivers listed above were to occur, resulting in a fire ignition or wildfire incident, there could be many potential consequences. The worst-case scenarios could include:

- Personal injuries or fatalities to the public, employees and contractors
- Damage to public and/or private property
- Damage and loss of SMUD owned facilities and assets
- Impacts to reliability and operations
- Damage claims and litigation costs, as well as fines from governing bodies
- Damage to SMUD’s creditworthiness, or ability to borrow money or purchase insurance
- Environmental and ecological damage
- Damage to SMUD’s reputation and loss of public confidence
- Customer and community impacts
- Bankruptcy

SMUD recognizes the impacts that wildfires can have on the company, community and local economy.

4.5 Tabletop Exercise

SMUD regularly conducts tabletop exercises (TTXs) to test, analyze and enhance the current level of SMUD’s internal and external coordination and expertise in responding to potential wildfire threats related to SMUD’s utility system facilities. The TTXs are used to enhance general internal awareness, test SMUD standard emergency operating plans and procedures in the wildfire context, invite collaboration with our public safety partners and community partners, and provide an opportunity to rehearse emergency practices in a simulated environment. The TTX's operational objectives are developed to evaluate SMUD's core response capabilities in three specific areas: (1) wildfire preparedness/mitigation, (2) emergency notification and response, and (3) short-term recovery operations and procedures.

SMUD utilizes the Homeland Security Exercise and Evaluation Program (HSEEP) principles for its exercise program management, exercise design, development, evaluation, and improvement planning processes. Each exercise program provides for analysis of data collected during the exercise as well as feedback obtained from relevant stakeholders to inform improvement planning.

Most recently SMUD hosted Tabletop Exercises in April 2021 and April 2022. External agencies, including local fire, law enforcement and emergency services serving communities within the design scenario were invited to participate. Strengths in the following areas were identified: relationships with local emergency response agencies, coordination between the SMUD EOC and local agencies, information-sharing, and clarity of SMUD’s response procedures and Wildfire Mitigation Plan. Where appropriate, recommendations for further collaboration and information sharing processes were developed.

5 SMUD's asset overview

SMUD provides electricity to its customers via substations and T&D line assets. Table 4 depicts a high-level description of SMUD's T&D assets.

Table 4 Asset description

Asset Category	Asset Description
Transmission line assets	Assets include conductor, transmission structures and switches operating at or above 115 kV (lines that are tied to generation are considered transmission regardless of operating voltage).
Distribution line assets	Assets include overhead conductor, underground cabling transformers, voltage regulators, capacitors, switches, line protective devices and street lighting operating at less than 69 kV (all 69 kV lines not tied to generation are considered distribution).
Substation assets	Assets include major equipment such as power transformers, voltage regulators, capacitors, reactors, protective devices, relays, open-air structures, switchgear and control houses.

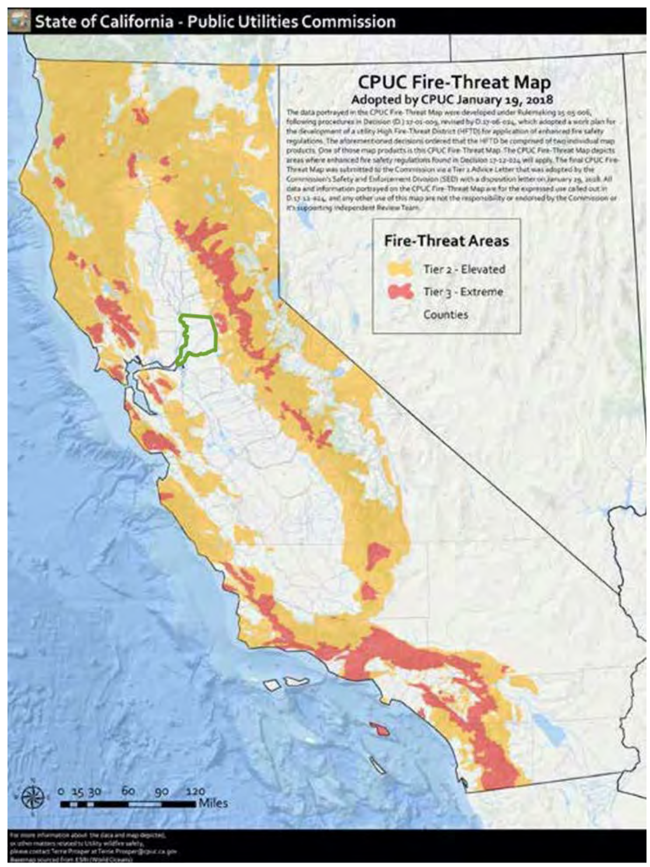
5.1 Fire threat assessment in SMUD service territory

5.1.1 CPUC high fire threat district (HFTD)

SMUD directly participated in the development of the CPUC's Fire-Threat Map[9], which defines a statewide high fire threat district (HFTD). SMUD has incorporated the HFTD map into its construction, inspection, maintenance, repair and clearance practices, where applicable.

In the HFTD map development process, SMUD served as a territory lead, and worked with utility staff and local fire and government officials to identify whether any areas within SMUD's service territory are at an elevated or extreme risk of powerline ignited wildfire. It was determined through that process and affirmed by both a peer review and a team of independent nationwide experts led by the California Department of Forestry and Fire Protection (CAL FIRE), that SMUD's service area is properly situated outside the HFTD. Outside of its service area SMUD's UARP facilities, including approximately 3 miles of 4kV power lines are situated within both Tier 2 and Tier 3 of the HFTD. Based on these processes, the existing environment and current information, SMUD believes that the HFTD map appropriately identifies the level of wildfire risk within SMUD's service territory and UARP. SMUD will continue to evaluate factors that may indicate the CPUC should expand the HFTD to include additional areas.

Figure 5 SMUD's territory within CPUC Fire-Threat Map



The CPUC Fire-Threat map identifies Tier 3, extreme fire risk, Tier 2, elevated fire risk, and areas outside of the HFTD. Figure 5 depicts the CPUC Fire-Threat Map and SMUD's location within the map.

SMUD's assets are located both within HFTD areas (including Tier 2 and 3) and areas not deemed within the HFTD (referred to as non-tier or outside HFTD in this document). Approximately one quarter of SMUD's 469 overhead circuit-miles are located within the HFTD. with approximately 10% located within Tier 3 ("Extreme Fire Threat"). None of SMUD's 244 substations are located within the HFTD. Table 5 shows the breakdown of SMUD's T&D assets by HFTD tiers.

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[9] Adopted by CPUC Decision 1-12-024.

Table 5. Overview of SMUD's T&D assets in CPUC HFTD tiers

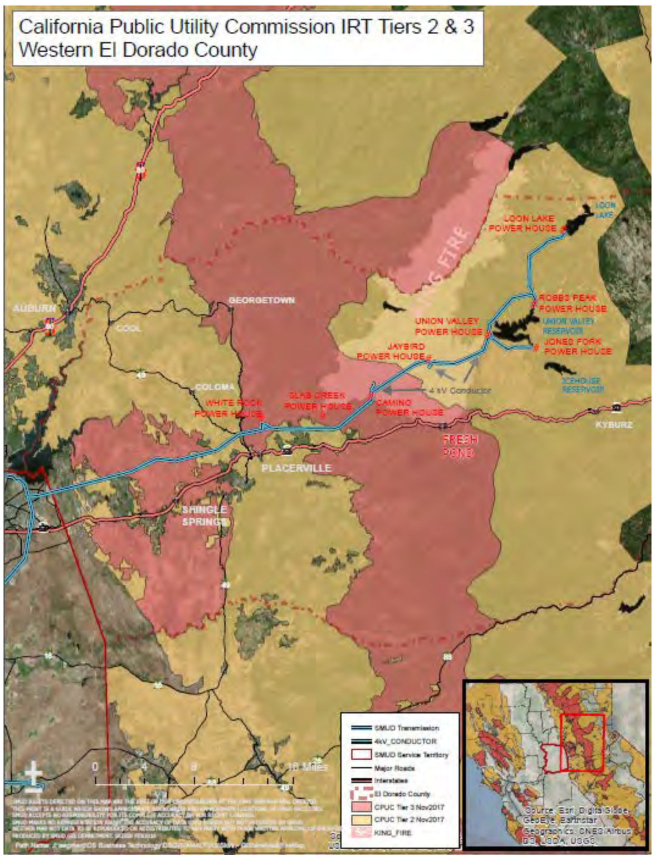
Asset	Total	Outside HFTD		Tier 2		Tier 3	
	Circuit-miles	Circuit-miles	%	Circuit-miles	%	Circuit-miles	%
Total OH transmission	469	326	69%	89	19%	55	12%
12 & 21 kV (Generation tie lines)							
69 kV							
115 kV							
230 kV							
Total OH distribution	3870	3869	100%	<1	<1%	0	0
Total OH T & D circuit-miles	4339	4195	97%	89	2%	55	1%
	Total No.	Outside HFTD		Tier 2		Tier 3	
Total load serving substations	244	244	100%	0	0%	0	0%

Notes:

- All Tier 2 and Tier 3 facilities are in the UARP area, outside of SMUD's electric service territory.
- Values rounded to nearest mile

Figure 6 below shows the UARP area where all of SMUD's Tier 2 and Tier 3 assets are located.

Figure 6 CPUC Tier 2 and Tier 3 areas for SMUD's UARP



5.1.2 CAL FIRE Fire Resource and Assessment Program (FRAP)

CAL FIRE publishes multiple maps related to fire threat throughout the state. The Fire Hazard Severity Zone (FHSZ)[10] map is one which SMUD staff has relied on for many years to plan maintenance activities. CAL FIRE is in the process of updating this map. In addition, a new Fire Threat[11] map was published in December 2019. SMUD will incorporate information from the 2019 map into SMUD's mitigation programs as needed. The new FHSZ map will trigger a similar analysis when published. Program adjustments will be noted in the next revision of the WMP.

Although SMUD takes CAL FIRE's FHSZ mapping into consideration as part of its wildfire mitigation planning, SMUD's Wildfire Mitigation Plan references the CPUC Fire Threat Map that focuses on the risk of utility associated wildfires[12].

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[10] https://egis.fire.ca.gov/FHSZ/
[11] https://frap.fire.ca.gov/media/10315/firethreat_19_ada.pdf
[12] www.cpuc.ca.gov/firethreatmaps, July 19, 2019.

6 Wildfire prevention strategy and program

SMUD has a robust set of measures to address potential wildfire risks. The WMP will incorporate existing efforts and identify the process moving forward to supplement them where a need is identified.

SMUD regularly coordinates with local fire agencies and other first response agencies. It also participates with emergency operations activities in its system areas. SMUD has robust Vegetation Management (VM) programs with accelerated and targeted VM work (pruning & removal) cycles and is using enhanced technologies including LiDAR and Ortho Imagery (these technologies can help identify diseased trees and trees that are a risk to SMUD facilities). It also has robust inspection and maintenance programs that include traditional aerial patrols with helicopters, IR inspections using helicopters (which can detect heat from power equipment before an event occurs) and regular ground inspections of all facilities (including core testing of the wood poles).

SMUD is exploring potential system improvements such as the use of non-sparking equipment in key areas (e.g., use of CAL FIRE exempt fuses), replacing wood poles with steel or ductile iron in certain cases and the use of covered conductor alternatives.

SMUD has initiated multiple projects to underground 4kV distribution lines in the UARP. SMUD has protocols for disabling automatic reclosers and for de-energizing lines to protect public safety. Some conditions that factor into these protocols include: RFW, forecasted temperatures above 100°F, winds exceeding design standards and low humidity. It also has an Outage Communications Plan that addresses potential de-energization events. SMUD will include targeted messaging for affected areas that will set expectations and identify support resources. See the following table for activities that address key wildfire risk factors.

Table 6 Activities that address wildfire risk factors

Risk factor	Activity
Equipment/ facility failure	
Wire to wire contact	Weather station and monitoring

6.1 Distribution grid operational practices

6.1.1 Disabling reclosing during fire season

SMUD has procedures for the operation of reclosers. For the purposes of those procedures, fire season is defined as:

- May 1 to October 1, or
- RFW in effect for areas inside or immediately surrounding the PCA

SMUD disables automatic reclosing on certain substation and line reclosers that extend into the PCA. In some cases, the line reclosers are completely bypassed with fuses if automatic reclosing cannot be disabled. On circuits where line reclosers are bypassed, the fuses provide protection to the end of the line. Due to climate change, the dry summer season is extending further into the year. Reclosing will remain disabled until the first major rain event in the service territory. See Figure 8 for graphic of the PCA.

6.1.2 Planned de-energization during fire season

During fire season, SMUD has elected to take certain measures to mitigate the risk of wildfires in the PCA, that could potentially migrate to the HFTD areas. When weather conditions that precede wildfires are forecasted and a wildfire threat is imminent, SMUD's Distribution System Operations (DSO) personnel have the authority to de-energize select distribution circuits in the PCA. DSO personnel will use individual or multiple de-energization triggers listed below, as well as power system knowledge and potential community impacts to make de-energization decisions. This decision requires a balancing of all these factors as well as a knowledge of the area and operation of the power system. No single trigger is determinative. DSO relies on weather data from various sources, including Wunderground.com and SMUD's internal Energy Management System.

Triggers for de-energization of PCA circuits:

- Imminent fire danger
- Customer or community impacts
- A RFW declaration by National Weather Service in effect for areas inside or immediately surrounding the PCA
- Critically dry vegetation that could serve as fuel for a wildfire
- Low humidity levels
- Temperatures over 100ºF
- Winds projected beyond 12kV design criteria (56 mph)
- Mandatory fire orders in effect (as directed by any Agency Incident Commander)
- On-the-ground, real-time observation from SMUD or other agency field staff

SMUD's DSO personnel have the authority to de-energize portions of the distribution grid during emergency conditions when requested by local police or local fire officials. These are handled individually, and don't fall under PUC 8387 requirements.

6.2 Transmission grid operational practices

6.2.1 Disabling reclosing

All Valley 115 kV, 230 kV and UARP 69 kV, 230 kV transmission auto reclosers are disabled and will remain disabled to mitigate wildfire risks.

6.2.2 *Planned de-energization during fire season*

SMUD's Power System Operators (PSO) have the authority to de-energize portions or all of the Valley and UARP transmission line(s) for safety, reliability, conditions beyond design criteria, threat of wildfires and during emergency conditions when requested by local law enforcement or fire officials. Per existing protocols, planned de-energizations are coordinated with interconnected agencies.

During active fire season as declared by CAL FIRE the PSO is authorized to de-energize portions or all of the Valley and UARP transmission line(s) when there is imminent fire danger, mandatory fire orders are in effect, and/or the transmission system is experiencing conditions beyond design criteria. The PSO will take a combination of many factors into consideration when implementing de-energization procedures, which include the triggers listed below, as well as power system knowledge and potential community impacts. De-energization decisions require a balancing of all these factors as well as a knowledge of the area and operation of the power system. No single element is determinative.

- Extreme fire danger threat levels, as classified by the National Fire Danger Rating System
- A RFW declaration by the National Weather Service
- Low humidity levels lower than what is required for an RFW
- Sustained winds exceeding design standards
- Site-specific conditions such as temperature, terrain, and local climate
- Critically dry vegetation that could serve as fuel for a wildfire
- On-the-ground, real-time observation from SMUD or other agency field staff

The PSO utilizes various operational and situational awareness tools to determine when de-energization is appropriate. The tools are listed below:

- Weather data telemetered into SMUD's Energy Management System, such as wind speed, wind direction, air temperature, barometric pressure, and relative humidity
- US Forest Service – Wildland Fire Assessment System, https://www.wfas.net/
- CAL FIRE Incidents Information, http://cdfdata.fire.ca.gov/incidents/incidents_statsevents
- CAL FIRE California Statewide Fire Map: https://www.fire.ca.gov/incidents/
- National Weather Service: https://www.weather.gov/
- Indji Watch real time operational tool
- Geographic Information System (GIS) based tools
- ALERTWildfire: http://www.alertwildfire.org/tahoe/index.html
- NOAA/National Weather Service Storm Prediction Center: https://www.spc.noaa.gov/
- National Significant Wildland and Fire Potential Outlook, https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

6.3 Infrastructure inspections and maintenance

SMUD performs a multitude of time-based inspections on its T&D facilities. A description of the inspections is summarized in the following sections.

6.3.1 Transmission line inspections

SMUD's transmission lines are grouped in two inspection areas. UARP region includes all lines east of Folsom going up to the hydroelectric facilities in the Sierra. The Valley region comprises of all transmission lines in SMUD's service territory.

6.3.1.1 Aerial patrols (helicopter)

SMUD uses helicopters to perform aerial inspections of transmission lines. During these patrols, line inspectors inspect the condition of line structures and attachments, any structural problems and safety hazards, damage to insulators, vibration dampers, hardware, conductors, static shield wires, optical ground wires, signs of hot spots, potential vegetation concerns and tower identification signs (aerial signs).

Aerial patrols are performed twice a year on all lines in the UARP and once a year in the Valley.

6.3.1.2 Ground patrols

Line inspectors use a combination of walking and driving when conducting ground patrols. They visit transmission tower sites to make detailed visual inspections and on occasion they complete IR inspections. The line inspectors utilize binoculars to detect any damage to above ground components. Line inspectors may climb towers identified with severe corrosion or deformation to determine the corrective action required.

Ground patrols are performed annually on all lines in the UARP, and every two years on all lines in the Valley.

6.3.1.3 IR inspections (helicopter)

The line inspectors use IR cameras to inspect transmission lines as part of one of the helicopter patrols. An IR camera is used to identify "hot spots" on current carrying components of the transmission line. Hot spots could be an indication of loose connections that may fail. The images are saved, and written reports are prepared, which document the conditions found. The documentation identifies the location, problem found, date and time of the IR inspection.

IR inspections are performed annually on all lines in the UARP, and every two years in the Valley.

6.3.1.4 Wood pole intrusive inspections

Intrusive inspections require sample material be taken for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading. Wood poles are subjected to an intrusive inspection to determine and identify problems such as rot and decay. The inspection is performed using a calibrated drill bit that records the resistance and pressure required to drill a fixed diameter hole to a measured depth. The results are produced as a graph on a depth scale which is used to find voids and decay within the pole.

SMUD intrusively inspects wood poles at a minimum cycle of 10 years and a maximum cycle of 14 years.

6.3.1.5 Vegetation right-of-way maintenance

Both line inspectors and VM planners visually inspect the T&D ROW for encroachments, access road conditions and safety hazards. Two traditional helicopter patrols are also conducted annually by certified arborists or registered professional foresters to specifically inspect for vegetation issues that could threaten SMUD facilities. The VM ROW maintenance program's approach is to remove and prune vegetation in the ROW of incompatible species and to maintain low-growing native and diverse plant communities that are compatible with electrical facilities by using Integrated Vegetation Management (IVM) Wire Zone-Border Zone Management which is the industry standard. This is a long-term approach which supports system reliability through reclaiming the ROW and managing for future workload. This approach allows for ongoing monitoring of vegetation corridors to prevent encroachment into the minimum vegetation clearance distance (MVCD) and ensures SMUD facilities meet or exceed state laws and industry standards.

Traditional (boots on the ground) vegetation ROW inspections are performed annually on all transmission, and distribution lines in the UARP, and regularly one to three years on T&D lines in the Valley.

6.3.1.6 Splice assessment program

This program is designed to assess the integrity of transmission conductor splices. The technology used by an outside contractor uses an x-ray machine that encompasses a splice and takes an x-ray image of the splice. Inspectors then evaluate the image to determine the internal condition of the splice. This allows staff to identify splices that are potentially close to failure. A special type of in-line splice connector corrector is installed to strengthen the splice when needed.

6.3.1.7 Distribution line inspections

SMUD performs various inspections on distribution lines to ensure safety, reliability, and consistency with standards in California Public Utility Commission (CPUC) General Order (GO) 95, GO 128 and GO 165.

6.3.1.8 Detailed line inspections

Line inspectors use a combination of walking and driving when conducting detailed line inspections (DLIs). They visit each SMUD pole to make detailed visual inspections. The line inspectors utilize binoculars to detect any damage to above ground components attached to the pole. The inspectors look for broken or loose hardware; mechanical damage to any component; condition of guy wires and anchors; condition of insulators and conductors; condition of disconnects and fuse holders; condition of risers and conduits; condition of transformers, reclosers and cap banks. Ground conductors, moldings, signs, and other minor hardware is also inspected. Similar inspections are performed on pad-mounted equipment and equipment installed below grade in vaults or building basements.

DLIs are performed every five years on all overhead distribution equipment and pad-mounted equipment, and every three years on underground equipment.

6.3.1.9 Line patrols

Line patrollers patrol their designated service area and track their progress with a GIS enabled visualization tool. The use of the tool ensures that all devices within SMUD's service territory are patrolled. The patrollers are looking for obvious signs of defects, structural damages, broken hardware, sagging lines and vegetation clearance issues. Any anomalies found are addressed based on severity of the defect.

Line patrols are performed annually on all distribution lines and equipment.

6.3.1.10 69 kV and Pole Clearing Area 12 kV IR inspections (helicopter)

SMUD performs helicopter IR inspections on 69 kV circuits in the Valley and 12 kV circuits within the PCA. See section 6.3.1.3 for additional description.

69 kV and PCA 12 kV IR inspections are performed every other year in the Valley.

6.3.1.11 Wood pole intrusive inspections

Distribution wood pole intrusive inspections follow the same criteria as transmission wood poles intrusive inspections. See section 6.3.1.4.

6.3.1.12 Annual pole clearing program

The pole clearing program is an annual requirement to clear vegetation around poles that have certain CAL FIRE non-exempt equipment on it in the PCA. This program is in compliance with California Public Resource Code 4292. The code calls for clearing vegetation within a 10-foot radius of a pole or tower on which non-exempt equipment is attached, unless such pole or tower meets certain criteria that makes it exempt from the clearance requirements. SMUD contracts this activity out for completion prior to May 15th of each year.

*6.3.2 **Distribution substation inspections***

SMUD performs various inspections on substations to ensure safety and reliability. SMUD inspections meet or exceed standards in CPUC GO 174.

6.3.2.1 Visual inspections

Substation inspectors visit each SMUD substation to visually inspect the facility and all equipment within. The inspectors look for broken or loose hardware; vandalism or damage to any equipment; oil or gas leaks; perimeter fence security; condition of the buss, insulators and other hardware; condition of the control house; conditions of the poles/structures and lines exiting the substation; condition of the disconnects and fuses for signs of damage and connectivity.

Visual inspections are performed at least 10 times per year.

6.4 Vegetation management

SMUD's VM program is responsible for the patrol, work plans and quality control (QC) audits of the actual tree work for the transmission and distribution system in the Valley, as well as the transmission and distribution system in the UARP. These activities are performed year-round in order to maintain compliance with applicable Federal Facilities Design, Connections and Maintenance (FAC) 003-5 and State regulations, including Public Resources Codes section 4292 and 4293; and incorporate the standards in CPUC GO 95 Rule 35.

6.4.1 Distribution system vegetation management

SMUD performs routine traditional vegetation maintenance, such as pruning and removal, on a time-based interval. This interval consists of one, two, and three-year ground-based field patrols. The field patrols are ground based inspections of tree and conductor clearances and hazard tree identification. The results of the patrols are targeted areas for vegetation pruning or removal.

SMUD hires contracted tree crews to complete the identified annual vegetation work (pruning and removal) needed to ensure public safety and electric reliability as well as reduce wildfire risk in SMUD's service territory. During the tree work, the contractor aims to achieve up to 15 feet of clearance in local responsibility areas within SMUD's Service Area and 30+ feet of clearance in the HFTD (Tier 2 and 3) at time of tree work, unless otherwise directed by SMUD VM staff. The contractor also clears vegetation from SMUD's secondary voltage, service drops and pole climbing space on an as needed basis. SMUD's contractors follow American National Standards Institute (ANSI) A300 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the work cycle.

6.4.2 Transmission system vegetation management

SMUD VM planners perform traditional annual ground-based field patrols to ensure compliance with state and federal regulatory requirements (Public Resource Code 4293) and alignment with standards in CPUC GO 95 Rule 35 and FAC 003-5. The field patrols are traditional, ground-based inspections of tree and conductor clearances and hazard tree identification. The results of the patrols are targeted areas for vegetation pruning or removal. Additionally, SMUD completes two annual aerial patrols in El Dorado County to address the ongoing challenge of tree mortality due to drought and various insect vectors.

SMUD hires contracted tree crews to complete the identified annual vegetation work (pruning and removal) needed to ensure public safety and electric reliability as well as reduce wildfire risk.

During the tree work, the contractor follows the planner's prescription (scope of work) to achieve the desired safety clearance. SMUD's contractors follow ANSI A300 concepts and utility directional pruning, which supports proper pruning/tree health while achieving and maximizing the pruning cycle. Additionally, SMUD's transmission VM program aligns with ANSI A300 Part 7 IVM standard.

6.5 Fire mitigation construction

6.5.1 Ester-based insulating fluid in transformers

Natural ester-based insulating fluids are derived from renewable vegetable oils – providing improved fire safety, transformer life/load ability and environmental benefits that are superior to mineral oil and unsurpassed by any other dielectric coolant. SMUD began purchasing and installing pad mounted and pole mounted transformers with ester-based fluid in 2004. All new distribution transformers installed since 2004 and moving forward contain ester based insulating fluid. This includes replacements for old transformers and new installations.

6.5.2 Non-expulsion equipment in PCA and UARP 4kV

SMUD has identified additional targeted wildfire mitigation measures for the PCA and the UARP 4kV lines. A capital program is in place and scheduled for overall replacement of expulsion type equipment. SMUD may have to replace poles, lines or equipment as ongoing activities. For this reason, SMUD crews will install non-expulsion equipment (CAL FIRE exempt equipment) if any construction activity occurs in the PCA or on the UARP 4kV lines.

6.5.3 Weather stations

SMUD has 14 weather stations within its service territory and UARP, eight are in the Sacramento Metropolitan area and six in the UARP. Of the six in the UARP, four new weather stations were installed in 2018 and are positioned on towers located within the HFTD to support SMUD's de-energization procedures. Data from weather stations installed in SMUD's service territory and UARP assist in the real-time monitoring of weather conditions for situational awareness and to help inform implementation of mitigation measures such as de-energization of transmission lines.

6.5.4 Covered conductor and Ductile Iron poles

A new generator tie line was required to interconnect a new small hydro generator to PG&E distribution in the UARP. This opportunity was used to pilot the installation of covered conductor installed on ductile iron poles. This line is the first of its kind in SMUD's experience. Use of these materials has provided valuable information to SMUD engineering and construction staff. This information can be used to identify other potential locations for use of covered conductor solutions.

6.6 System enhancement capital projects

SMUD forecasts and plans for upcoming work several years in advance. This planning process allows adequate level of staffing and funding for needed projects. This section identifies the specific upcoming projects that help reduce SMUD's wildfire risk.

6.6.1 Install non-expulsion devices in PCA

Start date: 2020
Expected completion: 2025

This project will target SMUD's PCA to reduce the risk of fire ignitions by installing non-expulsion equipment (CAL FIRE exempt equipment[13]). Existing overhead fuses and fuse holders will be replaced with non-expulsion type fuses. Existing arresters will be replaced with new arrestors that have arc protection.

6.6.2 Upgrade UARP 4kV breakers for remote operability

Start Date: 2020
Completed: 2020

This project targeted SMUD's 4kV distribution system in the UARP to reduce the risk of fire ignitions. The 4kV circuit breakers were upgraded to allow PSO to remotely de-energize the lines during high fire threat conditions. The upgrade also brought back breaker status to PSO to provide confirmation of breaker open or close status.

6.6.3 Install non-expulsion devices in UARP 4kV system

Projected Start Date: 2020
Completed: 2021

This project targeted SMUD's 4kV distribution system in the UARP to reduce the risk of fire ignitions by installing non-expulsion equipment (CAL FIRE exempt equipment[14]). Existing overhead fuses and fuse holders were replaced with non-expulsion type fuses. Existing arresters were replaced with new arrestors that have arc protection.

6.6.4 Replace #6 Copper conductors in PCA

Projected Start Date: 2021
Expected Completion: 2023

This project will target SMUD's PCA for removal of #6 copper conductors and replacement with heavier gauge aluminum. The project was proposed in conjunction with Eagle Take Permit mitigation work to reduce avian contacts issued in connection with the expansion of SMUD's Wind Farm in Solano County. The mitigation activity involves re-framing approximately 185 poles to increase overhead conductor spacing.

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[13] Additional Information: https://osfm.fire.ca.gov/media/8482/fppguidepdf126.pdf
[14] Additional Information: https://osfm.fire.ca.gov/media/8482/fppguidepdf126.pdf

6.6.5 UARP 4kV UG conversion

Start Date: 2020
Expected Completion: 2022

After performing a feasibility study of alternatives, SMUD decided to replace the 4kV bare wire lines and install underground infrastructure. Two of the shorter lines were undergrounded in 2020 and 2021. Construction began on the longest of the three lines in 2021 and is scheduled for completion before summer of 2022.

6.7 Pilot projects

Pilot projects are initiated to explore technologies and practices that are new to SMUD. These projects are intended for SMUD staff to evaluate the effectiveness and benefits of the technologies or practices. The pilot has to prove successful in order to implement the technology or practice. Some of the factors considered at the conclusion of a pilot are proven risk reductions, material and installation costs, ease and efficiency of installations and overall effectiveness of the technology. Based on the results of the pilots, SMUD may elect to integrate the technologies or practices into its various ongoing maintenance programs. Current pilot projects are described below.

6.7.1 Aerial LiDAR[15] ortho, and oblique imagery

Start Date: 2017
Expected Completion: 2022

SMUD contracted with an external vendor to utilize LiDAR and remote sensing to supplement or enhance traditional "boots on the ground" vegetation patrols. Both LiDAR and Ortho Imagery is obtained from rotary and fixed wing aircraft.

The technology measures vegetation clearance distances from the conductor in both "as flown" and modeled conditions. Modeling is taking all the engineering calculations for maximum load and wind ratings to calculate clearance distances in a "worse-case scenario." Ortho Imagery is used to provide a more accurate and pre-mature visibility of vegetation in decline that may not yet be visible to the human eye.

The vendor captured LiDAR data along the transmission corridors in the UARP, as well as the portions of Sacramento County designated as CAL FIRE's State Responsibility Area (SRA) for both T&D circuits. The LiDar detections are categorized by priority. As soon as SMUD VM receives notification, SMUD VM field checks within 1 business day, and most within the same day data is received. Urgent and future potential conflicts are field checked and tree work prescribed as needed within 2-3 weeks of obtaining the data. Additionally, longer range detection conflicts are prioritized and incorporated into routine annual patrols (Transmission & SRA Distribution). These are reviewed by SMUD VM planners during annual patrols and tree work prescribed as required.

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[15] Additional Information: https://www.neonscience.org/lidar-basics

6.7.2 *Install fire monitoring cameras on towers in UARP transmission corridor*

Projected Start Date: 2022
Expected Completion: 2024

Fire monitoring cameras are a new technology tool that could be used to detect fire. An alarm is sent in real-time through a communications network to operators when the camera detects a fire in its field of vision. Operators can then verify and respond accordingly to prevent or reduce fire risks. SMUD's UARP transmission corridor travels through some remote locations of the Sierra Nevada range where cell networks may not be available. SMUD will pilot the use of these cameras to see how it may help reduce SMUD's wildfire risk. The pilot project is in the early stages of development and project milestones have not been outlined.

6.7.3 *High resolution image capture using drones*

Start Date: 2020
Completed: 2021

SMUD is partnered with a vendor who captured high resolution images of SMUD's transmission structures in the UARP using unmanned aerial vehicles ("drones") with attached cameras. Multiple images were captured of various components such as insulators, hardware and dampers found on typical transmission structures. The images were then processed by an Artificial Intelligence (AI) software that automatically identified known defects on the various components. The images were separately reviewed by online qualified electrical workers who identified additional potential defects. The identified defects were reviewed by SMUD staff and where needed corrective actions were scheduled.

6.7.4 *DeadEnd Termination x-ray evaluation*

Start Date: 2021
Completed: 2021

This program assessed the integrity of pressed deadend clamps on SMUD transmission lines. The inspection technology used x-rays to produce an image showing the internal condition of the deadend clamps. These images allowed SMUD staff to identify installation errors and some forms of material degradation. If any clamps were found to be in poor condition they were reinforced immediately using a Clampstar deadend unit.

6.7.5 *Phos Check fire retardant on wood poles*

Start Date: 2021
Completed: 2021

The Caldor Fire in the summer of 2021 created an opportunity for SMUD staff to field evaluate fire retardant materials to protect some of SMUD's wooden poles in the UARP. SMUD contractors applied Phos Check LC95W to 69kV wooden poles using backpack sprayers. Although the Caldor Fire did not impact the treated pole line, SMUD will use the opportunity to apply excess Phos Check material from the UARP treatment to wood poles within the Service Area, at targeted locations historically experiencing human caused fires, to help minimize damage to wooden poles.

6.8 Emerging Technologies

SMUD recognizes that numerous emerging technologies are developing and may play a role in building the resiliency of the system. SMUD will continue to monitor available technologies in future WMPs.

6.9 Workforce Training

SMUD has work rules and complementary training programs for its workforce to help reduce the likelihood of the ignition of wildfires. In summary:

SMUD Lineworkers complete a 4 year apprenticeship with over 7,500 hours of on-the-job training, in-class, hands-on, and eLearning training. Beyond the carefully documented and tracked on-the-job training Lineworker Apprentices also participate in 2 weeks of Initial Field Training, a 24 week Cold / Hot School, and annual safety / regulatory bundled training. All training programs include a mix of classroom and hands-on training. Each Apprentice is held accountable to their training and progress is measured through a step test system that includes a written and hands-on / practical test every six months.

In addition, all new SMUD Lineworkers receive a 1.5 hour hands-on Fire Safety training during Initial Field Training. This training consists of 30 minutes classroom training that covers hazards, hot work near power poles and off-road activities, red flag warnings, preparedness, fire extinguishers, and more. The training also includes about 60 minutes of hands-on training using fire extinguishers. In addition, all SMUD Lineworkers receive a 30-60 minute Fire Safety training every two years. This training includes classroom and hands-on training. SMUD also offers a 30 minute Fire Safety eLearning module that can be offered when the hands-on training is not feasible.

For work occurring in the UARP, all employees and contractors receive wildfire prevention, mitigation, and response training prior to the start of work. This includes compliance requirements for SMUD's Hot Work Standard and Eldorado National Forest's Project Activity Level fire prevention and mitigation measures.

7 Response Guidelines

7.1 Emergency Preparedness and Response

As a publicly owned utility, SMUD has planning, communication and coordination obligations pursuant to the California Standardized Emergency Management System (SEMS) Regulations adopted in accordance with Government Code section 8607. The SEMS Regulations specify roles, responsibilities, and structures of communications at five different levels: field response, local government, operational area, regional and state. SMUD has adopted SEMS and other local, state and federal emergency management doctrine into its comprehensive Emergency Operations Plan (EOP). The EOP identifies wildfire as a major risk in accordance with this Wildfire Mitigation Plan. Pursuant to this structure, SMUD regularly coordinates and communicates with the relevant safety agencies as well as other relevant local and state agencies, as a peer partner.

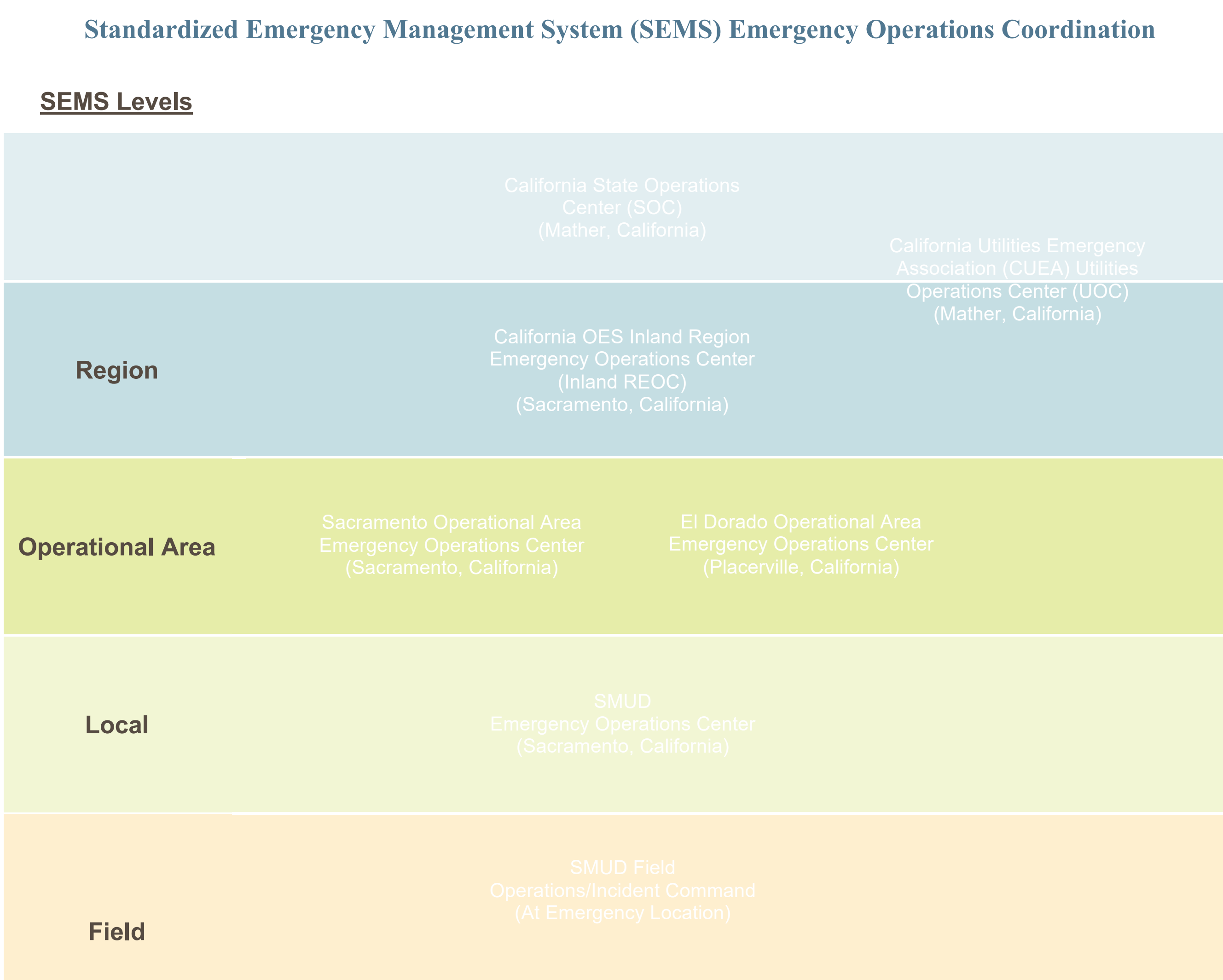
SMUD interacts with emergency response agencies on a peer-to-peer relationship. As part of SMUD's response to a storm, fire, rotating outage, black start events, etc., SMUD collaborates with the local Office of Emergency Services (OES) and provides an agency representative (liaison) to the county (and/or city) Emergency Operations Centers (EOC) to ensure appropriate communication and coordination. Our two primary coordination points for wildfire-related coordination are Sacramento County OES and El Dorado County Sheriff's Office OES (for the UARP region). Additionally, SMUD maintains good relationships with Yolo (gas pipeline), Placer County (service territory and UARP), Solano (Wind Farm) and Yuba (Camp Far West) counties.

Upon notification of potential proactive de-energizations or rotating outage events due to wildfire concerns, EP staff will coordinate with the appropriate County OES to ensure that all first and emergency response organizations are notified of the de-energization and estimated restoration time (if known). In addition, during a highly localized event, EP Staff will directly notify first and emergency responder jurisdictions of the de-energization/outage.

SMUD EP staff also invite counties to send agency representatives into SMUD's EOC. These representatives can include personnel from the following organizations: City of Sacramento Fire Department, Sacramento Metropolitan Fire District, City of Folsom Fire Department, local cities, Sacramento County OES, the National Weather Service, and other local critical infrastructure agencies, ensuring coordination for our service territory.

Additionally, SMUD EP staff serve as SMUD's utility representatives when requested by the California Governor's OES (CalOES) at the California State Operations Center (SOC) for the California Utilities Emergency Association (CUEA), providing a direct link for critical infrastructure coordination to the SOC.

Figure 7 Standardized emergency management system (SEMS) emergency operations coordination



7.2 Public and agency communications for a potential wildfire

Public safety is a guiding principle at SMUD. De-energizing powerlines may be the safest approach and makes sense if the risk of a wildfire starting and spreading is severe. While SMUD's WMP activities are designed to mitigate wildfire danger, in instances of high fire threat conditions, interruption of electrical service by de-energizing powerlines may be necessary. SMUD proactively communicates with customers and key stakeholders through multiple channels about preparing for potential power outages, and the power restoration process. SMUD recognizes that many entities and individuals are particularly vulnerable during extended power outages and makes every effort to provide up-to-date information to these populations prior to, during and after an event.

This proactive communication is utilized for:

1. A wildfire threat to localized circuits within the SMUD service territory that results in localized de-energization.
2. A wildfire threat to SMUD's UARP hydroelectric generation and transmission system that results in a de-energization event causing a capacity/energy shortage (rotating outages).
3. A wildfire threat to a major shared transmission line(s) that impacts the statewide grid or parts of it and creates a resource shortage for the utilities, including SMUD, that rely on the resources the line(s) provides.

SMUD's Contact Center, Strategic Account Advisors, Media Services, social media and smud.org will provide ongoing and available resources for communication and education for the overall customer base. SMUD has implemented an opt-in program on smud.org for all customers that allows participants to receive additional information or notifications in the unlikely event of a wildfire in our service territory.

Customers will be directed to the smud.org/WildfireSafety webpage for information where they'll be able to find:

- Wildfire Policy and Procedure brochure
- Information on how SMUD mitigates fire risk
- Emergency preparedness tips guide (7 languages)
- Links to additional resources
- Video on wildfire mitigation efforts
- Rotating outage map and periodic event updates
- Frequently Asked Questions on the de-energization process

SMUD's dedicated webpage, smud.org/WildfireSafety, provides access to information about SMUD's effort on wildfire planning and prevention (including an archive of this and prior WMPs), how to identify fire risk in areas where SMUD maintains electric facilities, a video on our wildfire mitigation efforts, emergency planning and preparation (in six different languages) and SMUD's de-energization protocols.

SMUD also proactively communicates before potential emergency events about our efforts to prepare for and reduce wildfire risk.

In advance of peak fire season, SMUD conducts ongoing communications about how to prepare for emergencies in the event of a wildfire, natural disaster or major outage. The communications include:

- Letters and email to MED Rate, Senior ID, vulnerable customers, with preparation checklists.
- Outdoor billboards
- Digital monitors in our lobby
- Bill inserts
- Hero banner on smud.org encouraging updating contact information
- smud.org updates
- Articles in Customer newsletters (print and email)

SMUD's Public Information Specialists will provide ongoing mass media communication via traditional news media channels and via Facebook, Twitter, and other social media channels to provide customers and the community with information about an emergency or potential emergency. SMUD will use established standard outbound communications channels for unplanned outages.

SMUD's Government Affairs representatives will reach out to the executive staff of local governments, elected officials, SMUD's state delegation, federal and tribe representatives and appropriate agency staff to provide initial contact and ongoing communications by email and phone with messages for their constituents.

In the time leading up to a potential or imminent de-energization event, SMUD does its best to establish or maintain contact with customers it believes may be impacted (via the various channels mentioned above) and keep the media, local agencies and the public aware of the number of customers affected and SMUD's activities and restoration efforts.

Key stakeholders and public safety partners, including potentially affected federal, state and local elected officials, City and County executive staff, tribe representatives and first responders are also contacted via a variety of channels and personnel. SMUD has specific personnel assigned to elected officials and agencies, and to critical customers including water and telecommunications utilities, potentially affected by de-energized powerlines.

7.2.1 Event communications

Whenever possible, SMUD will provide potentially impacted customers with notice before implementing any de-energization action, using all available channels to reach customers and other stakeholders with outage information. Sudden onset of conditions could impact its ability to provide advanced notice to customers.

SMUD sends automated pre-recorded phone calls to customers in the impacted areas/neighborhoods advising when the outage is called and directing them to smud.org/outages for up-to-date information. Smud.org has been updated with features to further enhance customer communications before and during de-energization events.

The Contact Center's Interactive Voice Response (IVR) will have real-time recorded information informing each group of customers that may be impacted before the de-energizations begin. Messages will be customized and updated as needed for each specific event.

Among SMUD's vulnerable customers are those enrolled in the Medical Equipment Discount Rate program (MED rate). These customers rely on specialized medical equipment. SMUD has a Vulnerable Customer program which allows customers to self-identify as vulnerable for concerns not covered by our MED Rate. SMUD has approximately 10,500 customers who rely on specialized medical equipment and who are enrolled in the MED rate program or enrolled in our Vulnerable customer program. SMUD will send these customers an email or letter each year to remind them of the risk of wildfire danger, to have an emergency back-up plan if an outage occurs and refer them to smud.org/WildfireSafety for more information.

7.2.2 Public safety partners, government agencies, tribes and critical infrastructure providers

De-energization is a last resort to maintain public and customer safety during extreme fire risk conditions. If extreme fire danger resulted in de-energization or planned rotating outages, SMUD will provide proactive communications to alert key stakeholders and essential and critical customers like governments, agencies, utilities, healthcare and communications accounts to provide as much notice as possible to minimize the impact on our customers and community.

The following customer categories are considered essential and/or critical service providers:

- Jurisdictions providing essential fire, police and prison services
- Government agencies essential to national defense
- Hospitals, assisted living, and skilled nursing facilities
- Communication utilities, as they relate to public health, welfare, and security, including telephone utilities
- Radio and television broadcasting stations used for broadcasting emergency messages, instruction, and other public information related to the electric curtailment emergency
- Water and sewage treatment utilities identified as necessary for services such as firefighting

SMUD interacts regularly with executive staffs, elected officials, other government representatives, and key critical infrastructure customers to keep them updated on its wildfire mitigation efforts. SMUD also works closely with staff members in various departments of regional and local governments, public utilities, nonprofits and other service providers on collaborative strategies and partnership opportunities.

Examples of SMUD's communication and engagement initiatives include:

- Regular in-person briefings with federal, state, and local elected officials and key staff on wildfire risk mitigation and other utility-related issues with comprehensive "leave-behind" materials
- Meetings with regional and local government staff and elected officials focused on individual districts, communities, and neighborhoods and mitigation opportunities
- Regular in-person and/or digital communication with critical facilities and key customers through SMUD Strategic Account Advisors
- Interagency projects, collaborative staff training efforts, and regular communication with first responders and essential service providers
- Cross-SMUD participation with the El Dorado County Wildfire Mitigation Stakeholder Group and at other El Dorado County government, public and community meetings
- Ongoing communication, collaboration and support for local Fire Safe Councils and other fire prevention agencies and nonprofits

8 Restoration of service

If a transmission or distribution line has been de-energized in anticipation of a wildfire threat, SMUD troubleshooters or patrollers must perform additional steps prior to re-energization. In an event of a wildfire where distribution poles or transmission structures were burned, additional steps must be taken to rebuild the lines.

8.1 Steps to restoration of service

SMUD work crews must take several important steps prior to restoring electrical service after a de-energization event.

- **Patrol.** SMUD crews patrol the line to look for vegetation in lines and any obvious damage that may prevent safe energization. Depending on the length of the lines, and number of circuits, the patrols can take a several hours to days to complete.
- **Repair.** During patrol, crews look for potential damage to the lines and poles. Where equipment damage is found, additional crews are dispatched with new materials to repair or replace damaged equipment. In some cases, VM crews may be called in to help clear an area of downed trees or branches that have fallen into the power lines while it was de-energized.
- **Test.** Once the lines and poles are safe to operate, crews test the infrastructure by closing the fuse, or breaker to re-energize the line segment.
- **Restore.** Power is restored and the outage communication system provides notification of power restoration to customers.

8.2 Reconstruction after a wildfire

When infrastructure is damaged during a wildfire event, a lot of work is required to plan and execute the rebuilding effort. After local police and fire officials have given SMUD clearance, SMUD work crews can proceed with the assessment and rebuilding effort.

- **Assessment**. SMUD crews must patrol each line segment to determine the extent of damage that has occurred. The patrol involves assessing equipment damage, access issues, any cleanup/debris removal issues and determining personal protective equipment requirements for the crews. SMUD works with the local agency in charge of the fire to access impacted areas as soon as the area is deemed safe by fire officials. During this phase the VM team assesses vegetation damaged by the wildfire that could impact SMUD's facilities.
- **Planning.** After the initial assessment, SMUD supervisors, managers and engineers meet to plan the restoration. The team will work with system operations to prioritize the restoration efforts, targeting the circuits that serve the most critical infrastructure needs.
- **Mobilize.** Based on the size and complexity of the rebuild/restoration efforts, SMUD will coordinate the crews and material needs internally if possible. Mutual aid and contractors may be used on an "as needed" basis to provide additional support. VM crews will begin clearing the ROW and any dangerous trees that pose a threat to the restoration crews. SMUD maintains a critical material vendor list and has contracts it can draw on for labor and material needs; though in an instance of widespread catastrophic damage, necessary materials and labor could experience shortages that may delay work.
- **Rebuild.** The rebuild effort lead by SMUD will commence as soon as areas become safe and accessible. The lines will be rebuilt with a mix of temporary and/or permanent structures as determined during planning. The initial efforts will be to get the lines up and restore the damaged circuits. Depending on the extent of damage, demolition may be performed concurrently or after crews start installing new facilities. SMUD will incorporate new materials and technologies as indicated and available.
- **Restore.** SMUD, mutual aid, or contract crews will restore electric services to our customers as soon as possible after the wildfire. Depending on the extent of damages, customers may have to perform repairs on their facilities and pass inspections by local agencies prior to having full electric service restored. These are coordinated on an as needed basis.

9 Performance Metrics and Monitoring

This section identifies SMUD's management responsibilities for overseeing this WMP and includes the operating departments and teams responsible for carrying out the various activities described in the previous chapters. This section also identifies the metrics which are used to demonstrate compliance with this WMP.

9.1 Accountability of the plan

SMUD's Chief Operating Officer has overall responsibility for the WMP. The Chief Operating Officer and Chief Customer Officer are responsible for executing the various components of the WMP.

9.1.1 SMUD operating unit responsibility specific to each component of the plan

The table below lists the Director with responsibility for the departments or workgroups that are accountable for the various components of SMUD's WMP. In each case the Director or the Director's designees will be responsible for the accuracy of, and for operations in accordance with, the specified component of the plan.

Table 7 Accountability for the WMP components.

Mitigation Activities	Responsible Department and Workgroup
Fire threat assessment in service territory	Director, Distribution Planning & Operations
Wildfire prevention strategy and programs	
- Disable reclosers - Planned de-energizations	Director, Transmission Planning & Operations, Director, Distribution Planning & Operations
	Director, Line Assets
- Substation visual inspections	Director, Substation, Telecom & Metering Assets
- Vegetation management - Pole clearing program	Director, Line Assets
Fire mitigation construction	
- Natural Ester-based fluid - non-expulsion equipment	Director, Distribution Planning & Operations
- Weather stations	Director, Transmission Planning & Operations
System enhancement capital projects	
- Underground conversion of 4kV lines in Upper American River Project area	Director, Line Assets
Pilot projects	
- Light Detection and Ranging and Ortho Imagery	Director, Line Assets
- Fire monitoring cameras	Director, Transmission Planning & Operations, Director, Distribution Planning & Operations
Emergency preparedness	
- SMUD Emergency Operations Centers	Director, Facilities, Security & IPPS
- Public and agency communications for wildfires	Director, Customer Operations & Community Energy Services, Director, Customer Experience Delivery. Director, Corporate Communications

9.2 Effectiveness of the WMP

In the initial WMP, SMUD staff identified metrics that met the criteria of PUC 8387. These identified metrics were general in nature. Since those initial metric criteria were identified, the wildfire planning process has continued to develop, and SMUD has received independent evaluation of its WMP. In response to the industry's maturing understanding of wildfire metrics and recommendations received, SMUD undertook a multi-step effort to identify new metrics that can better gauge the success of its many programs and mitigation activities outlined in the WMP.

The first step in this multi-step effort was to assess, identify and establish useful metrics that best measure the activities related to minimizing the probability that SMUD's transmission and distribution system may be the origin or contributing source for the ignition of a wildfire. Metrics identified in this section are measures of quantitative assessment that will be used for assessing, comparing, and tracking performance of the programs and efforts identified in this WMP. This step was completed and reflected in the metrics identified in this WMP.

The second step is to define the benchmarks associated with the metrics. The purpose of these benchmarks is to establish criteria to measure performance of the various activities. Some activities can be measured with specific units of work that are forecasted at the beginning of a year, such as quantities of inspected units etc. Progress towards these forecasted units would indicate on- or off-track completion cadence, which can be adjusted as needed during the year. Other metrics are identified to count uncontrollable units that indicate performance of the grid, such as outage event counts or number of corrective action findings. Development of these benchmarks will require several years of data to determine trendlines and averages. Data collection for the new metrics began in 2021. Following existing practices, SMUD anticipates five years of data will be required to establish the benchmarks, with a target period in 2026.

The third and final step is to determine or define the percentage reduction targets against the benchmarks. Percent reductions against benchmarks would need to be realistic, and not easily achievable. SMUD anticipates the initial benchmarks would require fine adjustments periodically to ensure continued effort towards risk reduction activities. These benchmarks and adjustments will be reflected in SMUD's annual WMP updates.

9.2.1 Metrics and assumptions for measuring WMP performance

SMUD will track the following metrics to measure the performance of this WMP, and its effectiveness in reducing catastrophic wildfire. These new set of metrics are more granular and targeted towards specific maintenance activities that can more closely be tied to performance of the WMP.

Work is identified in annual work plans authorized on an executive level, and work that remains incomplete will be flagged in future work plans. Work may be field-verified and open work notifications are regularly reviewed to allow management to prioritize work in accordance with current risks. SMUD's target is always to complete 100 percent of the work within the initially scheduled time frame. However, emergencies or other unforeseen contingencies can occur that require material and labor resources to be otherwise assigned. In this instance delayed work will be prioritized in following time periods. All work is completed within time periods to allow for the safe and reliable operation of the electric system in accordance with applicable requirements and industry standards.

The Inspection Program Performance metrics shown in Table 8 are based on inspection activities for targeted areas. These are key performance indicators (KPI) based metrics, with specific targets for completion within a year.

Table 8 Inspection Program Performance

Inspection Program Performance (KPI)	Target
Number of circuit miles inspected from Visual Patrol, Distribution, PCA	>=95%
Number of circuit miles inspected from Visual Patrol, Distribution, HFTD Tier 2	>=95%
Number of circuit miles inspected from Visual Patrol, Distribution, HFTD Tier 3	>=95%
Number of poles inspected from DLI, Distribution, PCA	>=95%
Number of poles inspected from DLI, Distribution, HFTD Tier 2	>=95%
Number of poles inspected from DLI, Distribution, HFTD Tier 3	>=95%
Number of circuit miles inspected from Patrol, Transmission, PCA	>=95%
Number of circuit miles inspected from Patrol, Transmission, HFTD Tier 2	>=95%
Number of circuit miles inspected from Patrol, Transmission, HFTD Tier 3	>=95%
Percentage of circuit miles inspected for vegetation compliance, Distribution, PCA	>=95%
Percentage of circuit miles inspected for vegetation compliance, Distribution, HFTD Tier 3	>=95%
Percentage of circuit miles inspected for vegetation compliance, Transmission, HFTD Tier 2	>=95%
Number of aerial Flight Patrols, Visual, Valley	1
Number of aerial Flight Patrols, Infrared, Valley	1
Number of aerial Flight Patrols, 69kV, Infrared, Valley	1
VM Quality Control for Transmission, Sacramento County	>=95%
Number of trees trimmed or removed, normal activities, PCA	>=95%
Number of poles cleared/treated before start of fire season, PCA	>=95%

9.2.2 *Outcome Metrics*

Two sets of outcome metrics were identified that measure performance of the grid. These metrics replace the more general "ignition events" identified in previous WMPs, which couldn't directly be tied to risk categories. The outcome metrics shown in Table 9 are consistent with GO95 Rule 18[16] repair priority levels.

Table 9 Grid Condition Findings

Grid Condition Findings (Non-KPI)
Number of GO95 Rule 18 Level 1 findings, Distribution, HFTD Tier 2
Number of GO95 Rule 18 Level 1 findings, Transmission, PCA
Number of GO95 Rule 18 Level 1 findings, Transmission, HFTD Tier 3
Number of GO95 Rule 18 Level 2 findings, Distribution, HFTD Tier 2
Number of GO95 Rule 18 Level 2 findings, Transmission, PCA
Number of GO95 Rule 18 Level 2 findings, Transmission, HFTD Tier 3
Number of GO95 Rule 18 Level 3 findings, Distribution, HFTD Tier 2
Number of GO95 Rule 18 Level 3 findings, Transmission, PCA
Number of GO95 Rule 18 Level 3 findings, Transmission, HFTD Tier 3

[16] https://ia.cpuc.ca.gov/gos/Resmajor/DesNo09-08-029/GO95/DesNo09-08-029-Rule%2018.htm

The second set of outcome metrics are a measure of the ignition drivers during fire season, shown in Table 10.

Table 10 Drivers of Ignitions

Drivers of Ignitions, fire season only (Non-KPI)
Number of Overhead Outage Events caused by animals, inside PCA
Number of Overhead Outage Events caused by Vegetation - Tree Preventable, inside PCA

9.2.3 Enhancement Projects

Once a project or program is approved, it is planned for execution based on the upcoming year's work schedule. The targets listed here for the approved projects are monitored via milestone achievements.

Table 11 System enhancement capital project performance

Project (KPI)	Target
Circuit feet completed, PCA, #6CU Reconductor	>=95%
Number of Miles, UARP 4kV UG Conversion	
Units of trees pruned or removed, Wildfire Mitigation Vegetation Management work, UARP	>=95%

9.2.4 Community Outreach Measures

SMUD reaches out to customers, local communities, and government agencies for multiple programs. Metrics were developed specific to wildfire mitigation efforts and communication. The various type of community outreach measures are shown in Table 12.

Table 12 Community Outreach Programs

Community Outreach Programs (non-KPI)
Number of contacts with Federal, State and Local Govt offices, specific to wildfire or de-energization related contacts
Number of mailers sent to customers related to Wildfire Mitigation Activities, Email, MED rate
Number of mailers sent to customers related to Wildfire Mitigation Activities, Email, Senior ID
Number of mailers sent to customers related to Wildfire Mitigation Activities, Customer Connection/Direct Mail

9.3 Monitoring and auditing of the WMP

The WMP will be reviewed annually. This annual review will align with SMUD's existing business planning process. This review will include an assessment of the WMP programs and performance.

SMUD's business planning process includes budgeting and strategic planning for a 3-5-year planning horizon.

9.3.1 Accountability

SMUD's Chief Operating Officer (referred to as COO) will be responsible for monitoring and auditing the targets specified in the WMP to confirm that the objectives of the WMP are met.

9.3.2 Identify deficiencies in the WMP

At any point in time when deficiencies are identified, the COO or their delegates are responsible for correcting the deficiencies.

9.3.3 Written processes and procedures

The operational areas conduct their work according to written processes and procedures. Having written processes and procedures provides for consistency in the execution of programs and activities.

9.3.4 Monitor and audit the effectiveness of inspections

SMUD has existing quality control processes embedded into its existing general practice. However, for certain programs, there is a formal quality control process. The following depicts a few of these programs.

9.3.4.1 Distribution system inspections

SMUD's maintenance planning group manages T&D line and substation assets. A key component in managing assets is the development of comprehensive inspection and maintenance programs. The maintenance planning group develops inspection and maintenance programs driven by the need to ensure the safe operation of T&D line and substation facilities, reduce risk of power-related wildfire, meet federal and state regulatory requirements, achieve reliability performance within mandated limits and optimize capital and operations & maintenance (O&M) investments. In addition, this group regularly monitors inspection and corrective maintenance records, as well as diagnostic test results to adjust maintenance plans and develop new programs. SMUD uses best industry practices in developing its maintenance plans.

SMUD's inspection and maintenance programs focus on the following objectives:

- Ensure employee and public safety
- Minimize risk of wildfire posed by power lines and equipment
- Maintain regulatory and SMUD policy compliance
- Improve the availability and reliability of the system
- Employ industry best practices
- Extend the useful life of equipment
- Minimize the total cost of equipment ownership

The maintenance planning group develops and issues annual inspection work plans during the last quarter of the current year for the following year, which are maintained in SMUD's Enterprise Asset Management (EAM) system.

SMUD's Grid Assets Department is responsible for performing the inspections and corrective maintenance. When deficiencies in SMUD facilities are identified, corrective maintenance notifications are created in SAP. The priority for corrective maintenance is to remove safety hazards immediately and repair deficiencies according to the type of deficiency, severity and HFTD tiers. Inspection notifications are monitored throughout the year to ensure timely completion via regular internal reports using SAP data. Enterprise applications are used to deploy, visualize and validate work based on business rules. These applications provide the visibility and monitoring of work required to make informed decisions and to achieve compliance with our inspection and maintenance programs.

9.3.4.2 Vegetation management (VM)

SMUD's vegetation pruning/removal activities are performed by contractors. The contractors are quality audited by SMUD (VM) personnel. Distribution system related work and contractors are field audited and approximately 7% of the tree work (pruning and removal) is reviewed. This quality assurance (QA) effort is tracked to monitor program effectiveness and overall tree work performance. For transmission, SMUD VM staff perform a quality control (QC) audit of 100% of the transmission system related work performed by the contractor. For both T&D QC efforts all deficiencies are reissued to the contractor management team and corrective action is required.

9.3.5 ***Internal audit***

SMUD's internal audit department, known as Audit and Quality Services (AQS) provides independent, objective assurance and consulting services to the Board of Directors and management designed to add value and improve SMUD's operations. The AQS mission is to enhance and protect organizational value by providing risk-based and objective assurance advice and insight.

The work of AQS provides reasonable assurance regarding the achievement of objectives in the following areas:

- Adherence to plans, policies and procedures
- Compliance with applicable laws and regulations
- Effectiveness and application of administrative and financial controls
- Effectiveness and efficiency of operations
- Reliability of data
- Safeguarding assets
- Accuracy of the SD monitoring reports

As part of AQS' process to develop its annual audit plan, AQS considers all enterprise risks and performs audits over a selection of processes across electric T&D as well as substation assets.

10 Independent evaluation, public comment and board presentation

SMUD conducted extensive stakeholder outreach during its preparation of the WMP. SMUD personnel met with local fire agencies and safe councils, OES and healthcare organizations. In addition, SMUD invited federal, state and local agencies, representatives of utilities, telecommunication providers, and critical care customers to attend stakeholder outreach meetings where information regarding the preparation and contents of the WMP were provided.

10.1 Public comment

A draft of the WMP was posted on SMUD's website, smud.org/WildfireSafety and made available for public comment for over 30 days. Notice of the public review draft was provided to the above stakeholders and published in local newspapers, including the Sacramento Bee, on social media, and through electronic newsletter. Interested parties were also invited to comment on the plan at the time it was presented to SMUD's Board of Directors in a noticed public meeting.

SMUD Board and Board Committee meetings are open and accessible to the public. Meeting notices and agendas are posted, least 72 hours in advance at the SMUD office and on SMUD's website. Those who are unable to attend the meeting in-person can livestream the meeting or view a recording on SMUD's website. SMUD offers the opportunity for persons interested in wildfire related matters to sign up to receive notifications any time wildfire is being discussed at an upcoming Board or committee meeting at smud.org/WildfireSafety.

10.2 Board presentation

The WMP was presented to and adopted by the Board at a noticed public meeting. Updates are presented annually, and a comprehensive revision will be presented no less than every three years.

10.3 Independent evaluation

In 2019 and 2020, SMUD issued a public request for information, consistent with SMUD's procurement practices, to identify the best qualified independent evaluator (QIE) to assess the comprehensiveness of SMUD's WMP. SMUD contracted with two different qualified independent evaluators respectively with experience in assessing the safe operation of electrical infrastructure. SMUD also retained a QIE to make a similar assessment of this 2022 WMP. Each QIE report was presented to SMUD's Board of Directors at a noticed public meeting and posted to SMUD's website along with the WMP. The reports concluded SMUD's WMP is comprehensive and meets statutory requirements as well as industry standard.

10.4 Wildfire Safety Advisory Board

Each year SMUD submits its WMP to the Wildfire Safety Advisory Board (WSAB). The WSAB reviews and provides comments and an advisory opinion regarding the content and sufficiency of the WMP. SMUD will consider comments and opinions received by the WSAB in future documents.

10.5 Budgeting WMP initiatives

SMUD adopts its budget through open and public processes. Program commitments reflected in any given budget are impacted by many factors, including risk evaluations, system condition and requirements, emergency occurrences, economy, legislation, environment, and liability exposure. These commitments are consistently under evaluation, and program priorities can change if any of these factors shift.

10.6 Change Summary

SMUD reviews and updates its WMP annually. A summary of the key changes from SMUD's previously adopted WMP and this Plan is included as an Exhibit to the WMP. The summary does not represent a comprehensive identification of every update to the WMP from the prior WMP, and a full understanding of SMUD's wildfire risk profile and its wildfire prevention and mitigation efforts should be based on a holistic review of the complete WMP.

11 Appendix

This section contains supporting information to the document.

11.1 Definitions

Distribution System Operations (DSO): SMUD's DSO personnel is responsible for directing the safe and reliable operation of SMUD's distribution system while operating within current policies and procedures during normal and emergency situations. Distribution system operators prepare, check, and administer the execution of safe and reliable switching procedures. DSO will monitor and maintain equipment loading levels to prevent damage to equipment. This group is also responsible for updating outage information timely and accurately so that information can be provided to internal and external customers.

Fire Hazard[17]: "Hazard" is based on the physical conditions that give a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts.

Fire Risk[1]: "Risk" is the potential damage a fire can do to the area under existing conditions, including any modifications such as defensible space, irrigation and sprinklers and ignition resistant building construction which can reduce fire risk. Risk considers the susceptibility of what is being protected.

Hardening: Modifications to electric infrastructure to reduce the likelihood of ignition and improve the survivability of electrical assets.

High Fire Threat District (HFTD)[18]: The HFTD identifies areas of elevated and extreme fire risk related to electric utility facilities. These areas are reflected in a map adopted by the CPUC after an extensive public process. It is a composite of two maps:

1. Tier 1 High Hazard Zones (HHZs) on the U.S. Forest Service - CAL FIRE joint map of Tree Mortality HHZs ("Tree Mortality HHZ Map"). Tier 1 HHZs are zones in direct proximity to communities, roads, and utility lines and are a direct threat to public safety.
2. Tier 2 and Tier 3 fire-threat areas on the CPUC Fire-Threat Map. Tier 2 fire-threat areas depict areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility associated wildfires. Tier 3 fire-threat areas depict areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility associated wildfires.

Pole Clearing Area (PCA): SMUD defined area where poles with non-exempt equipment have annual vegetation clearing and/or pruning within a 10-foot radius in compliance with PRC 4292 prior to the start of fire season, currently May 1 of each year. The custom defined PCA boundary includes SRA boundary and adjacent areas with similar vegetation, and portions of a Local Responsibility Area (LRA) in the southern part of Sacramento County. This boundary area exceeds the current SRA boundary due to similar vegetation and risk of ignition. Overhead

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[17] Source: http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview_Glossary.pdf
[18] Source: http://www.cpuc.ca.gov/FireThreatMaps/

electrical facilities crossing into and within the boundary of the PCA fall under special operating conditions and fall under enhanced maintenance programs.

Power System Operations (PSO): SMUD's PSO personnel analyze, direct, monitor, control and/or operate SMUD's gas pipelines and electric generation and transmission systems and associated facilities in a safe, reliable, and efficient manner during routine and emergency situations. This position has the responsibility and authority to support and implement real-time actions.

Red Flag Warning (RFW)[19]: A term used by fire-weather forecasters to call attention to limited weather conditions of particular importance that may result in extreme burning conditions. It is issued when it is an on-going event, or the fire weather forecaster has a high degree of confidence that Red Flag criteria will occur within 24 hours of issuance. Red Flag criteria occurs whenever a geographical area has been in a dry spell for a week or two, or for a shorter period, if before spring green-up or after fall color, and the National Fire Danger Rating System (NFDRS) is high to extreme and the following forecast weather parameters are forecasted to be met:

- A sustained wind average 15 mph or greater
- Relative humidity less than or equal to 25 percent; and
- A temperature of greater than 75 degrees F

In some states, dry lightning and unstable air are criteria. A Fire Weather Watch may be issued prior to the RFW. *State Responsibility Area (SRA)[1]:* "The California Board of Forestry and Fire Protection classify areas in which the primary financial responsibility for preventing and suppressing fires is that of the state. California Department of Forestry (CDF) has SRA responsibility for the protection of over 31 million acres of California's privately-owned wildlands."

Transmission and Distribution (T&D): At SMUD, for line maintenance purposes, the transmission system includes 230 kV, 115 kV, and dedicated 12 kV, 21 kV and 69 kV lines tying generation facilities to bulk or transmission substations. The distribution system includes 69 kV, 21 kV, 12 kV, and 4 kV lines serving distribution substations and customers.

Wildfire[20]: An unplanned, unwanted fire in an area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities and structures, if any, are widely scattered ("wildland"), including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

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[19] Source: https://w1.weather.gov/glossary/index.php?word=Red%20Flag%20Warning
[20] Source: https://www.nwcg.gov/glossary/a-z#Wildfire, July 19, 2019.

11.2 References

- CPUC Fire Threat Map, ftp://ftp.cpuc.ca.gov/safety/fire-threat_map/2018/PrintablePDFs/8.5X11inch_PDF/CPUC_Fire-Threat_Map_final.pdf
- Public Utilities Code, Chapter 6. Wildfire Mitigation [8387], http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=8387&lawCode=PUC
- County Maps of Fire Hazard Severity Zones in SRA,
- https://frap.fire.ca.gov/frap-projects/fhsz-in-sra-county-maps/
- General Order 95[21] contains rules for the design, construction, maintenance, inspection, repair and replacement of overhead utility lines. http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K464/209464026.pdf
- General Order 165[24], Inspection Requirements for Electric Distribution and Transmission Facilities.
- http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K552/209552704.pdf
- General Order 166[24], Standards for Operation, Reliability and Safety During Emergencies and Disasters
- http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K451/209451792.pdf
- General Order 174[24], Rules for Electric Utility Substations
- http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M031/K879/31879476.PDF
- Power Line Fire Prevention Field Guide
- https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildfire-prevention-engineering/prevention-field-guides/

11.3Acronym glossary

AAM (After-Action Meeting)
AAR (After-Action Report)
AB (Assembly Bill)
AEU (Amador-El Dorado Unit)
AI (Artificial Intelligence)
ANSI (American National Standards Institute)
AQS (Audit and Quality Services)
CAISO (California Independent System Operator)
CAL FIRE (California Department of Forestry and Fire Protection)
CalOES (California Governor's Office of Emergency Services)
CDF (California Department of Forestry)
COO (Chief Operating Officer)
CPUC (California Public Utilities Commission)
CUEA (California Utilities Emergency Association)DLI (Detailed Line Inspections)

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[21] SMUD is not subject to CPUC jurisdiction, but has developed design standards, and maintenance programs that meet or exceed the regulations in GO 95, GO 128, GO 165, GO 166, and GO 174.

DSO (Distribution System Operations)
EAM (Enterprise Asset Management)
EOC (Emergency Operations Center)
EOP (Emergency Operations Plan)
EP (Emergency Preparedness)
ERM (Enterprise Risk Management)
EROC (Enterprise Risk Oversight Committee)
FAC (Facilities Design, Connections and Maintenance)
FHSZ (Fire Hazard Severity Zone)
FRAP (Fire Resource and Assessment Program)
GHG (Greenhouse gas)
GIS (Geographic Information System)
GO (General Order)
HFTD (High Fire Threat Districts)
HHZ (High Hazard Zone)
HSEEP (Homeland Security Exercise and Evaluation Program)
ID (Identification)
IOU (Investor-owned Utility)
IP (Improvement Plan)
IR (Infrared)
IVM (Integrated Vegetation Management)
IVR (Interactive Voice Response)
kV (Kilovolt)
kWH (Kilowatt Hours)
LIDAR (Light Detection and Ranging)
LRA (Local Responsible Area)
MED (Medical Equipment Discount)
MVCD (minimum vegetation clearance distance)
MW (Mega Watts)
NASA (National Aeronautics and Space Administration)
NFDRS (National Fire Danger Rating System)
O&M (Operations & Maintenance)
OES (Office of Emergency Services')
PCA (Pole Clearing Area)
PG&E (Pacific Gas & Electric)
PRC (Public Resources Code)
PSO (Power System Operations)
PSPS (Public Safety Power Shutoff)
PUC (Public Utilities Code)
QA (Quality Assurance)
QC (Quality Control)
QIE (Qualified Independent Evaluator)
RFW (Red Flag Warning)

ROW (rights-of-way)
SAP (Systems Applications and Products)
SB (Senate Bill)
SD (Strategic Direction)
SEMS (Standardized Emergency Management System)
SME (Subject Matter Expert)
SOC (State Operations Center)
SRA (State Responsibility Area)
T&D (Transmission and Distribution)
TTX (Tabletop Exercise)
UARP (Upper American River Project)
VM (Vegetation Management)
WAPA (Western Area Power Administration)
WMP (Wildfire Mitigation Plan)
WSAB (Wildfire Safety Advisory Board)
WUI (Wildland-Urban Interface)

11.4 Reference for SMUD plans

11.4.1 SMUD's Pole Clearing Area Map

Figure 8 SMUD's Pole Clearing Area with respect to Sacramento County boundary

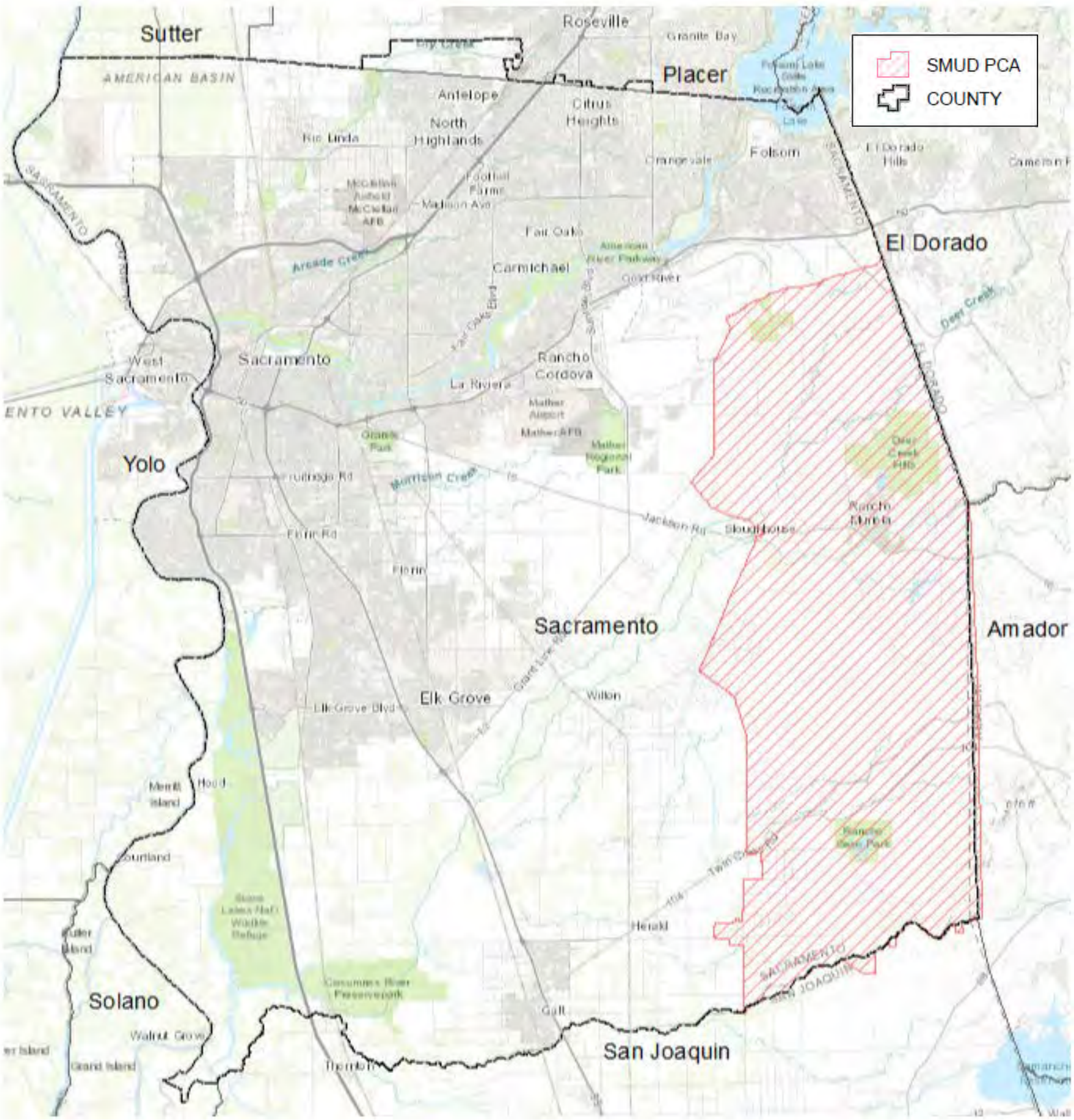


Exhibit to SMUD's 2022 WMP: Summary of Changes 2021 to 2022 Wildfire Mitigation Plan Submittals

This Summary identifies key changes between SMUD's 2021 Wildfire Mitigation Plan (WMP) and this 2022 WMP. The 2021 WMP can be found at https://www.smud.org/en/In-Our-Community/Safety-Tips/Wildfire-safety/Wildfire-Mitigation-Plan.

The Summary is offered for the sole purpose of simplifying review of SMUD's 2022 WMP for those already familiar with the 2021 WMP. It does not represent a comprehensive identification of every update to the WMP from the prior WMP. A full understanding of SMUD's wildfire risk profile and its wildfire prevention and mitigation efforts should be based on a holistic review of the complete 2022 WMP.

1. Context Setting Information

Section 1 of the WMP provides an overview of SMUD. This Section was updated to include a Context Setting Table with summary information to highlight SMUD's unique characteristics impacting its low wildfire risk

2. Tabletop Exercise

Section 4.5 of the WMP describes the tabletop exercises SMUD conducts to test, analyze and enhance the current level of SMUD's coordination and expertise in responding to potential wildfire threats related to SMUD's utility system facilities. This section was updated to provide additional information regarding SMUD's most recent tabletop exercises and collaboration with our public safety and community partners.

3. Overview of SMUD's T&D assets in CPUC HFTD

Section 5.1 of the WMP describes the fire threat assessment SMUD conducted of its assets. This Section includes a Table presenting an overview of SMUD's T&D assets in the California Public Utilities Commission High Fire Threat District (HFTD). This table has been updated to reflect current line mileages in each HFTD tier.

4. Wildfire Preventative Strategy and Program

Section 6 of the WMP describes SMUD's current wildfire prevention strategy and programs. This Section was updated to reflect current program objectives and completion dates. The updates include the addition of new programs and program work that were completed since the initial plan was adopted. These initiatives include:

- Noting additional situational awareness tools used by SMUD's Power System Operators
- Noting the use of certified and experiences vegetation experts to conduct regular right-of-way inspections and maintenance, and clarifying the various types of inspections and clearance objectives in and out of the HFTD
- Noting the completion of several projects during 2020-2021
- Updated, added and/or removed initiatives in Section 6.7 to reflect current pilot projects.
- Expanding the discussion of workforce training (Section 6.9) to include wildfire prevention mitigation and response training that occurs prior to the start of all work occurring in the HFTD.

5. Community Outreach and Customer Communication

Section 7.2 of the WMP includes a description of SMUD's public and agency communications related to potential wildfire. This section was updated to recognize several new efforts by SMUD, including the roll out of an opt in program for all customers that allows participants to receive additional information or notifications in the unlikely event of a wildfire in SMUD's service territory.

6. Roles and Responsibilities

Section 9 of the WMP identifies SMUD's management responsibility for overseeing the WMP and includes the operating departments and teams responsible for carrying out the various program activities described in the WMP. Section 9 was updated to reflect an organizational realignment implemented by SMUD in 2021. SMUD's Chief Operating Officer has overall responsibility for the WMP. In addition to the Chief Operating Officer, the Chief Zero Carbon Officer and Chief Customer Officer are responsible for executing the various components of the WMP.

Table 7 was updated to list the Director's with responsibility for the departments or workgroups that are accountable for the various components of SMUD's WMP under the realignment. Conforming changes were made throughout the 2022 WMP.

7. WMP Metrics and Performance

Section 9 of SMUD's WMP also describes the metrics used to measure the performance of the WMP and the programs outlined in the WMP. SMUD has updated this Section with a series of new metrics and measures and a more detailed description of the metric development and data collection process. These new metrics provide a more granular measure of SMUD initiatives that prevent and/or mitigate potential wire down, equipment failure or other ignition causing events. Accordingly, the wire down and ignition event metrics were replaced.

8. Other Areas

The following changes are also reflected in the updated 2021 WMP:

- Section 10 updated to clarify SMUD's public comment and governing board adoption process for the WMP, including the independent evaluation and submittal to the WSAB
- A new 10.5 was added to describe SMUD's budgeting process for wildfire mitigation plan program commitments.
- A new 10.6 was added to identify this Change Summary Exhibit.
- Graphics were updated
- Updates were made to ensure internal consistency within the WMP and make non-substantive editorial corrections

RESOLUTION NO. 22-05-06

WHEREAS, SMUD is committed to preserving public access and participation in meetings of the Board of Directors and to the safety of meeting attendees; and

WHEREAS, all meetings of the Board of Directors are open and public, as required by the Ralph M. Brown Act (Gov't Code, §§ 5495054963) ("Brown Act"), so that any member of the public may attend, participate in, and watch SMUD's governing body conduct its business; and

WHEREAS, the newly enacted Government Code section 54953(e) authorizes a local agency's governing body, during a proclaimed state of emergency, to participate in its public meetings using remote teleconferencing without compliance with the requirements of Government Code section 54953(b)(3), under specified conditions; and

WHEREAS, a required condition is that a state of emergency is declared by the Governor pursuant to Government Code section 8625, proclaiming the existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions as described in Government Code section 8558; and

WHEREAS, another condition is that state or local officials have imposed or recommended measures to promote social distancing, or, the legislative body determines that meeting in person would present imminent risks to the health and safety of attendees; and

WHEREAS, on February 28, 2022, the California Department of Public Health rescinded the mask requirement effective March 1, 2022, for all individuals regardless of vaccination status and instead issued a strong recommendation that all persons, regardless of vaccine status, continue indoor masking; and

WHEREAS, the Sacramento County Department of Public Health on its Epidemiology COVID-19 Dashboard continues to show elevated case and death data, with the case rate nearly more than quadrupling between the end of March 2022 and early May, and continuing to increase; and

WHEREAS, it was reported on May 11, 2022, that Sacramento County has returned to high community transmission rates for COVID-19 as defined by the Centers for Disease Control and Prevention; and

WHEREAS, on April 21, 2022, the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) re-adopted its workplace COVID-19 Emergency Temporary Standards (ETS), as modified, effective May 6, 2022, through December 31, 2022, including outbreak reporting; and

WHEREAS, SMUD is incrementally reintroducing staff to its administrative buildings, staff infections continue to be reported with some consistency, and, under the current schedule, the majority will not return to working on-site until August or September 2022; and

WHEREAS, SMUD Board and Committee meetings can last as long as four hours, with participants sitting in the same room sharing air the entire time; and

WHEREAS, it would be impractical for SMUD to take steps necessary to prevent imminent risks to the health and safety of attendees, such as by holding public meetings outdoors, ensuring public meeting attendees are vaccinated, have appropriate face coverings, and wear them consistent with public health guidance; and

WHEREAS, all meetings, agendas, meeting dates, times, and manner in which the public may participate in the public meetings of the SMUD Board and offer public comment by telephone or internet-based service options including video conference are posted on the SMUD website and physically outside of SMUD's Headquarters Building; and

WHEREAS, by Resolution No. 21-10-01 adopted on October 12, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-10-03 adopted on October 21, 2021, this Board made findings that requisite conditions exist for the SMUD

Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-11-05 adopted on November 18, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-12-04 adopted on December 9, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-03-01 adopted on March 8, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-03-03 adopted on March 17, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-04-01 adopted on April 13, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-04-03 adopted on April 21, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; **NOW, THEREFORE**,

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. Risks to Health and Safety of Attendees. The Board has reconsidered the circumstances of the state of emergency and hereby finds that the state of emergency continues to directly impact the ability of the members to meet safely in person and holding SMUD Board meetings in person would present imminent risks to the health and safety of attendees.

Section 2. Remote Teleconference Meetings. SMUD staff are hereby authorized and directed to take all actions necessary to carry out the intent and purpose of this Resolution, including conducting open and public meetings in accordance with section 54953(e) and other applicable provisions of the Brown Act.

Section 3. Effective Date of Resolution. This Resolution shall take effect immediately upon its adoption and shall be effective until the earlier of (i) June 18, 2022, or (ii) such time the Board of Directors adopts a subsequent resolution in accordance with Government Code section 54953(e)(3) to extend the time during which the SMUD Board may continue to teleconference without compliance with paragraph (3) of subdivision (b) of section 54953.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

RESOLUTION NO. 22-05-07

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. That an election is called to be held on the 8th day of November, 2022, for the purpose of electing four (4) directors of the Sacramento Municipal Utility District ("SMUD"), one of whom shall be a resident and voter of each of Wards 3, 4, 6 and 7. The boundaries of said wards are hereby fixed and established as shown on the sheets appended hereto. Each director shall be elected for a full four-year term from the ward in which he or she resides and the election shall be held and conducted in all respects as required by law.

Ward	Incumbent	Expiration of Term
3	Gregg Fishman	2022
4	Rosanna Herber	2022
6	Dave Tamayo	2022
7	Heidi Sanborn	2022

Section 2. That the Board of Supervisors of the County of Sacramento is requested to consolidate said election of directors of SMUD with the general election to be held on the 8th day of November, 2022.

Section 3. That the Board of Supervisors of the County of Sacramento is requested to reestablish the boundaries of such election precincts as are divided by the boundaries of Wards 3, 4, 6, and 7 of SMUD to provide that the boundaries of the election precincts coincide with the boundaries of said wards.

Section 4. That the Board of Supervisors of the County of Sacramento is authorized to canvass the returns of the election of directors and to certify the election results to this Board.

Section 5. That in the event of a tie vote between candidates, the election shall be determined by lot.

Section 6. That any candidate for the Board of Directors of SMUD who files a statement of qualifications for printing and distributing pursuant to Section 13307 of the Elections Code shall pay at the Sacramento County Voter Registration and Elections office, in advance, for the publication of the candidate's statement, pursuant to Elections Code Section 13307, in the amount estimated by the Sacramento County Registrar of Voters, and that any such statement shall contain 200 words or less.

Section 7. That SMUD agrees to reimburse the Registrar of Voters for actual costs incurred, such costs to be calculated by the method set forth in the County's current Election Costs Allocation Procedures, pursuant to Elections Code section 10520.

Section 8. That the Secretary of SMUD is directed to transmit certified copies of this resolution to the Clerk of the Board of Supervisors of the County of Sacramento, to the County Clerk of the County of Sacramento, and to the Registrar of Voters of the County of Sacramento.

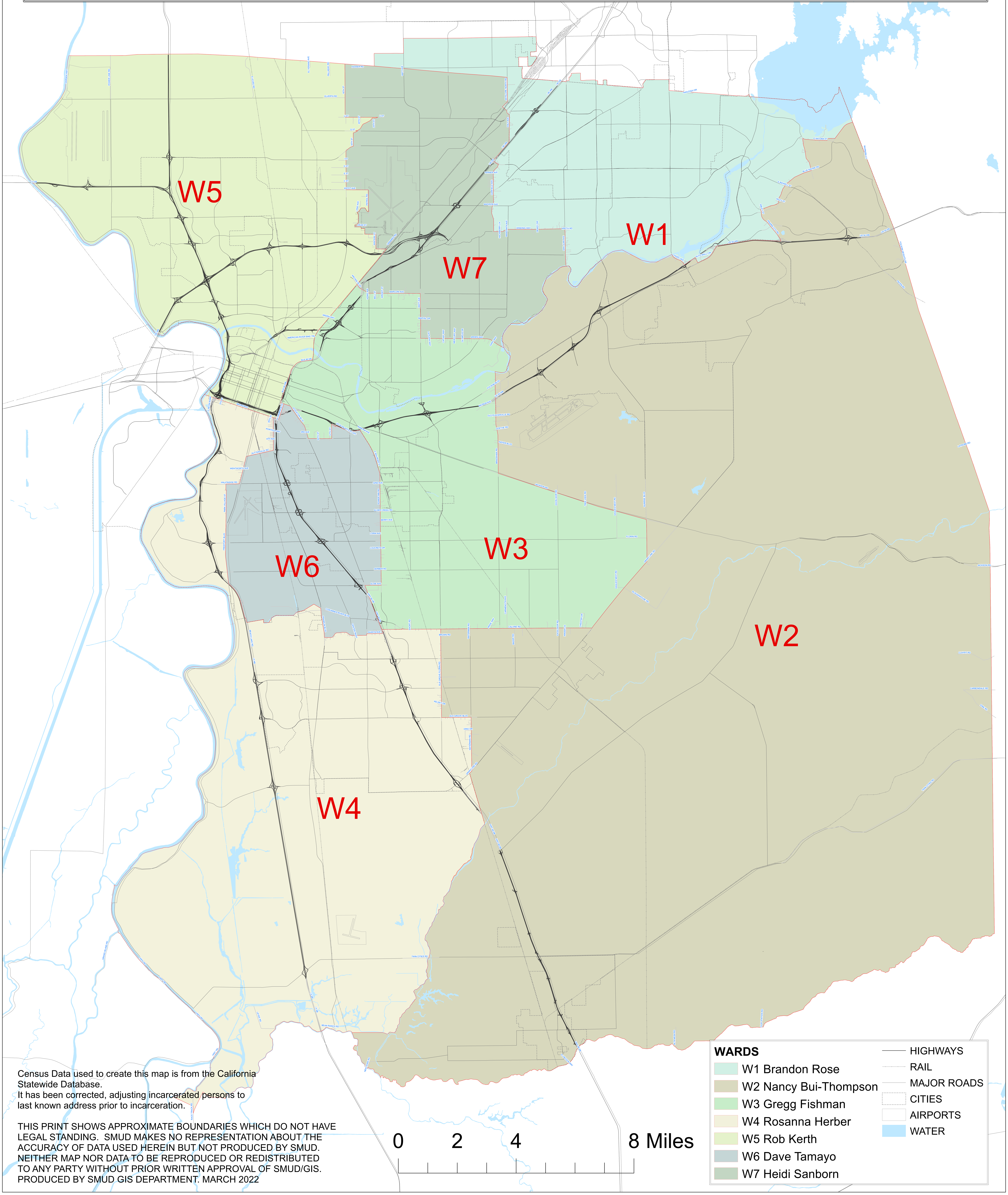
Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

SMUD

Sacramento Municipal Utility District Ward Boundaries

Attachment D
to Resolution No. 22-05-07



Census Data used to create this map is from the California Statewide Database.
It has been corrected, adjusting incarcerated persons to last known address prior to incarceration.

THIS PRINT SHOWS APPROXIMATE BOUNDARIES WHICH DO NOT HAVE LEGAL STANDING. SMUD MAKES NO REPRESENTATION ABOUT THE ACCURACY OF DATA USED HEREIN BUT NOT PRODUCED BY SMUD. NEITHER MAP NOR DATA TO BE REPRODUCED OR REDISTRIBUTED TO ANY PARTY WITHOUT PRIOR WRITTEN APPROVAL OF SMUD/GIS. PRODUCED BY SMUD GIS DEPARTMENT. MARCH 2022

SACRAMENTO MUNICIPAL UTILITY DISTRICT

WARD BOUNDARY DESCRIPTIONS

FROM January 20, 2022, TO CURRENT DATE

Ward 1

Beginning at a point of intersection of the Easterly Boundary Line of Sacramento County and the centerline of Green Valley Road; thence Southwesterly along Green Valley Road to the centerline of Cummings Way; thence Westerly and Southerly along the centerline of Cummings Way to the centerline of East Natoma Street; thence Westerly along the centerline of East Natoma Street to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility Distract as described in the Final Order of Condemnation recorded in the office of the Sacramento County Recorder in Book 3277, at Page 346 of Official Records; thence Southeasterly along the centerline of said easement to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility District as described in the deed recorded in the office of the Sacramento County Recorder in Book 2998, at Page 399 of Official Records; thence Southeasterly along the centerline of last said easement to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility Distract as described in the Final Order of Condemnation recorded in the office of the Sacramento County Recorder in Book 3277, at Page 346 of Official Records; thence Southeasterly along the centerline of last said easement to the centerline of Oak Avenue Parkway; thence Southeasterly along the centerline of Oak Avenue Parkway to the centerline of Blue Ravine Road; thence Southwesterly along the centerline of Blue Ravine Road to the Northeasterly prolongation of the Southerly Parcel line of Parcel 7 as described in the Quitclaim Deed recorded in the office of the Sacramento County Recorder in Book 19960906 at Page 1665; thence Southwesterly along the Northeasterly prolongation of said parcel and along the Southerly Parcel Line of said Parcel to the centerline of Sibley Street; thence Southerly along the centerline of Sibley Street to merge with the centerline of Prairie City Road; thence Southerly and Southeasterly along the centerline of Prairie City Road to the City of Folsom Boundary Line; thence Westerly and Southwesterly along the City of Folsom Boundary Line to the centerline of Aerojet Road; thence Northwesterly along the City of Folsom Boundary Line and the centerline of Aerojet Road to the centerline of US Highway 50 (the El Dorado Freeway); thence Southwesterly along the centerline of US Highway 50 (the El Dorado Freeway) to the centerline of Hazel Avenue; thence Northwesterly along the centerline of Hazel Avenue to the centerline of the American River; thence Southwesterly, along the centerline of the American River to the southerly prolongation of the centerline of San Juan Avenue; thence Northerly, along the southerly prolongation of the centerline of San Juan Avenue and the centerline of San Juan Avenue to the centerline of Winding Way; thence Westerly, along the centerline of Winding Way to the centerline of Garfield Avenue; thence Northerly, along the centerline of Garfield Avenue to the centerline of Greenback Lane; thence Northwesterly, along the centerline of Greenback Lane to the centerline of Interstate Highway 80; thence Northeasterly along the centerline of Interstate Highway 80 to the City of Citrus Heights Boundary Line; thence Northerly along the City of Citrus Heights Boundary Line to the Southerly prolongation of the Eastern boundary line of the Plat of “Larchmont Foothills Unit No. 9” as recorded in the office of the Sacramento County Recorder in Book 110 at Page 21; thence Northerly along the Southerly prolongation of said Plat and along the Eastern boundary line of said plat to the Eastern boundary of the Plat of “Larchmont Foothills Unit No. 8” as recorded in the office of the Sacramento County Recorder in Book 113 at Page 2; thence Northerly along the boundary line of said Plat to the Eastern boundary of the Plat of “Larchmont Foothills Unit No. 11” as recorded in the office of the Sacramento County Recorder in Book 129 at Page 19 to the centerline of Daly Avenue; thence Northerly along the centerline of Daly Avenue to the Centerline of Roseville Road; thence Northwesterly along the centerline of Roseville Road to the Southeasterly prolongation of the centerline of Poker Lane; thence Northwesterly along the prolongation of the centerline of Poker Lane and the centerline of Poker Lane to the centerline of Antelope North Road; thence Northeasterly along the centerline of Antelope North Road to the Northern Boundary Line of Sacramento County; thence Westerly along the northerly boundary line of Sacramento County to the west line of Section 11, Township 10 North, Range 5 East, M.D.B. &M.; thence Northerly, along the westerly line of Section 11, one-half mile, more or less, to a road running east and west through the center of Section 11; thence Easterly, along east-west road to the west line of Section 12, Township 10 North, Range 5 East, M.D.B. &M.; thence Northerly, along the west line of Section 12, one-half mile, more or less, to the northwest corner of Section 12; thence Easterly, along the north line of Section 12 to the Range line between Township 10 North, Range 5 East, M.D.B. &M. and Township 10 North, Range 6 East, M.D.B. &M.; thence continuing Easterly, along the north lines of Sections 7, 8, 9 and 10 Township 10 North, Range 6 East, M.D.B. &M. to the northeast corner of Lot 28 as shown on the plat of "Hicken Tract", recorded in the office of the Recorder of Placer County in Book A of Maps, Page 31; thence South 00°03'55" West 20 feet; thence South 00°19'40" East 2635.13 feet, thence South 00°28’00” West 20.22 feet to the southerly line of Booth Road; thence Westerly, along the southerly line of Booth Road the following three (3) courses: 1) South 82°05'00" West 513.96 feet; 2) South 89°18'00" West 292.20 feet; and 3) North 85°19'00" West 237.29 feet; thence leaving the southerly line of Booth Road, and along the Roseville City Limits line South 00°02'00" East 794.50 feet; thence South 89°56'00" East 1038.21 feet to the north-south centerline of Section 10, Township 10 North, Range 6 East, M.D.B. &M.; thence along north-south centerline South 00°28'00" West 367.40 feet to a point in the westerly line of Atkinson Street; thence along the westerly line of Atkinson Street South 33°56’00” East 1221.02 feet; thence along a curve to the right, having a radius of 870 feet, the chord of which bears South 61°12'07" West 810.35 feet, to a point in the northerly line of P.F.E. Road; thence Westerly, along the northerly line of P.F.E. Road, 148 foot to the easterly line of Parcel D as shown on "Parcel Map No. 71906", recorded in the office of the Recorder of Placer County in Book 10 of Parcel Maps at Page 133; thence Northerly, along the easterly line of Parcel D, 1564.15 feet, more or less, to the northeast corner of Parcel D; thence Westerly, along the northerly line of Parcel D and the northerly line of Parcels B and C of the Parcel Map, 1629 feet, more or less, to the northwest corner of

Parcel B; thence Southerly, along the westerly line of Parcel B and its southerly prolongation, 1631.43 feet, more or less, to the southerly line of P.F.E. Road; thence, along the southerly line of P.F.E. Road, North 89°07'01" East 636.84 feet; thence South 00°02'00" East 450 feet; thence South 89°59'00" West 96.80 feet to the westerly line of Section 15, Township 10 North, Range 6 East, M.D.B. &M.; thence along the westerly line of Section 15, South 00°02'00 East 1412.00 feet to the northerly boundary line of Sacramento County; thence Easterly along the northerly line of Sacramento County to the centerline of Interstate 80; thence Northeasterly, along the centerline of Interstate 80 to its intersection with the east-west centerline of Section 14, Township 10 North, Range 6 East, M.D.B. &M.; thence Easterly, along the east-west centerline of Section 14 to the southerly prolongation of the east line of Lots 5 and 6 as shown on the plat of "Livoti Tract", recorded in the office of the Recorder of Placer County in Book E of Maps at Page 5; thence Northerly, along the east line of Lots 5 and 6 and its southerly and northerly prolongation 660 feet, more or less, to the northerly right of way line of Livoti Avenue; thence Easterly, along the northerly line of Livoti Avenue 210.13 feet, to the easterly line of Lot 26 of "Livoti Tract"; thence Northerly, along the easterly line of Lot 26, 227 feet, more or less, to a point 3.00 feet northerly of the northerly line of Lot 25 of "Livoti Tract"; thence Easterly, along a line parallel with and 3.00 feet northerly of the northerly line of Lot 25, 138.75 feet; thence Northerly, along a line parallel with and 138.75 feet easterly of the easterly line of Lot 26, 445.23 feet to the northerly line of "Livoti Tract"; thence along the northerly line of "Livoti Tract", North 89°22'20" East 1712.24 feet to the northeast corner of "Livoti Tract"; thence Southerly, along the easterly line of "Livoti Tract", also being the westerly line of Section 13, Township 10 North, Range 6 East, M.D.B. &M., 1332.60 feet to the southwest corner of the Northwest one-quarter of Section 13; thence Easterly, along the southerly line of the Northwest one-quarter of Section 13, 2640 feet, more or less, to the westerly line of Sunrise Boulevard; thence Southerly, along the westerly line of Sunrise Boulevard 112 feet, more or less, to its intersection with the westerly prolongation of the north line of the parcel of land conveyed to Charles R. and Marjory A. Knoche and recorded in Volume 1138 of Official Records of Placer County at Page 138; thence East, along the westerly prolongation of the north line of the Knoche parcel to the east line of Sunrise Boulevard; thence continuing East, along the north line of the Knoche parcel, 344.67 feet to the northeast corner of Knoche parcel, said northwest corner of the Knoche parcel being a point on the east line of Lot 166, as shown on the plat of "Citrus Heights Addition No. 8" recorded in the Placer County Recorder's Office in Book C of Maps, Page 53; thence South 00°01'00" East 635.60 feet along the east line of Lot 166 to a point on the northerly line of Sacramento County; thence South 84°18'41" East 994.92 feet, along the Sacramento County Line to a point on the east line of Lot 169, as shown on "Citrus Heights Addition No. 8"; thence North 00°01'00" West 845.91 feet, along the east line of Lot 169 to the northeast corner of Lot 169, also being a point on the south line of the North one-half of Section 13, Township 10 North, Range 6 East; thence Easterly 652 feet, more or less, along the south line of the North one-half of Section 13 to the northwest corner of

Lot 172, as shown on "Citrus Heights Addition No. 8"; thence Southerly, along the west line of Lot 172, 906.6 feet, more or less, to the Sacramento County line; thence along the Sacramento County line, South 85°18'30" East 6391 feet, more or less, to the easterly right of way line of Old Auburn Road; thence along the easterly right of way line of Old Auburn Road the following five (5) courses: 1) North 50°33'00" East 120 feet; 2) along a curve to the left, having a radius of 90.3 feet, the chord of which bears North 21°15'00" East 89.3 feet; 3) North 08°41'50" West 413.2 feet; 4) along a curve to the right, having a radius of 330 feet, the chord of which bears North 14°16'50" West 257.6 feet; and 5) North 37°14'50" East 815 feet; thence North 30 feet to the centerline of Old Auburn Road; thence Easterly, along the centerline of Old Auburn Road 4100 feet, more or less, to the centerline of Sierra College Boulevard; thence Southerly, along the centerline of Sierra College Boulevard to the Sacramento County line; thence Easterly along the Sacramento County Line to a point on the boundary line of the 75-foot wide canal described that certain Deed to San Juan Suburban Water District recorded in the office of the Recorder of Placer County in Book 664 of Official Records at Page 618; thence Northerly and Easterly along the canal described in said deed to the Northerly line of Section 23; thence Easterly along the Northerly line of Section 23 to the Westerly line of Folsom Auburn Road; thence Southerly along the Westerly line of Folsom Auburn Road to the northerly boundary line of Sacramento County; thence Easterly and Southerly along the northerly and easterly boundary line of Sacramento County to the point of beginning.

Ward 2

Beginning at a point of intersection of the Easterly Boundary Line of Sacramento County and the centerline of Green Valley Road; thence Southwesterly along Green Valley Road to the centerline of Cummings Way; thence Westerly and Southerly along the centerline of Cummings Way to the centerline of East Natoma Street; thence Westerly along the centerline of East Natoma Street to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility Distract as described in the Final Order of Condemnation recorded in the office of the Sacramento County Recorder in Book 3277, at Page 346 of Official Records; thence Southeasterly along the centerline of said easement to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility District as described in the deed recorded in the office of the Sacramento County Recorder in Book 2998, at Page 399 of Official Records; thence Southeasterly along the centerline of last said easement to the centerline of the two hundred (200’) foot wide easement to Sacramento Municipal Utility Distract as described in the Final Order of Condemnation recorded in the office of the Sacramento County Recorder in Book 3277, at Page 346 of Official Records; thence Southeasterly along the centerline of last said easement to the centerline of Oak Avenue Parkway; thence southeasterly along the centerline of Oak Avenue Parkway to the centerline of Blue Ravine Road; thence Southwesterly along the centerline of Blue Ravine Road to the Northeasterly prolongation of the Southerly Parcel line of Parcel 7 as described in the Quitclaim Deed recorded in the office of the Sacramento County Recorder in Book 19960906 at Page 1665; thence Southwesterly along the Northeasterly prolongation of said parcel and along the Southerly Parcel Line of said parcel to the centerline of Sibley Street; thence Southerly along the centerline of Sibley Street to merge with the centerline of Prairie City Road; thence Southerly and Southeasterly along the centerline of Prairie City Road to the City of Folsom Boundary Line; thence Westerly and Southwesterly along the City of Folsom Boundary Line to the centerline of Aerojet Road; thence Northwesterly along the City of Folsom Boundary Line and the centerline of Aerojet Road to the centerline of US Highway 50 (the El Dorado Freeway); thence Southwesterly along the centerline of US Highway 50 (the El Dorado Freeway) to the centerline of Hazel Avenue; thence Northwesterly along the centerline of Hazel Avenue to the centerline of the American River; thence Southwesterly, along the centerline of the American River to a point on the northerly prolongation of the west line of the plat of "Larchmont Riviera East Unit No. 2", recorded in the office of the Recorder of Sacramento County on July 7, 1970, in Book 85 of Maps, Map No. 16; thence Southerly, along the northerly prolongation of the west line of "Larchmont Riviera East Unit No. 2" and the west line of "Larchmont Riviera East Unit No. 2" to the northwest corner of the plat of "Larchmont Riviera East Unit No. 1", recorded in the office of the Recorder of Sacramento County on September 10, 1969, in Book 84 of Maps, Map No. 15; thence South 105.00 feet, along the west line of "Larchmont Riviera East Unit No. 1", to the southwest corner of Lot 73 as shown on "Larchmont Riviera East Unit No. 1"; thence Southeasterly to the centerline of Hyannis Way; thence Southerly, along the centerline of Hyannis Way to the centerline of Bradshaw Road; thence Southerly along the centerline of Bradshaw Road to the centerline of Jackson Highway (CA State Route 16); thence Southeasterly along the centerline of Jackson Highway (CA State Route 16) to the centerline of Sunrise Boulevard; thence Southerly along the centerline of Sunrise Boulevard to the centerline of Grant Line Road; thence Southwesterly along the centerline of Grant Line Road to the centerline of Calvine Road; thence Westerly along the centerline of Calvine Road to the centerline of Elk Grove Florin Road; thence Southerly along the centerline of Elk Grove Florin Road to the centerline of Elk Grove Boulevard; thence Easterly along the centerline of Elk Grove Boulevard to the centerline of Waterman Road; thence Southerly along the centerline of Waterman Road to the centerline of Grant Line Road; thence Southwesterly along the centerline of Grant Line Road to the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad); thence Southeasterly along the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad) to the centerline of the Cosumnes River; thence Southwesterly along the centerline of the Cosumnes River to the Easterly prolongation of the Northern Parcel line of the Parcel as described in the Grant Deed recorded by the Sacramento County Recorder’s Office in Book 20080606 at Page 1041; then Westerly along the Easterly prolongation of and along the Northern Parcel Line of said parcel to the Sacramento County Boundary Line; thence Southeasterly and Easterly along the Sacramento County Boundary Line to the Southeastern most point of the Sacramento County Boundary Line; thence Northerly and Northwesterly along the Sacramento County Boundary Line to the point of beginning.

Ward 3

Beginning at a point which is the intersection of the centerline of Howe Avenue with the centerline of Marconi Avenue; thence from said point of beginning Northwesterly along the centerline of Marconi Avenue to the centerline of the Southern Pacific Transportation Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad); thence Southwesterly along the centerline of the Southern Pacific Transportation Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad) to the centerline of the Capitol City Freeway (Business 80); thence Southwesterly along the centerline of the Capitol City Freeway (Business 80) to the centerline of R Street; thence Southeasterly along the centerline of R street to the centerline of what was previously known as R Street as shown on the Parcel Map recorded in Book 42 of Parcel Maps, at Page 40 in the Sacramento County Recorder's Office; thence Southeasterly along the centerline of what was previously known as R Street to the centerline of Stockton Boulevard; thence Southeasterly along the centerline of Stockton Boulevard to the centerline of Broadway; thence Easterly, along the centerline of Broadway to the centerline of 57th Street; thence Northerly along the centerline of 57th Street to the centerline of T Street; thence Southeasterly along the centerline of T Street to the centerline of 59th Street; thence Northerly along the centerline of 59th Street to the centerline of Eastbound US Highway 50, thence Easterly along the centerline of Eastbound US Highway 50 to the Eastbound 65th Street Off-Ramp of US Highway 50; thence Easterly along the centerline of the Eastbound 65th Street Off-Ramp of US Highway 50 to the centerline of 65th Street; thence Northerly along the centerline of 65th Street to the centerline of Eastbound US Highway 50; thence Easterly along the centerline of Eastbound US Highway 50 to the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad); thence Southeasterly along the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad) to the centerline of Power Inn Road; thence Southerly, along the centerline of Power Inn Road to the centerline of Elsie Avenue; thence Westerly along the centerline of Elsie Avenue to the centerline of Stockton Boulevard; thence Southeasterly along the centerline of Stockton Boulevard and its southerly prolongation to the centerline of California State Highway 99; thence Southerly along the centerline of California State Highway 99 to the Westerly prolongation of the centerline of Geneva Pointe (formerly Old Calvine Road); thence Easterly along the prolongation of the centerline of Geneva Pointe (formerly Old Calvine Road) and the centerline of Geneva Pointe to the centerline of

Calvine Road; then Easterly along the centerline of Calvine Road to the centerline of Grant Line Road; thence Northeasterly along the centerline of Grant Line Road to the centerline of Sunrise Boulevard; then Northerly along the centerline of Sunrise Boulevard to the centerline of Jackson Highway (CA State Route 16); thence Northwesterly along the centerline of Jackson Highway (CA State Route 16) to the centerline of Bradshaw Road; thence Northerly, along the centerline of Bradshaw Road to the centerline of Hyannis Way; thence Northerly, along the centerline of Hyannis Way and its northerly prolongation to the southwest corner of Lot 73, as shown on the plat of "Larchmont Riviera East Unit No. 1", recorded in the office of the Recorder of Sacramento County on September 10, 1969, in Book 84 or Maps, Map No. 15; thence North 105.00 feet, along the west line of "Larchmont Riviera East Unit No. 1", to the northwest corner of "Larchmont Riviera East Unit No. 1"; thence Northerly, along the west line of "Larchmont Riviera East Unit No. 2" recorded in the office of the Recorder of Sacramento County on July 7, 1970 in Book 85 of Maps, Map No. 16, and the northerly prolongation of the west line of "Larchmont Riviera East Unit No. 2" to the centerline of the American River; thence Northeasterly, along the centerline of the American River to the southeasterly prolongation of the centerline of Arden Way; thence Northwesterly, along the prolongation of the centerline of Arden Way and the centerline of Arden Way to the centerline of Watt Avenue; thence North along the centerline of Watt Avenue to the centerline Marconi Avenue; thence West along the centerline of Marconi Avenue to the centerline of Howe Avenue, said point being the point of beginning.

Ward 4

Beginning at the intersection of the centerline of the Sacramento River and the Sacramento County Boundary with the westerly prolongation of Broadway; thence from said point of beginning Southeasterly, along the westerly prolongation of Broadway and the centerline of Broadway to the centerline of Franklin Boulevard; thence Southerly along the centerline of Franklin Boulevard to the centerline of Sutterville Road; thence Southwesterly along the centerline of Sutterville Road to the centerline of Freeport Boulevard; thence Southerly, along the centerline of Freeport Boulevard to the centerline of Fruitridge Road; thence Westerly along the centerline of Fruitridge Road to the easterly line of the Record of Survey entitled "A Portion of the East 1/2 of Section 2 and the NE 1/4 of Section 11, Township 7 North, Range 4 East, Mount Diablo Meridian and a Portion of Sections 14, 23, 26, and 35, Township 8 North, Range 4 East, Mount Diablo Meridian", recorded in the office of the Recorder of Sacramento County on November 25, 1991, in Book 49 of Surveys at Page 29; thence Southerly, Easterly, Southerly, and Westerly along the easterly line of said Record of Survey recorded in Book 49 of Surveys at Page 29 to the centerline of Park Village Street; thence Southerly along the centerline of Park Village Street and the southerly prolongation of Park Village Street to the centerline of Freeport Boulevard; thence Southerly along the centerline of Freeport Boulevard and the southerly prolongation of Freeport Boulevard to the centerline of Interstate 5; thence Southeasterly, along the centerline of Interstate 5 to the centerline of Morrison Creek; thence Northeasterly, along the centerline of Morrison Creek to the centerline of Union House Creek (otherwise known as Beacon Creek); thence Easterly, along the centerline of Union House Creek (otherwise known as Beacon Creek) to the centerline of Franklin Boulevard; thence Southerly, along the centerline of Franklin Boulevard to the centerline of Calvine Road; thence Easterly along the centerline of Calvine Road to the centerline of Bruceville Road; thence Northerly along the centerline of Bruceville Road to the centerline of Shasta Avenue; thence Easterly along the centerline of Shasta Avenue to the centerline of California State Highway 99; thence Northwesterly along the centerline of California State Highway 99 to the Westerly prolongation of the centerline of Geneva Pointe (formerly Old Calvine Road); thence Easterly along the Westerly prolongation of the centerline of Geneva Pointe (formerly Old Calvine Road) and the centerline of Geneva Pointe to the centerline of Calvine Road; then Easterly along the centerline of Calvine Road to the centerline of centerline of Elk Grove Florin Road; thence Southerly along the centerline of Elk Grove Florin Road to the centerline of Elk Grove Boulevard; thence Easterly along the centerline of Elk Grove Boulevard to the centerline of Waterman Road; thence Southerly along the centerline of Waterman Road to the centerline of Grant Line Road; thence Southwesterly along the centerline of Grant Line Road to the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad); thence Southeasterly along the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad) to the centerline of the Cosumnes River; thence Southwesterly along the centerline of the Cosumnes River to the Easterly prolongation of the Northern Parcel line of the Parcel as described in the Grant Deed recorded by the Sacramento County Recorder's Office in Book 20080606 at Page 1041; thence Westerly along the Easterly prolongation of and along the Northern Parcel Line of said parcel to the Sacramento County Boundary Line and the centerline of the Mokelumne River; thence Southwesterly, along the centerline of the Mokelumne River to a point located South 85°45'00" East 1534.5 feet and South 76°45'00" East 1181.4 feet from the most southerly corner of Tract 2 as shown on the "Amended Plat of Survey of Property of Green, Harley, Marsh, and Sansforth", recorded in the office of the Recorder of Sacramento County in Book 3 of Surveys at Page 61; thence North 76°45'00" West 1181.4 feet; thence North 85°45'00" West 1534.5 feet to the most southerly corner of Tract 2; thence North 57°32'00" West 1458.64 feet, along the south line of Tract 2 to the easterly right of way line of the Southern Pacific Railroad (now abandoned); thence Southerly, along the easterly right of way line of the Southern Pacific Railroad (now abandoned); to the south line of that certain Record of Survey recorded in the office of the Recorder of Sacramento County in Book 3 of Surveys at Page 100; thence Westerly, along the south line of the Record of Survey recorded in Book 3 of Surveys at Page 100, to the westerly right of way line of the Southern Pacific Railroad (now abandoned); thence Northerly, along the westerly right of way line of the Southern Pacific Railroad (now abandoned); to the westerly line of Race

Track Road; thence Northerly, along the westerly line of Race Track Road to the most southerly corner of Parcel B as shown on the Parcel Map entitled "Swamp Land Survey No 336 Located on Tyler Island", recorded in the office of the Recorder of Sacramento County on September 30, 1985, in Book 89 of Parcel Maps at Page 12; thence North 64°12'51" West along the southwesterly line of the Parcel Map recorded in Book 89 of Parcel Maps at Page 12, and along it's northwesterly prolongation to the centerline of Georgiana Slough; thence Northeasterly, along the centerline of Georgiana Slough to the centerline of the Sacramento River; thence Northerly, along the centerline of the Sacramento River and the Sacramento County Boundary line to a point on westerly prolongation of the centerline of Broadway, said point being the point of beginning.

Ward 5

Beginning at the intersection of the Northerly boundary line of Sacramento County and the centerline of 16th Street; thence from said point of beginning Southerly along the centerline of 16th Street to the centerline of U Street; thence Easterly along the centerline of U Street and the easterly prolongation of U Street to the Northerly line of 24th Street; thence at right angles, Southerly to the centerline of 24th Street; thence Southwesterly along the centerline of 24th Street the easterly prolongation of the south line of Parcel 3 as shown on the Parcel Map recorded in Book 132 of Parcel Maps, at Page 22 in the office of the Sacramento County Recorder; thence Westerly along said easterly prolongation and the south line of said Parcel 3 to the centerline of Dry Creek; thence Southwesterly along the centerline of Dry Creek to the centerline of Q Street; thence Easterly along the centerline of Q Street to the centerline of 18th Street; thence Southerly along the centerline of 18th Street to the centerline of Elkhorn Boulevard; thence Southwesterly along the centerline of Elkhorn Boulevard to the centerline of 16th Street; thence Southerly along the centerline of 16th Street to the centerline of Ascot Avenue; thence Easterly along the centerline of Ascot Avenue to the City of Sacramento City Limit Line as shown on the Record of Survey entitled “McClellan Park” recorded in the office of the Recorder of Sacramento County on December 31, 2001 in Book 61 of Records of Survey at Page 25; thence following said City of Sacramento City Limit Line in the Southerly direction to the centerline of North Avenue; thence Easterly along the centerline of North Avenue and the Easterly prolongation of North Avenue to the centerline of the Southern Pacific Transportation Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad); thence Southwesterly, along the centerline of the Southern Pacific Transportation Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad) to the centerline of the Capitol City Freeway (Business 80); thence Southwesterly along the centerline of the Capitol City Freeway (Business 80) to the centerline of R Street; thence Easterly along the centerline of R Street to the centerline of Alhambra Boulevard; thence Southerly along the centerline of Alhambra Boulevard to the centerline of Broadway; thence Westerly, along the centerline of Broadway and its westerly prolongation to the centerline of the Sacramento River; thence Northerly, along the centerline of the Sacramento River to its intersection with the northerly boundary line of Sacramento County and the southerly boundary line of Sutter County; thence Easterly, along the northerly boundary line of Sacramento County to a point on the centerline of 16th Street, said point being the point of beginning.

Ward 6

Beginning at the intersection of the centerline of Alhambra Boulevard and the centerline of what was previously known as R Street as shown in Parcel Map recorded at Book 42 at Page 40 in the Sacramento County Recorder's Office; thence Southeasterly along the centerline of said R Street to the centerline of Stockton Boulevard; thence Southeasterly along the centerline of Stockton Boulevard to the centerline of Broadway; thence Easterly, along the centerline of Broadway to the centerline of 57th Street; thence Northerly along the centerline of 57th Street to the centerline of T Street; thence Southeasterly along the centerline of T Street to the centerline of 59th Street; thence Northerly along the centerline of 59th Street to the to the centerline of Eastbound US Highway 50, thence Easterly along the centerline of Eastbound US Highway 50 to the centerline of the Eastbound 65th Street Off-Ramp of US Highway 50; thence Easterly along the centerline of the Eastbound 65th Street Off-Ramp of US Highway 50 to the centerline of 65th Street; thence Northerly along the centerline of 65th Street to the centerline of Eastbound US Highway 50; thence Easterly along the centerline of Eastbound US Highway 50 to the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad); thence Southeasterly, along the centerline of the Southern Pacific Transportation Company's Sacramento-Stockton Main Line right of way (now owned by Union Pacific railroad) to the centerline of Power Inn Road; thence Southerly, along the centerline of Power Inn Road to the centerline of Elsie Avenue; thence Westerly along the centerline of Elsie Avenue to the centerline of Stockton Boulevard; thence Southeasterly along the centerline of Stockton Boulevard and its southerly prolongation to the centerline of California State Highway 99; thence Southerly along the centerline of California State Highway 99 to the Easterly prolongation of the centerline of Shasta Avenue; thence Westerly along the Easterly prolongation of the centerline of Shasta Avenue and the centerline of Shasta Avenue to the centerline of Bruceville Road; thence Southerly along the centerline of Bruceville Road to the centerline of Calvine Road; thence Westerly along the centerline of Calvine Road to the centerline of Franklin Boulevard; thence Northerly along the centerline of Franklin Boulevard to the centerline of Union House Creek (otherwise known as Beacon Creek); thence Westerly, along the centerline of Union House Creek (otherwise known as Beacon Creek) to the centerline of Morrison Creek; thence Southwesterly, along the centerline of Morrison Creek to the centerline of Interstate 5; thence Northwesterly, along the centerline of Interstate 5 to the southerly prolongation of the centerline of Freeport Boulevard; thence Northerly along the southerly prolongation of

Freeport Boulevard and Northerly along the centerline of Freeport Boulevard to the southerly prolongation of Park Village Street; thence Northerly along the southerly prolongation of Park Village Street and Northerly along the centerline of Park Village Street to the easterly line of the Record of Survey entitled "A Portion of the East 1/2 of Section 2 and the NE 1/4 of Section 11, Township 7 North, Range 4 East, Mount Diablo Meridian and a Portion of Sections 14, 23, 26, and 35, Township 8 North, Range 4 East, Mount Diablo Meridian", recorded in the office of the Recorder of Sacramento County on November 25, 1991, in Book 49 of Surveys at Page 29; thence Easterly, Northerly, Westerly, and Northerly along the easterly line of said Record of Survey recorded in Book 49 of Surveys at Page 29 to the centerline of Fruitridge Road; thence Easterly, along the centerline of Fruitridge Road to the centerline of Freeport Boulevard; thence Northeasterly along the centerline of Freeport Boulevard to the centerline of Sutterville Road; thence Northeasterly along the centerline of Sutterville Road to the centerline of Franklin Boulevard; thence Northerly along the centerline of Franklin Boulevard to the centerline of Broadway; thence Southeasterly along the centerline of Broadway to the centerline of Alhambra Boulevard; thence Northerly along the centerline of Alhambra Boulevard at to the point of beginning.

Ward 7

Beginning at the point of intersection of the northerly boundary line of Sacramento County and the centerline of Watt Avenue; thence from said point of beginning Westerly along the northerly boundary line of Sacramento County to the centerline of 16th Street; thence Southerly along the centerline of 16th Street to the centerline of U Street; thence Easterly along the centerline of U Street and the easterly prolongation of U Street to the Northerly line of 24th Street; thence at right angles, Southerly to the centerline of 24th Street; thence Southwesterly along the centerline of 24th Street the easterly prolongation of the south line of Parcel 3 as shown on the Parcel Map recorded in Book 132 of Parcel Maps, at Page 22 in the office of the Sacramento County Recorder; thence Westerly along said easterly prolongation and the south line of said Parcel 3 to the centerline of Dry Creek; thence Southwesterly along the centerline of Dry Creek to the centerline of Q Street; thence Easterly along the centerline of Q Street to the centerline of 18th Street; thence Southerly along the centerline of 18th Street to the centerline of Elkhorn Boulevard; thence Southwesterly along the centerline of Elkhorn Boulevard to the centerline of 16th Street; thence Southerly along the centerline of 16th Street to the centerline of Ascot Avenue; thence Easterly along the centerline of Ascot Avenue to the City of Sacramento City Limit Line as shown in the Record of Survey “McClellan Park” recorded in the office of the Sacramento County Recorder on December 31, 2001 at Book 61 and Page 25; thence following said City of Sacramento City Limit Line in the Southerly direction to the centerline of North Avenue; thence easterly along the centerline of North Avenue and the Easterly prolongation of North Avenue to the centerline of the Southern Pacific Transportation

Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad); thence Southwesterly, along the centerline of the Southern Pacific Transportation Company's Sacramento-Salt Lake City Right of Way (now owned by Union Pacific Railroad) to the centerline Marconi Avenue; thence Easterly along the centerline of Marconi Avenue to the centerline of Watt Avenue; thence Southerly along the centerline of Watt Avenue to the centerline of Arden Way; thence Easterly along the centerline of Arden Way to the Southeasterly prolongation of Arden Way; thence along the Southeasterly prolongation of Arden Way to the centerline of the American River, thence Northeasterly along the centerline of the American River to the Southerly prolongation of San Juan Avenue; thence North along the Southerly prolongation of San Juan Avenue and the centerline of San Juan Avenue to the centerline of Winding Way; thence Westerly along the centerline of Winding Way to the centerline of Garfield Avenue; thence Northerly along the centerline of Garfield Avenue to the centerline of Greenback Lane; thence Northwesterly along the centerline of Greenback Lane to the centerline of Interstate Highway 80; thence Northeasterly along the centerline of Interstate Highway 80 to the Southerly prolongation of the Eastern boundary line of the Plat of “Larchmont Foothills Unit No. 9” as recorded in the office of the Sacramento County Recorder in Book 110 at Page 21; thence Northerly along the Southerly prolongation of said Plat and along the Eastern boundary line of said plat to the Eastern boundary of the Plat of “Larchmont Foothills Unit No. 8” as recorded in the office of the Sacramento County Recorder in Book 113 at Page 2; thence Northerly along the boundary line of said Plat to the Eastern boundary of the Plat of “Larchmont Foothills Unit No. 11” as recorded in the office of the Sacramento County Recorder in Book 129 at Page 19 to the centerline of Daly Avenue; thence Northerly along the centerline of Daly Avenue to the Centerline of Roseville Road; thence Northwesterly along the centerline of Roseville Road to the Southeasterly prolongation of the centerline of Poker Lane; thence Northwesterly along the prolongation of the centerline of Poker Lane and the centerline of Poker Lane to the centerline of Antelope North Road; thence Northeasterly along the centerline of Antelope North Road to the Northern Boundary Line of Sacramento County; thence Northwesterly along the Northerly Boundary Line of Sacramento County to a point on the centerline of Watt Avenue, said point of beginning.

Cal OES ID No. 067-91007

RESOLUTION NO. 22-05-08

BE IT RESOLVED BY THE DIRECTORS
OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. That this Board hereby designates SMUD's Chief Financial Officer, Controller, Assistant Controller(s), and Principal Financial Accountant to act as "Authorized Agents" to engage with the Federal Emergency Management Agency (FEMA) and the California Governor's Office of Emergency Services (Cal OES) for the purpose of obtaining certain federal financial assistance grants for the next 3 years and to execute for and on behalf of the Sacramento Municipal Utility District, a public entity established under the laws of the State of California, applications and other documents and to file them in the Office of Emergency Services for the purpose of obtaining federal financial assistance for any existing or future grant program, including, but not limited to, the following:

- Federally declared Disaster (DR), Fire Mitigation Assistance Grant (FMAG), California State Only Disaster (CDAA), Immediate Services Program (ISP), Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), Legislative Pre-Disaster Mitigation Program (LPDM), under Public Law 93-288 as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, and/or state financial assistance under the California Disaster Assistance Act.
- Flood Mitigation Assistance Program (FMA), under Section 1366 of the National Flood Insurance Act of 1968.
- National Earthquake Hazards Reduction Program (NEHRP) 42 U.S. Code 7704 (b)((2) (A) (ix) and 42 U.S. Code 7704 (b) (2) (B) National Earthquake Hazards Reduction Program, and also The Consolidated Appropriations Act, 2018, Div. F,

Department of Homeland Security Appropriations Act, 2018, Pub. L. No. 115-141.

- California Early Earthquake Warning (CEEW) under CA Gov Code – Gov, Title 2, Div. 1, Chapter 7, Article 5, Sections 8587.8, 8587.11, 8587.12.

Section 2. That this Board hereby authorizes its "Authorized Agents" to provide to FEMA and Cal OES, for all matters pertaining to such state disaster assistance, the assurances and agreements required.

Section 3. This is a universal resolution and is effective for all open and future disasters/grants declared up to three (3) years following the date of adoption below.

Section 4. Resolution No. 19-06-07 adopted on June 24, 2019, is hereby superseded.

Approved: May 19, 2022

INTRODUCED: DIRECTOR SANBORN				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

President Rose then turned to Discussion Calendar Item 13, to approve the issuance of SMUD 2022 Series J Revenue Refunding Bonds and/or SMUD 2022 Series C Subordinated Electric Revenue Refunding Bonds, authorize the distribution of the Preliminary Official Statement, and authorize the Chief Executive Officer and General Manager to execute documents necessary to complete the refunding transaction or transactions, including the Bond Purchase Agreement or Agreements.

Russell Mills, Director of Treasury Operations & Risk Management, gave a presentation regarding Discussion Calendar Item 13. A copy of the slides used in his presentation is attached hereto.

No public comment was forthcoming on Discussion Calendar Item 13.

After some discussion, Director Herber moved to approve Discussion Calendar Item 13, Director Fishman seconded, and Resolution Nos. 22-05-09 through 22-05-11 were unanimously approved.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

RESOLUTION NO. 22-05-09

SIXTY-FIFTH SUPPLEMENTAL RESOLUTION

AUTHORIZING THE ISSUANCE OF

ELECTRIC REVENUE REFUNDING BONDS, 2022 SERIES J

(Supplemental To Resolution No. 6649
Adopted January 7, 1971)

Adopted: May 19, 2022

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RESOLUTION NO. 22-05-09

Sixty-Fifth Supplemental Resolution
(Supplemental To Resolution No. 6649,
Adopted January 7, 1971)
Authorizing the Issuance of
Electric Revenue Refunding Bonds, 2022 Series J

WHEREAS, on January 7, 1971, the Board of Directors of the Sacramento Municipal Utility District (the "Board") adopted its Resolution No. 6649 providing for the issuance of the Sacramento Municipal Utility District's Electric Revenue Bonds (as supplemented and amended, herein called the "Master Resolution");

WHEREAS, the Master Resolution provides that the Sacramento Municipal Utility District (the "District") may issue bonds from time to time as the issuance thereof is authorized by the Board by a supplemental resolution;

WHEREAS, revenue bonds may be issued pursuant to the provisions of the Master Resolution and Article 6a of Chapter 6 of the Municipal Utility District Act (California Public Utilities Code Sections 12850 et seq.) and the Revenue Bond Law of 1941 (California Government Code Section 54300 et seq.) for the purpose of financing improvements and additions to the District's Electric System;

WHEREAS, revenue bonds may be issued pursuant to the provisions of the Master Resolution and California Government Code Section 53580 et seq. for the purpose of refunding revenue bonds;

WHEREAS, the District has determined to issue its 2022 Series J Bonds (as defined herein), in one or more series or subseries (as specified in the hereinafter defined Sales Certificate) and in an aggregate principal amount not to exceed the principal amount described herein, to (i) refund certain series and maturities of the District's Electric Revenue Bonds (to be identified in the Sales Certificate) (the "Refunded Bonds"), (ii) pay costs of issuance (to the extent specified in the Sales Certificate), (iii) fund a termination payment for the termination of an interest rate swap agreement relating to the issuance of the 2022 Series J Bonds (to the extent specified in the Sales Certificate) and (iv) make deposits to the Reserve Fund or a separate debt service reserve fund (as and if specified in the Sales Certificate);

WHEREAS, the District anticipates that, if necessary or desirable in the judgment of the Treasurer, it may seek commitments from one or more bond insurers (each, a "Bond Insurer") to issue one or more financial guaranty policies with respect to all or part of the 2022 Series J Bonds, each of which commitments is expected to be conditioned on certain terms and conditions to be set forth in one or more insurance agreements among the applicable Bond Insurer, the Trustee and the District (each, an "Insurance Agreement");

WHEREAS, Section 8.03 of the Master Resolution provides that the District may amend the Master Resolution by a supplemental resolution to be effective when there shall have been filed with the District or the Trustee the written consents of the holders and registered owners of 60% of the District's Electric Revenue Bonds then outstanding; and

WHEREAS, the District has drafted proposed amendments to the Master Resolution which are described in Section 142.01 of this Sixty-Fifth Supplemental Resolution, and the District intends to issue the 2022 Series J Bonds with the provision that each holder of the 2022 Series J Bonds by purchasing the 2022 Series J Bonds is deemed to have consented to the proposed amendments, all as more fully described herein;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Sacramento Municipal Utility District, as follows:

ARTICLE CXL

2022 SERIES J BONDS

Section 140.01 Authorization and Terms of 2022 Series J Bonds.

(a) The Board hereby authorizes the issuance of revenue bonds of the District for the purpose of refunding outstanding revenue bonds of the District, in each case in accordance with the Master Resolution and the Sales Certificate. The authorization provided in this paragraph to issue revenue bonds shall include, in addition to the purposes mentioned above, the authorization to issue such bonds for the allocable portion of any original issue discount, underwriting discount, bond insurance premiums, costs of issuance, interest rate swap termination payments, deposits to the Reserve Fund or a separate debt service reserve fund, and other miscellaneous costs necessary or desirable, in the judgment of the Treasurer, to be financed by such bonds.

(b) A sixty-first series of bonds to be issued under the Master Resolution is hereby created. Said bonds shall be known as the "Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2022 Series J" (herein called the "2022 Series J Bonds"). The 2022 Series J Bonds may be issued in one or more series or subseries (as specified in the hereinafter defined Sales Certificate) only in fully registered form. The 2022 Series J Bonds shall be initially registered in the name of "Cede & Co.," as nominee of The Depository Trust Company ("DTC") and shall be numbered in consecutive order in such manner as is determined by the Trustee. Registered ownership of the 2022 Series J Bonds, or any portion thereof, may not thereafter be transferred except as set forth in Section 140.08.

(c) The 2022 Series J Bonds shall be issued in such aggregate principal amount which, together with the aggregate principal amount of the District's Subordinated Electric Revenue Refunding Bonds, 2022 Series C, if any, issued and delivered at the same time shall not exceed $170,000,000, shall be dated, shall bear interest at such rate or rates (payable on such dates), not exceeding the maximum rate permitted by law, shall mature and become payable as to principal on such maturity dates in the amounts and subject to such mandatory sinking fund payments on such mandatory sinking fund payment dates, if any, all as set forth in a Sales Certificate to be executed and delivered concurrently with the sale of the 2022 Series J Bonds (the "Sales Certificate"). If all or any portion of the 2022 Series J Bonds are to bear interest at variable rates of interest, not exceeding the maximum rate permitted by law, the manner of determining such variable rates of interest shall be as set forth in the Sales Certificate. In addition to the provisions required pursuant to the terms of this Resolution to be specified in the Sales Certificate, the Chief Executive Officer and General Manager of the District, any Member of the Executive Committee of the District, the Treasurer of the District, the Secretary of the District, or the Chief Financial Officer of the District or the designee of any of them (each an "Authorized Officer"), on behalf of the District, may set forth in the Sales Certificate such provisions, in a form approved by its bond counsel and the District's counsel, as such Authorized Officer may deem necessary or desirable and consistent with the purpose of this Resolution, including provisions (i) adding additional covenants and agreements to be observed by the District, (ii) curing, correcting, amending or supplementing any ambiguous, defective or ineffective provision contained in the Resolution, or (iii) amending or supplementing any provision contained herein to the extent necessary to obtain one or more bond insurance policies, to obtain a rating on any of the 2022 Series J Bonds, or to provide for the issuance of any of the 2022 Series J Bonds if, in the judgment of any Authorized Officer, after consulting with its municipal advisor, bond counsel and District counsel, such insurance, rating or provision is reasonable. Any Authorized Officer, acting alone, is hereby authorized and instructed to execute and deliver the Sales Certificate and, upon execution and delivery thereof, the Sales Certificate shall be incorporated herein and in the Master Resolution by reference. The execution and delivery of the Sales Certificate shall be conclusive evidence that, where any judgment or determination of reasonableness is required to be made by the person signing said Sales Certificate, such judgment or determination has been made.

(d) Notwithstanding the foregoing, the Sales Certificate shall not specify (i) a true interest cost on all 2022 Series J Bonds bearing interest at fixed rates of interest in excess of 3.85%; or (ii) a maturity date for any 2022 Series J Bond later than forty (40) years after the dated date of such 2022 Series J Bond.

(e) Interest on the 2022 Series J Bonds shall be calculated on the basis and be payable on the dates set forth in the Sales Certificate, to the registered owners thereof as of the record dates specified in the Sales Certificate.

(f) Pursuant to Section 5.04 of the Master Resolution, the Sales Certificate shall specify whether the 2022 Series J Bonds or any series or subseries thereof are to be secured by (A) the Reserve Fund, (B) a separate debt service reserve fund, or (C) neither (A) nor (B). If the Sales Certificate provides that the 2022 Series J Bonds or any series or subseries thereof are to be secured by a separate debt service reserve fund, such Sales Certificate may provide for the creation of such funds or accounts in furtherance thereof as may be deemed appropriate in the Treasurer's discretion, and such funds or accounts shall be held in trust by the District or the Trustee, as specified in the Sales Certificate, solely for the benefit of the Holders of the 2022 Series J Bonds or applicable series or subseries thereof, and is hereby pledged solely to the payment of the 2022 Series J Bonds or applicable series or subseries thereof, subject to the application thereof for the purposes set forth in the Sales Certificate. If a separate debt service reserve fund is so created, the Sales Certificate may further specify such other terms and provision relating thereto, as in the Treasurer's discretion are appropriate, including, without implied limitation, the minimum balance required to be maintained on deposit therein, the purposes for which moneys on deposit therein may or shall be applied, the terms on which any deficiencies therein are to be replenished, additional limitations concerning investment of moneys therein and the valuation thereof, and provisions concerning the deposit of credit instruments in lieu of cash therein.

(g) The Sales Certificate shall designate the series, amounts and maturity or sinking fund payment dates of the Refunded Bonds.

Section 140.02 Redemption of 2022 Series J Bonds. The 2022 Series J Bonds shall be subject to redemption on the terms set forth below and in the Sales Certificate (which may specify that some or all of the 2022 Series J Bonds will not be subject to redemption).

(a) Notice of Redemption. If any of the 2022 Series J Bonds are subject to redemption, then in addition to the notice of redemption required to be given pursuant to Article IV of the Master Resolution, the Trustee shall mail, by first class mail, postage prepaid, notice of redemption of any 2022 Series J Bond to the Securities Depositories. Failure of the Trustee to give notice of redemption to any Securities Depository, or any defect therein, however, shall not affect the sufficiency of the proceedings of redemption with respect to any 2022 Series J Bond. For purposes of this paragraph, the following term shall have the following meaning:

> "Securities Depositories" means DTC, 55 Water Street, 50th Floor, New York, N.Y. 10041-0099 Attn. Call Notification Department, Fax (212) 855-7232; or, in accordance with the current guidelines of the Securities and Exchange Commission, to such other address and/or such other securities depositories as the District may designate to the Trustee in writing.

Notwithstanding any contrary provision of Article IV of the Master Resolution or this Sixty-Fifth Supplemental Resolution, (1) publication of any notice of redemption shall not be required with respect to the 2022 Series J Bonds, so long as such 2022 Series J Bonds are in full book-entry form, (2) any notice of redemption of the 2022 Series J Bonds shall be mailed not less than twenty (20) nor more than sixty (60) days prior to the redemption date, and (3) any notice of optional redemption may be made conditional on the receipt of money or any other condition.

(b) Redemption Otherwise Subject to Article IV. Except as in this Section and in the Sales Certificate otherwise provided, the redemption of 2022 Series J Bonds shall be subject to the provisions of Article IV of the Master Resolution.

Section 140.03 Deposits to Interest Fund and Principal Account. Notwithstanding any contrary provision of the Resolution, the Treasurer, out of Net Revenues received by the District, shall set aside in the Interest Fund and the Principal Account, respectively, such amounts as may be required so that an amount equal to the amount of principal and/or interest becoming due and payable on the 2022 Series J Bonds on each interest payment date and principal payment date is on deposit in the Interest Fund and the Principal Account, respectively, at such time on or prior to such interest payment date or principal payment date as shall be specified in the Sales Certificate.

Section 140.04 2022 Series J Sinking Fund.

(a) An account is hereby established within the Sinking Fund created by Section 5.02 of the Master Resolution to be designated the "2022 Series J Sinking Fund." On or before each minimum sinking fund payment date for any 2022 Series J Bonds set forth in the Sales Certificate, the Treasurer shall deposit in the 2022 Series J Sinking Fund, out of Net Revenues received by the District, such amounts as may be required to cause the balance therein to be equal to the amount of the minimum sinking fund payment due and payable on the 2022 Series J Bonds on such minimum sinking fund payment date as set forth in the Sales Certificate.

(b) The District shall apply all such minimum sinking fund payments, as rapidly as practicable, to the purchase of 2022 Series J Bonds at public or private sale, as and when and at such prices (including brokerage and other expenses, but excluding accrued interest, which is payable from the Interest Fund) as the District may in its discretion determine.

(c) If on the first day of the month preceding the month in which a minimum sinking fund payment date occurs, as set forth in the Sales Certificate, the moneys in the 2022 Series J Sinking Fund equal or exceed $25,000, such moneys shall be applied by the District to the redemption on such minimum sinking fund payment date of as many 2022 Series J Bonds as such moneys in the 2022 Series J Sinking Fund shall suffice to redeem at a redemption price equal to the principal amount thereof (except that accrued interest on such 2022 Series J Bonds so called for redemption shall be paid from the Interest Fund). All 2022 Series J Bonds purchased or redeemed under the provisions of this Section shall be delivered to, and canceled by, the Trustee and shall not be reissued.

(d) No application of any moneys to the retirement of 2022 Series J Bonds shall operate to impair or affect the obligation of the District to make minimum sinking fund payments for 2022 Series J Bonds in the amounts and at the times provided in this Section; however, the District shall not be deemed to be in default with respect to any 2022 Series J Bonds minimum sinking fund payment for any minimum sinking fund payment date if at all times prior to such minimum sinking fund payment date the District shall have fixed rates and charges as required by Section 6.08 of the Master Resolution, and if at such minimum sinking fund payment date the aggregate principal amount of all 2022 Series J Bonds theretofore purchased or redeemed through the operation of the 2022 Series J Sinking Fund or otherwise (together with any moneys then in the 2022 Series J Sinking Fund) equals or exceeds the aggregate amount of minimum sinking fund payments for 2022 Series J Bonds then and theretofore required to be made pursuant to this Section.

(e) Any moneys remaining in the 2022 Series J Sinking Fund after all 2022 Series J Bonds have been retired shall be returned to the District for any lawful District use.

Section 140.05 Form of 2022 Series J Bonds. The 2022 Series J Bonds, and the certificate of authentication and registration to be executed thereon, shall be in substantially the form set forth as Appendix A to this Sixty-Fifth Supplemental Resolution. The series or subseries designations, numbers, maturity dates, interest rates, method or methods of determining interest rates, redemption provisions and other terms of the 2022 Series J Bonds shall be inserted therein in conformity with the Sales Certificate.

Section 140.06 Issuance of 2022 Series J Bonds.

(a) At any time after the adoption of this Sixty-Fifth Supplemental Resolution and the execution and delivery of the Sales Certificate, the District may execute and deliver the 2022 Series J Bonds in the aggregate principal amount set forth in the Sales Certificate, but not to exceed the aggregate principal amount described in Section 140.01(c).

(b) The Trustee shall authenticate and deliver the 2022 Series J Bonds upon written order of the District.

(c) The proceeds of the sale of the 2022 Series J Bonds shall be set aside and applied by the Treasurer as set forth in the Sales Certificate.

Section 140.07 Refunding of 2022 Series J Bonds. If Refunding Bonds are issued for the purpose of refunding 2022 Series J Bonds, then, in addition to any other provisions of Section 3.05 of the Master Resolution, the District is authorized to apply proceeds of the sale of such Refunding Bonds to the payment of the purchase price of direct non-callable obligations of the United States of America ("Treasury Obligations") to be held by the Trustee to insure the payment or retirement at or before maturity of all or a portion of the outstanding 2022 Series J Bonds. Upon deposit with the Trustee, in trust, of money or Treasury Obligations (including, but not limited to, direct obligations of the United States of America issued in book-entry form on the books of the Department of the Treasury of the United States of America), or any combination thereof, sufficient, together with the interest to accrue on any such Treasury Obligations, to pay or redeem all or a portion of 2022 Series J Bonds then outstanding at or before their maturity date, provided that, in the case of 2022 Series J Bonds which are to be redeemed prior to maturity, notice of such redemption shall have been given as provided in Article IV of the Master Resolution or provision satisfactory to the Trustee shall have been made for the giving of such notice, all liability of the District in respect of such 2022 Series J Bonds shall cease, determine and be completely discharged, and the holders thereof shall thereafter be entitled only to payment by the District out of the money and Treasury Obligations deposited with the Trustee as aforesaid for their payment, subject, however, to the provisions of Section 10.03 of the Master Resolution. If the liability of the District shall cease and determine with respect to all or a portion of the 2022 Series J Bonds as above provided, then said 2022 Series J Bonds shall not be considered to be outstanding Bonds for any purpose of the Master Resolution or of this Sixty-Fifth Supplemental Resolution.

Section 140.08 Use of Depository. Notwithstanding any provision of the Master Resolution or this Sixty-Fifth Supplemental Resolution to the contrary:

(a) The 2022 Series J Bonds shall be initially issued as provided in Section 140.01. Registered ownership of the 2022 Series J Bonds, or any portion thereof, may not thereafter be transferred except:

(i) To any successor of DTC or its nominee, or to any substitute depository designated pursuant to clause (ii) of this subsection (a) ("substitute depository"); provided that any successor of DTC or substitute depository shall be qualified under any applicable laws to provide the service proposed to be provided by it;

(ii) To any substitute depository not objected to by the Trustee, upon (1) the resignation of DTC or its successor (or any substitute depository or its successor) from its functions as depository or (2) a determination by the District that DTC or its successor (or any substitute depository or its successor) is no longer able to carry out its functions as depository; provided that any such substitute depository shall be qualified under any applicable laws to provide the services proposed to be provided by it; or

(iii) To any person as provided below, upon (1) the resignation of DTC or its successor (or substitute depository or its successor) from its functions as depository; provided that no substitute depository which is not objected to by the Trustee can be obtained or (2) a determination by the District that it is in the best interests of the District to remove DTC or its successor (or any substitute depository or its successor) from its functions as depository.

(b) In the case of any transfer pursuant to clause (i) or clause (ii) of Section 140.08(a) hereof, upon receipt of all outstanding 2022 Series J Bonds by the Trustee, together with a Certificate of the District to the Trustee, a single new 2022 Series J Bond shall be executed and delivered for each maturity of each series of 2022 Series J Bonds then outstanding registered in the name of such successor or such substitute depository, or their nominees, as the case may be, all as specified in such Certificate of the District. In the case of any transfer pursuant to clause (iii) of Section 140.08(a) hereof, upon receipt of all outstanding 2022 Series J Bonds by the Trustee together with a Certificate of the District to the Trustee, new 2022 Series J Bonds shall be executed, authenticated and delivered in such denominations and registered in the names of such persons as are requested in such a Certificate of the District, subject to the limitations of Section 140.08(a) hereof, provided the Trustee shall not be required to deliver such new 2022 Series J Bonds within a period less than 60 days from the date of receipt of such a Certificate of the District. Subsequent to any transfer pursuant to clause (iii) of Section 140.08(a) hereof, the 2022 Series J Bonds shall be transferred as provided in Article II of the Master Resolution.

(c) In the case of partial redemption or refunding of the 2022 Series J Bonds of a series evidencing all or a portion of the principal maturing in a particular year, DTC shall make an appropriate notation on such 2022 Series J Bonds indicating the date and amounts of such reduction in principal. The Trustee shall incur no liability for the failure or any error by DTC in making such notation and the records of the Trustee shall be determinative of the outstanding principal amount of 2022 Series J Bonds.

(d) The District and the Trustee shall be entitled to treat the person in whose name any 2022 Series J Bond is registered as the Bondholder thereof for all purposes of the Master Resolution and any applicable laws, notwithstanding any notice to the contrary received by the Trustee or the District; and the District and the Trustee shall have no responsibility for transmitting payments to, communicating with, notifying, or otherwise dealing with, any beneficial owners of the 2022 Series J Bonds. Neither the District nor the Trustee will have any responsibility or obligations, legal or otherwise, to the beneficial owners or to any other party including DTC or its successor (or substitute depository or its successor), except for the holder of any 2022 Series J Bond.

(e) So long as the outstanding 2022 Series J Bonds are registered in the name of Cede & Co. or its registered assigns, the District and the Trustee (to the extent funds are provided to it by the District) shall cooperate with Cede & Co., as sole registered Bondholder, and its registered assigns, in effecting payment of the principal of and redemption premium, if any, and interest on the 2022 Series J Bonds by arranging for payment in such manner that funds for such payments are properly identified and are made immediately available on the date they are due.

Section 140.09 Tax Covenants.

(a) The District shall at all times do and perform all acts and things permitted by law which are necessary or desirable in order to assure that interest paid on the 2022 Series J Bonds (or any of them) will be excluded from gross income for federal income tax purposes and shall take no action that would result in such interest not being excluded from gross income for federal income tax purposes. Without limiting the generality of the foregoing, the District agrees to comply with the provisions of the Tax Certificate of the District, dated the date of issuance of the 2022 Series J Bonds, as amended from time to time in accordance with its terms (the "Tax Certificate"). This covenant shall survive payment in full or defeasance of the 2022 Series J Bonds.

(b) Without limiting the generality of the foregoing, the District agrees that there shall be paid from time to time all amounts required to be rebated to the United States of America pursuant to Section 148(f) of the Internal Revenue Code of 1986 (the "Code") and any temporary, proposed or final United States Treasury Regulations as may be applicable to the 2022 Series J Bonds from time to time (the "Rebate Requirement"). The District specifically covenants to pay or cause to be paid the Rebate Requirement as provided in the Tax Certificate to the United States of America from any Net Revenues lawfully available to the District. This covenant shall survive payment in full or defeasance of the 2022 Series J Bonds. Capitalized terms in this Section not otherwise defined in the Master Resolution or this Sixty-Fifth Supplemental Resolution shall have the meanings ascribed to them in the Tax Certificate.

(c) Notwithstanding any provision of this Section, if the District shall obtain an opinion of counsel of recognized national standing in the field of obligations the interest on which is excluded from gross income for purposes of federal income taxation to the effect that any specified action required under this Section is no longer required, or to the effect that some different action is required, to maintain the exclusion from gross income of the interest on the 2022 Series J Bonds under Section 103 of the Code, the District may rely conclusively on such opinion in complying with the provisions hereof, and the agreements and covenants hereunder shall be deemed to be modified to that extent without the necessity of an amendment of the Master Resolution or this Sixty-Fifth Supplemental Resolution or the consent at any time of the Bondholders.

(d) This Section 140.09 shall be inapplicable to the 2022 Series J Bonds, if any, issued bearing interest included in gross income for federal income tax purposes, as set forth in the Sales Certificate.

Section 140.10 Terms of 2022 Series J Bonds Subject to the Master Resolution.

(a) Except as in this Sixty-Fifth Supplemental Resolution expressly provided, every term and condition contained in the Master Resolution shall apply to this Sixty-Fifth Supplemental Resolution and to the 2022 Series J Bonds with the same force and effect as if the same were herein set forth at length, with such omissions, variations and modifications thereof as may be appropriate to make the same conform to this Sixty-Fifth Supplemental Resolution.

(b) This Sixty-Fifth Supplemental Resolution and all the terms and provisions herein contained shall form part of the Master Resolution as fully and with the same effect as if all such terms and provisions had been set forth in the Master Resolution. The Master Resolution is hereby ratified and confirmed and shall continue in full force and effect in accordance with the terms and provisions thereof, as supplemented and amended hereby.

Section 140.11 Continuing Disclosure. The District hereby covenants and agrees that it will comply with and carry out all of the provisions of the Continuing Disclosure Agreement dated the date of issuance of the 2022 Series J Bonds (the "Continuing Disclosure Agreement"). Notwithstanding any other provision of the Master Resolution or this Sixty-Fifth Supplemental Resolution, failure of the District or the Trustee to comply with the Continuing Disclosure Agreement shall not be considered an Event of Default; however, the Trustee shall, at the written request of any Participating Underwriter (as defined in the Continuing Disclosure Agreement) or the Holders of at least 25% aggregate principal amount of outstanding 2022 Series J Bonds upon receipt of indemnity satisfactory to the Trustee or any Holder of 2022 Series J Bonds or Beneficial Owner may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the District to comply with its obligations under this Section. For purposes of this Section, "Beneficial Owner" means any person which has or shares the power, directly or indirectly, to make investment decisions concerning ownership of any 2022 Series J Bonds (including persons holding 2022 Series J Bonds through nominees, depositories or other intermediaries).

ARTICLE CXLI

INSURANCE PROVISIONS

Section 141.01 Insurance Agreements. Each Insurance Agreement, if any, is hereby incorporated in this Sixty-Fifth Supplemental Resolution by this reference, and the District covenants and agrees to comply with the terms and conditions thereof. The District further declares, covenants and agrees that the terms and conditions of each Insurance Agreement, if any, shall govern, with respect to the applicable 2022 Series J Bonds, the rights and responsibilities of the District, the Trustee, the applicable Bond Insurer and the holders of the applicable 2022 Series J Bonds, to the extent such terms and conditions may be inconsistent with any other provision of the Master Resolution, as amended and supplemented, including as supplemented by this Sixty-Fifth Supplemental Resolution.

ARTICLE CXLII

AMENDMENT OF MASTER RESOLUTION

Section 142.01 Amendment of Master Resolution. The District intends to amend the Master Resolution substantially in the form of Appendix B to this Sixty-Fifth Supplemental Resolution (the "Proposed Amendments"). The purchasers of the 2022 Series J Bonds, by virtue of their purchase of the 2022 Series J Bonds, have consented to the Proposed Amendments. Pursuant to Section 8.03 of the Master Resolution, the Proposed Amendments shall become effective when the written consents of the holders and registered owners of 60% of the Bonds then outstanding have been filed with the District or the Trustee.

Approved: May 19, 2022

INTRODUCED: DIRECTOR HERBER				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

APPENDIX A

FORM OF BOND

No. R-________ $____________

SACRAMENTO MUNICIPAL UTILITY DISTRICT
ELECTRIC REVENUE REFUNDING BOND
2022 SERIES J

<u>Maturity</u>	<u>Interest Per Annum</u>	<u>Date</u>	<u>CUSIP</u>

REGISTERED OWNER: CEDE & CO.

PRINCIPAL AMOUNT:

SACRAMENTO MUNICIPAL UTILITY DISTRICT, a municipal utility district duly organized and existing under and pursuant to the laws of the State of California (hereinafter called the "District"), for value received, hereby promises to pay (but only out of the Net Revenues hereinafter referred to) to the registered owner named above or registered assigns, on the maturity date specified above, the principal sum specified above together with interest thereon from the date of initial delivery hereof, until the principal hereof shall have been paid, at the interest rate per annum specified above, payable on February 15 and August 15 of each year, commencing February 15, 2023. Interest hereon is payable in lawful money of the United States of America by check or draft mailed on each interest payment date to the registered owner as of the first day of the month (whether or not a business day) in which an interest payment date occurs. Interest hereon shall be calculated on the basis of a 360-day year consisting of twelve 30-day months. At the option of the owners of $1,000,000 or more in aggregate principal amount of Bonds of this series, interest hereon is also payable in lawful money of the United States of America by wire transfer to such address as has been furnished to the Trustee in writing by the registered owner hereof at least 15 days prior to the interest payment date for which such payment by wire transfer is requested. The principal hereof is payable at the designated corporate trust office of U.S. Bank Trust Company, National Association, the Trustee, in lawful money of the United States of America.

This Bond is one of a duly authorized issue of Sacramento Municipal Utility District Electric Revenue Bonds (hereinafter called the "Bonds") of the series and designation indicated on the face hereof. Said authorized issue of Bonds is not limited in aggregate principal amount, except as otherwise provided in the Resolution hereinafter mentioned, and consists or may consist of one or more series of varying denominations, dates, maturities, interest rates and other provisions, as in said Resolution provided, all issued and to be issued pursuant to the provisions of the Revenue Bond Law of 1941 as made applicable by Article 6a of Chapter 6 of Division 6 of the California Public Utilities Code and Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (hereinafter called the "Act"). This

Bond is issued pursuant to a resolution of the Board of Directors of the District, adopted January 7, 1971, providing for the issuance of the Bonds, as amended and supplemented (the "Resolution"), including as amended and supplemented by a Sixty-Fifth Supplemental Resolution, adopted May 19, 2022, authorizing the issuance of the 2022 Series J Bonds. Reference is hereby made to the Resolution and the Act for a description of the terms on which the Bonds are issued and to be issued, the provisions with regard to the nature and extent of the Revenues, as that term is defined in the Resolution, and the rights of the registered owners of the Bonds; and all the terms of the Resolution and the Act are hereby incorporated herein and constitute a contract between the District and the registered owner from time to time of this Bond, and to all the provisions thereof the registered owner of this Bond, by its acceptance hereof, consents and agrees. Additional bonds may be issued on a parity with the Bonds of this authorized issue, but only subject to the conditions and limitations contained in the Resolution.

The Bonds and the interest thereon (to the extent set forth in the Resolution), together with the Parity Bonds (as defined in the Resolution) heretofore or hereafter issued by the District, and the interest thereon, are payable from, and are secured by a charge and lien on, the Net Revenues derived by the District from the Electric System (as those terms are defined in the Resolution). The District hereby covenants and warrants that for the payment of the Bonds and interest thereon, there have been created and will be maintained by the District special funds into which there shall be deposited from Net Revenues available for that purpose sums sufficient to pay the principal of, and interest on, all of the Bonds, as such principal and interest become due, and as an irrevocable charge the District has allocated Net Revenues to such payment, all in accordance with the Resolution.

The Bonds are special obligations of the District, and are payable, both as to principal and interest, out of the Net Revenues pertaining to the Electric System, and not out of any other fund or moneys of the District. No holder of this Bond shall ever have the right to compel any exercise of the taxing power of the District to pay this Bond or the interest hereon.

[The 2022 Series J Bonds are not subject to redemption.]**[Redemption Terms to be Determined at Time of Sale and Conformed to Official Statement and Sales Certificate]**

This Bond is transferable by the registered owner hereof, in person or by the attorney of such owner duly authorized in writing, at the designated corporate trust office of the Trustee but only in the manner, subject to the limitations and upon payment of the charges provided in the Resolution, and upon surrender and cancellation of this Bond. Upon such transfer a new fully registered Bond or Bonds without coupons, of authorized denomination or denominations, for the same aggregate principal amount and maturity will be issued to the transferee in exchange herefor. No transfer of this Bond will be made during the 15 days next preceding each interest payment date.

The District, the Trustee and any paying agent may deem and treat the registered owner hereof as the absolute owner hereof for all purposes, and the District, the Trustee and any paying agent shall not be affected by any notice to the contrary.

The rights and obligations of the District and of the holders and registered owners of the Bonds may be modified or amended at any time in the manner, to the extent, and upon the terms provided in the Resolution, provided that no such modification or amendment shall (i) extend the fixed maturity of any Bond, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon, or reduce the amount of any premium payable upon the redemption hereof, without the consent of the holder of each Bond so affected, or (ii) reduce the percentage of Bonds required for the affirmative vote or written consent to an amendment or modification, without the consent of the holders of all the Bonds then outstanding, or (iii) without its written consent thereto, modify any of the rights or obligations of the Trustee.

It is hereby certified and recited that any and all acts, conditions and things required to exist, to happen and to be performed, precedent to and in the incurring of the indebtedness evidenced by this Bond, and in the issuing of this Bond, do exist, have happened and have been performed in due time, form and manner, as required by the Constitution and statutes of the State of California, and that this Bond, together with all other indebtedness of the District pertaining to the Electric System, is within every debt and other limit prescribed by the Constitution and the statutes of the State of California, and is not in excess of the amount of Bonds permitted to be issued under the Resolution.

This Bond shall not be entitled to any benefit under the Resolution, or become valid or obligatory for any purpose, until the certificate of authentication hereon endorsed shall have been signed by the Trustee.

IN WITNESS WHEREOF, SACRAMENTO MUNICIPAL UTILITY DISTRICT has caused this Bond to be executed in its name and on its behalf by the facsimile signature of the President of its Board of Directors and by the facsimile signature of its Treasurer and countersigned by the facsimile signature of its Secretary, and the seal of the District to be reproduced hereon by facsimile, and this Bond to be dated as of the date first written above.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By______________________________________
President of the Board of Directors

By______________________________________
Treasurer of the District

(SEAL)

Countersigned:

____
Secretary of the District

CERTIFICATE OF AUTHENTICATION AND REGISTRATION

This is one of the Bonds described in the within-mentioned Resolution and registered on the date set forth below.

Dated:

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION, as Trustee

By______________________________________
Authorized Officer

ASSIGNMENT

For value received ____________________ hereby sell, assign and transfer unto _________________ whose taxpayer identification number is ___________________ the within-mentioned Bond and hereby irrevocably constitute and appoint __________________ attorney, to transfer the same on the books of the District at the office of the Trustee, with full power of substitution in the premises.

____

NOTE: The signature to this Assignment must correspond with the name on the face of the within Registered Bond in every particular, without alteration or enlargement or any change whatsoever.

Dated: __________________

Signature Guaranteed by:

____

NOTE: Signature must be guaranteed by an eligible guarantor institution

APPENDIX B

FORM OF PROPOSED AMENDMENTS TO MASTER RESOLUTION

SACRAMENTO MUNICIPAL UTILITY DISTRICT

RESOLUTION NO. __-__-__

_____________ SUPPLEMENTAL RESOLUTION

AMENDING RESOLUTION NO. 6649

(Supplemental to Resolution No. 6649
Adopted January 7, 1971)

Adopted: ___________ __, 20__

RESOLUTION NO. __-__-__

_____________ Supplemental Resolution
(Supplemental to Resolution No. 6649,
Adopted January 7, 1971)
Amending Resolution No. 6649

WHEREAS, the Board of Directors (the “Board”) of the Sacramento Municipal Utility District (the “District”), on January 7, 1971, adopted its Resolution No. 6649 (as previously supplemented and amended, herein called the “Master Resolution”) providing for the issuance of the District’s Electric Revenue Bonds (the “Bonds”);

WHEREAS, Section 8.03 of the Master Resolution provides that the District may amend the Master Resolution by a supplemental resolution to be effective when there shall have been filed with the District or the Trustee the written consents of the holders and registered owners of 60% of the Bonds then outstanding;

WHEREAS, the Board has determined to amend Sections 1.03, 3.02, 3.06, 5.04 and 6.08 of the Master Resolution, which amendments the Board deems necessary and desirable and not inconsistent with the Master Resolution;

WHEREAS, the District has obtained the consents of the holders and registered owners of 60% of the Bonds outstanding;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Sacramento Municipal Utility District, as follows:

ARTICLE _____

AMENDMENT OF MASTER RESOLUTION

SECTION _____. Amendment of Section 1.03 of Master Resolution. A new definition of “Subsidy” shall be added to Section 1.03 of the Master Resolution in correct alphabetical order to read as follows:

‘**Subsidy**

“Subsidy” means any subsidy, reimbursement or other payment from the federal government of the United States of America under the American Recovery and Reinvestment Act of 2009 (or any similar legislation or regulation of the federal government of the United States of America or any other governmental entity or any extension of any of such legislation or regulation).’

SECTION _____. Amendment of Section 3.02 of Master Resolution. A new paragraph shall be added to the end of Section 3.02 of the Master Resolution to read as follows:

> "For purposes of the calculations specified in this Section 3.02: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that the District receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Net Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by the District with respect to or in connection with such Parity Bonds during such period of time."

SECTION _____. Amendment of Section 3.06 of Master Resolution. A new paragraph shall be added to the end of Section 3.06 of the Master Resolution to read as follows:

> "For purposes of the calculations specified in this Section 3.06: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that the District receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Net Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by the District with respect to or in connection with such Parity Bonds during such period of time."

SECTION _____. Amendment of Section 5.04 of Master Resolution. A new paragraph shall be added to the end of Section 5.04 of the Master Resolution to read as follows:

> "For purposes of calculating the "debt service ratio" and, unless otherwise specified in a Supplemental Resolution providing for the issuance of a series of Parity Bonds, the amount required to be maintained in the Reserve Fund pursuant to this Section 5.04: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that the District receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Net Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by the District with respect to or in connection with such Parity Bonds during such period of time."

SECTION _____. Amendment of Section 6.08 of Master Resolution. A new paragraph shall be added to the end of Section 6.08 of the Master Resolution to read as follows:

> "For purposes of the calculations specified in this Section 6.08: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that the District receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by the District with respect to or in connection with such Parity Bonds during such period of time."

SACRAMENTO MUNICIPAL UTILITY DISTRICT

RESOLUTION NO. 22-05-10

THIRTEENTH SUPPLEMENTAL RESOLUTION

AUTHORIZING THE ISSUANCE OF

SUBORDINATED ELECTRIC REVENUE REFUNDING BONDS,
2022 SERIES C

Adopted: May 19, 2022

(Supplemental to Resolution No. 85-11-1 adopted November 7, 1985
as amended and restated by Resolution No. 01-06-10 adopted June 21, 2001)

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RESOLUTION NO. 22-05-10

Thirteenth Supplemental Resolution
(Supplemental to Resolution No. 85-11-1 Adopted November 7, 1985,
as amended and restated by Resolution No. 01-06-10 Adopted June 21, 2001)

Subordinated Electric Revenue Refunding Bonds,
2022 Series C

WHEREAS, the Board of Directors (the "Board") of the Sacramento Municipal Utility District (the "District"), on November 7, 1985, adopted its Resolution No. 85-11-1 which was amended and restated by Resolution No. 01-06-10, adopted on June 21, 2001, providing for the issuance of the District's Subordinated Electric Revenue Bonds (as supplemented and amended, herein called the "Subordinate Master Resolution");

WHEREAS, the Subordinate Master Resolution provides that the District may issue bonds from time to time as the issuance thereof is authorized by the Board by a supplemental resolution;

WHEREAS, revenue bonds may be issued pursuant to the provisions of the Subordinate Master Resolution and the Act (as defined in the Subordinate Master Resolution); and

WHEREAS, the District has determined to issue its Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022C Subordinated Bonds"), in the aggregate principal amount determined as set forth in Section 76.02 to (i) refund the outstanding principal amount of the District's Electric Revenue Refunding Bonds, 2012 Series Y maturing after August 15, 2022 (the "Refunded Bonds"), and (ii) pay costs of issuance (to the extent set forth in the Sales Certificate);

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Sacramento Municipal Utility District, as follows:

ARTICLE LXXV

AUTHORITY AND DEFINITIONS

Section 75.01. Supplemental Resolution. This Thirteenth Supplemental Resolution is supplemental to the Subordinate Master Resolution.

Section 75.02. Definitions; Prevailing Time.

(1) Except as provided by this Thirteenth Supplemental Resolution, all terms which are defined in Section 1.03 of the Subordinate Master Resolution shall have the same meanings in this Thirteenth Supplemental Resolution as such terms are given in said Section 1.03. Unless otherwise provided herein, all references to a particular time are to New York City time. In the event of a conflict between the meanings given in said Section 1.03 and the meanings given in this Section, the meanings given in this Section shall prevail.

(2) In this Thirteenth Supplemental Resolution:

Alternate Credit Enhancement shall mean a letter of credit, insurance policy, line of credit, surety bond, standby purchase agreement or other security instrument issued in accordance with the terms hereof as a replacement or substitute for any Credit Enhancement then in effect and providing for or securing the payment of the principal of and interest on the 2022C Subordinated Bonds.

Alternate Liquidity Facility shall mean a letter of credit, line of credit, standby bond purchase agreement or other liquidity instrument issued in accordance with the terms hereof as a replacement or substitute for any Liquidity Facility then in effect and providing for the payment of the Purchase Price of Tendered Bonds.

Alternate Rate shall mean, on any Rate Determination Date, for any Interest Rate Mode other than a Direct Purchase Index Mode, an Index Mode or a Term Rate Mode, a rate per annum equal to 110% of (a) the SIFMA Municipal Swap Index of Municipal Market Data most recently available as of the date of determination, or (b) if such index is no longer available, or if the SIFMA Municipal Swap Index is no longer published, the S&P Municipal Bond 7 Day High Grade Rate Index, or if neither the SIFMA Municipal Swap Index nor the S&P Municipal Bond 7 Day High Grade Rate Index is published, the index determined to equal the prevailing rate determined by the Remarketing Agent for tax-exempt state and local government bonds meeting criteria determined in good faith by the Remarketing Agent to be comparable under the circumstances to the criteria used by the Securities Industry and Financial Markets Association to determine the SIFMA Municipal Swap Index just prior to when the Securities and Financial Markets Association stopped publishing the SIFMA Municipal Swap Index. The Trustee shall make the determinations required by this definition, upon notification from the District, if there is no Remarketing Agent, if the Remarketing Agent fails to make any such determination or if the Remarketing Agent has suspended its remarketing efforts in accordance with the Remarketing Agreement.

Amortization End Date shall have the meaning set forth in the applicable Continuing Covenant Agreement.

Amortization Interest Payment Date shall have the meaning set forth in the applicable Continuing Covenant Agreement.

Amortization Period shall mean, in the event the 2022C Subordinated Bonds are not purchased or remarketed on any Bank Purchase Date and the other conditions set forth in Section 78.02(b) are satisfied, the period commencing on the Bank Purchase Date and ending on the Amortization End Date.

Amortization Principal Payment Date shall have the meaning set forth in the applicable Continuing Covenant Agreement.

Applicable Factor shall mean, upon any Conversion to a Direct Purchase Index Rate Period, the percentage of the Direct Purchase Index designated in writing by the District as the Applicable Factor for such Direct Purchase Index Rate Period pursuant to Section 76.09(a); provided, however, that the Applicable Factor shall never be less than 65% unless a Favorable

Opinion of Bond Counsel is delivered in connection with the Conversion to such Direct Purchase Index Rate Period.

Applicable Spread shall mean, with respect to any Direct Purchase Index Rate Period, the number of basis points determined by the Market Agent on or before the first day of such Direct Purchase Index Rate Period and designated by the District in accordance with Section 76.09(a) (which may include a schedule for the Applicable Spread based upon the ratings assigned to any indebtedness of the District) that, when added to the product of the Direct Purchase Index multiplied by the Applicable Factor, would equal the minimum interest rate per annum that would enable the 2022C Subordinated Bonds to be sold on such date at a price equal to the principal amount thereof (without regard to accrued interest, if any, thereon).

Authorized Denominations shall mean (i) with respect to 2022C Subordinated Bonds in a Daily Mode or Weekly Mode, $100,000 and any integral multiple of $5,000 in excess thereof, (ii) with respect to 2022C Subordinated Bonds in a Flexible Mode, $100,000 and any integral multiple of $1,000 in excess thereof; (iii) with respect to 2022C Subordinated Bonds in a Direct Purchase Index Mode or Index Mode, $100,000 and any integral multiple of $5,000 in excess thereof; and (iv) with respect to 2022C Subordinated Bonds in a Term Rate Mode or a Fixed Rate Mode, $5,000 and any integral multiple thereof.

Available Amount shall mean the amount available under a Credit Enhancement or Liquidity Facility, as applicable, to pay the principal of and interest on the 2022C Subordinated Bonds or the Purchase Price of the 2022C Subordinated Bonds, as applicable.

Available Moneys shall mean (a) if a Credit Enhancement is in effect, (i) moneys drawn under the Credit Enhancement which at all times since their receipt by the Trustee were held in a separate segregated account or accounts or subaccount or subaccounts in which no moneys (other than those drawn under the Credit Enhancement) were at any time held, (ii) moneys which have been paid to the Trustee and have been on deposit with the Trustee for at least 124 days (or, if paid to the Trustee by an “affiliate,” as defined in Bankruptcy Code §101(2), of the District, 366 days) during and prior to which no Event of Bankruptcy shall have occurred, (iii) any other moneys, if, in the opinion of nationally recognized counsel experienced in bankruptcy matters (which opinion shall be acceptable to each Rating Agency then rating the 2022C Subordinated Bonds), the application of such moneys will not constitute a voidable preference in the event of the occurrence of an Event of Bankruptcy, and (iv) investment earnings on any of the moneys described in clauses (i), (ii) and (iii) of this definition; and (b) if a Credit Enhancement is not in effect, “Available Moneys” means any moneys deposited with the Trustee.

Bank shall mean, while the 2022C Subordinated Bonds are in a Direct Purchase Index Mode, the Holder of the 2022C Subordinated Bonds, provided that there is a single Holder of all of the 2022C Subordinated Bonds and provided further that the 2022C Subordinated Bonds are not then held under the book-entry system of a Securities Depository. If there is more than one Holder of the 2022C Subordinated Bonds while the 2022C Subordinated Bonds are in a Direct Purchase Index Mode, “Bank” means Holders owning a majority of the aggregate principal amount of the 2022C Subordinated Bonds then Outstanding. If the 2022C Subordinated Bonds are held under the book-entry system of a Securities Depository during any

Direct Purchase Index Mode, "Bank" means the Beneficial Owner of the 2022C Subordinated Bonds, provided that there is a single Beneficial Owner of all of the 2022C Subordinated Bonds. If there is more than one Beneficial Owner of the 2022C Subordinated Bonds while the 2022C Subordinated Bonds are in a Direct Purchase Index Mode, "Bank" means Beneficial Owners who are the beneficial owners of a majority of the aggregate principal amount of the 2022C Subordinated Bonds then Outstanding.

Bank Purchase Date shall mean, during any Direct Purchase Index Rate Period, (i) the date designated by the District pursuant to Section 76.11(a) and (ii) the date which is five Business Days after the date on which the Trustee receives written notice from the Bank under a Continuing Covenant Agreement which (x) advises the Trustee of the occurrence and continuance of an "Event of Default" under and as defined in such Continuing Covenant Agreement and (y) directs the Trustee to cause a mandatory tender for purchase of the 2022C Subordinated Bonds by reason of such "Event of Default."

Bank Rate shall have the meaning set forth in the applicable Continuing Covenant Agreement.

Bankruptcy Code means Title 11 of the United States Code, as amended, and any successor statute.

Beneficial Owner shall mean, so long as the 2022C Subordinated Bonds are held in the Book-Entry System, any Person who acquires a beneficial ownership interest in a 2022C Subordinated Bond held by the Securities Depository. If at any time the 2022C Subordinated Bonds are not held in the Book-Entry System, Beneficial Owner shall mean Holder for purposes of the Subordinate Master Resolution.

Bond Counsel shall mean any firm of nationally recognized municipal bond attorneys selected by the District and experienced in the issuance of municipal bonds and matters relating to the exclusion of the interest thereon from gross income for federal income tax purposes.

Book-Entry System shall mean the system maintained by the Securities Depository.

Business Day shall mean any day other than (i) a Saturday or Sunday or (ii) a day on which banks located in (a) the State of California or the State of New York, (b) the city or cities in which the principal office of the Trustee, the Paying Agent, the Remarketing Agent, if any, the Bank, if any, or the Calculation Agent, if any, are located, or (c) the city or cities in which the office of the Credit Provider or Liquidity Provider at which it will pay draws or advances is located, are required or authorized to remain closed or (iii) a day on which The New York Stock Exchange or Federal Reserve Bank is closed.

Calculation Agent shall mean, (i) during any Direct Purchase Index Rate Period, the Bank or any other party appointed by the District with the consent of the Bank so long as the Bank owns a majority in aggregate principal amount of the 2022C Subordinated Bonds and (ii) during any Index Rate Period, the Trustee or any other party appointed by the District to act as calculation agent for the 2022C Subordinated Bonds.

Call Protection Date shall mean (i) with respect to the initial issuance of the 2022C Subordinated Bonds, if applicable, the date specified in the Sales Certificate as the Call Protection Date and (ii) with respect to any Conversion to a Term Rate Period or Index Rate Period, the date specified by the District in writing as the Call Protection Date for such Term Rate Period or Index Rate Period on or before the first day of such Term Rate Period or Index Rate Period.

Code shall mean the Internal Revenue Code of 1986, as amended.

Continuing Covenant Agreement shall mean, during any Direct Purchase Index Rate Period, any agreement between the District and the Bank which may be designated as the Continuing Covenant Agreement.

Conversion Date shall mean, with respect to the 2022C Subordinated Bonds in a particular Interest Rate Mode, the day on which another Interest Rate Mode for the 2022C Subordinated Bonds begins, with respect to the 2022C Subordinated Bonds in a Term Rate Mode, the day on which a new Term Rate Period begins, with respect to 2022C Subordinated Bonds in a Direct Purchase Index Mode, the day on which a new Direct Purchase Index Rate Period begins, and with respect to 2022C Subordinated Bonds in an Index Mode, the day on which a new Index Rate Period begins.

Conversion Notice shall mean the notice from the District to the other Notice Parties pursuant to Section 76.11(a)(i).

Credit Enhancement shall mean, with respect to the 2022C Subordinated Bonds, a letter of credit, insurance policy, line of credit, surety bond, standby purchase agreement or other security instrument issued in accordance with the terms hereof and then in effect and providing for or securing the payment of the principal of and interest on the 2022C Subordinated Bonds and, upon replacement of any such Credit Enhancement with an Alternate Credit Enhancement, the Alternate Credit Enhancement then in effect.

Credit Provider shall mean, with respect to the 2022C Subordinated Bonds, any bank, insurance company, pension fund or other financial institution which provides the Credit Enhancement, if any, then in effect for the 2022C Subordinated Bonds.

Credit Provider Failure or **Liquidity Provider Failure** shall mean a failure of a Credit Provider or Liquidity Provider, as applicable, to pay a properly presented and strictly conforming draw or request for advance under a Credit Enhancement or Liquidity Facility, as applicable, or the filing or commencement of any bankruptcy or insolvency proceedings by or against a Credit Provider or Liquidity Provider, as applicable, or a Credit Provider or Liquidity Provider, as applicable, shall declare a moratorium on the payment of its unsecured debt obligations or shall repudiate a Credit Enhancement or Liquidity Facility, as applicable.

Current Mode shall have the meaning specified in Section 76.11(a).

Daily Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at the Daily Rate.

Daily Rate shall mean the per annum interest rate on any 2022C Subordinated Bond in the Daily Mode determined pursuant to Section 76.06(a).

Daily Rate Period shall mean the period during which a 2022C Subordinated Bond in the Daily Mode shall bear a Daily Rate, which shall be from the Business Day upon which a Daily Rate is set to but not including the next succeeding Business Day.

Default Rate shall have the meaning assigned to such term in the Continuing Covenant Agreement.

Delayed Remarketing Period shall have the meaning specified in Section 78.10(b) hereof.

Determination of Taxability shall have the meaning assigned to such term in the Continuing Covenant Agreement.

Direct Purchase Index shall mean (i) the SIFMA Index or (ii) any other index chosen by the District in consultation with the Market Agent.

Direct Purchase Index Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at a Direct Purchase Index Rate.

Direct Purchase Index Rate shall mean the per annum interest rate on any 2022C Subordinated Bond in the Direct Purchase Index Mode determined in accordance with Section 76.09, being the Direct Purchase Index Rate, the Taxable Rate, the Default Rate or the Bank Rate, as applicable.

Direct Purchase Index Rate Determination Date shall mean (i) with respect to the SIFMA Index, Wednesday of each week, or if any Wednesday is not a Business Day, the next succeeding Business Day and (ii) with respect to any other Direct Purchase Index, the date or dates specified by the District in writing on or before the first day of any Direct Purchase Index Rate Period for which such Direct Purchase Index will be in effect.

Direct Purchase Index Rate Effective Period shall mean, during any Direct Purchase Index Rate Period, the period from and including the first day of such Direct Purchase Index Rate Period to but excluding the next succeeding Direct Purchase Index Rate Reset Date and, thereafter, means each Direct Purchase Index Rate Reset Date to but excluding the next succeeding Direct Purchase Index Rate Reset Date.

Direct Purchase Index Rate Period shall mean the period from (and including) the date on which the 2022C Subordinated Bonds begin to bear interest in the Direct Purchase Index Mode to (but excluding) the earliest to occur of (i) the immediately succeeding Bank Purchase Date, (ii) the immediately succeeding Conversion Date, (iii) the date on which all of the 2022C Subordinated Bonds have been redeemed or defeased in full and (iv) the Maturity Date.

Direct Purchase Index Rate Reset Date shall mean (i) with respect to the SIFMA Index, Thursday of each week and (ii) with respect to any other Direct Purchase Index, the date or dates specified by the District in writing on or before the first day of any Direct Purchase Index Rate Period for which such Direct Purchase Index will be in effect.

District Purchase Account shall mean the account by that name in the Purchase Fund created in Section 78.09.

Electronic Means shall mean telecopy, facsimile transmission, e-mail transmission or other similar electronic means of communication providing evidence of transmission, including a telephonic communication confirmed by any other method set forth in this definition.

Eligible Account shall mean an account that is either (a) maintained with a federal or state-chartered depository institution or trust company that has a Standard & Poor's short-term debt rating of at least 'A-2' (or, if no short-term debt rating, a long-term debt rating of 'BBB+'); or (b) maintained with the corporate trust department of a federal depository institution or state-chartered depository institution subject to regulations regarding fiduciary funds on deposit similar to Title 12 of the U.S. Code of Federal Regulation Section 9.10(b), which, in either case, has corporate trust powers and is acting in its fiduciary capacity. In the event that a fund or account required to be an "Eligible Account" no longer complies with the requirements listed above, the Trustee shall promptly (and, in any case, within not more than 30 calendar days) move such fund or account to another financial institution such that the Eligible Account requirements stated above will again be satisfied.

Event of Bankruptcy shall mean any of the following events:

(i) the District (or any other Person obligated, as guarantor or otherwise, to make payments on the 2022C Subordinated Bonds, or an "affiliate" of the District as defined in Bankruptcy Code § 101(2)) shall (a) apply for or consent to the appointment of, or the taking of possession by, a receiver, custodian, trustee, liquidator or the like of the District (or such other Person) or of all or any substantial part of their respective property, (b) commence a voluntary case under the Bankruptcy Code, or (c) file a petition seeking to take advantage of any other law relating to bankruptcy, insolvency, reorganization, winding-up or composition or adjustment of debts; or

(ii) a proceeding or case shall be commenced, without the application or consent of the District (or any other Person obligated, as guarantor or otherwise, to make payments on the 2022C Subordinated Bonds, or an "affiliate" of the District as defined in Bankruptcy Code § 101(2)) in any court of competent jurisdiction, seeking (a) the liquidation, reorganization, dissolution, winding-up, or composition or adjustment of debts, of the District (or any such other Person), (b) the appointment of a trustee, receiver, custodian, liquidator or the like of the District (or any such other Person) or of all or any substantial part of their respective property, or (c) similar relief in respect of the District (or any such other Person) under any law relating to bankruptcy, insolvency, reorganization, winding-up or composition or adjustment of debts.

Event of Taxability shall have the meaning assigned to such term in the Continuing Covenant Agreement.

Expiration Date shall mean the stated expiration date of a Credit Enhancement or a Liquidity Facility, as it may be extended from time to time as provided in the Credit Enhancement or the Liquidity Facility, or any earlier date on which a Credit Enhancement or a Liquidity Facility shall terminate at the direction of the District.

Favorable Opinion of Bond Counsel shall mean, with respect to any action the occurrence of which requires such an opinion, an Opinion of Counsel, which shall be a Bond Counsel, to the effect that such action is permitted under the Subordinate Master Resolution and will not, in and of itself, cause interest on the 2022C Subordinated Bonds to be included in gross income for purposes of federal income taxation.

Fitch shall mean Fitch, Inc., and its successors and assigns, except that if such corporation shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, then the term "Fitch" shall be deemed to refer to any other nationally recognized securities rating agency selected by the District after consultation with the Remarketing Agent.

Fixed Rate shall mean the per annum interest rate on any 2022C Subordinated Bond in the Fixed Rate Mode determined pursuant to Section 76.07(b).

Fixed Rate Bond shall mean a 2022C Subordinated Bond in the Fixed Rate Mode.

Fixed Rate Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at the Fixed Rate.

Fixed Rate Period shall mean the period from the Conversion Date upon which the 2022C Subordinated Bonds were converted to the Fixed Rate Mode to but not including the Maturity Date for the 2022C Subordinated Bonds.

Flexible Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at Flexible Rates.

Flexible Rate shall mean the per annum interest rate on a Flexible Rate Bond determined for such Flexible Rate Bond pursuant to Section 76.05. The Flexible Rate Bonds may bear interest at different Flexible Rates.

Flexible Rate Bond shall mean a 2022C Subordinated Bond in the Flexible Mode.

Flexible Rate Period shall mean the period of from one to 270 calendar days (which period must end on either a day which immediately precedes a Business Day or the day immediately preceding the Maturity Date) during which a Flexible Rate Bond shall bear interest at a Flexible Rate, as established by the Remarketing Agent pursuant to Section 76.05. The Flexible Rate Bonds may be in different Flexible Rate Periods.

Index shall mean (i) the SIFMA Index or (ii) any other index chosen by the District in consultation with the Remarketing Agent.

Index Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at an Index Rate.

Index Rate shall mean the per annum interest rate on any 2022C Subordinated Bond in the Index Mode determined in accordance with Section 76.10.

Index Rate Determination Date shall mean (i) with respect to the SIFMA Index, Wednesday of each week, or if any Wednesday is not a Business Day, the next succeeding Business Day and (ii) with respect to any other Index, the date or dates specified by the District in writing on or before the first day of any Index Rate Period for which such Index will be in effect.

Index Rate Effective Period shall mean, during any Index Rate Period, the period from and including the first day of such Index Rate Period through and including the day immediately preceding the next succeeding Index Rate Reset Date and, thereafter, means each Index Rate Reset Date through and including the day immediately preceding the next succeeding Index Rate Reset Date.

Index Rate Period shall mean the period from (and including) the date on which the 2022C Subordinated Bonds begin to bear interest in the Index Mode to (but excluding) the earliest to occur of (i) the Business Day immediately succeeding the last day thereof, (ii) the immediately succeeding Conversion Date, (iii) the date on which all of the 2022C Subordinated Bonds have been redeemed or defeased in full and (iv) the final Maturity Date.

Index Rate Reset Date shall mean (i) with respect to the SIFMA Index, Thursday of each week and (ii) with respect to any other Index, the date or dates specified by the District in writing on or before the first day of any Index Rate Period for which such Index will be in effect.

Index Percentage shall mean (i) with respect to the initial issuance of the 2022C Subordinated Bonds, if applicable, 100% and (ii) upon any Conversion to an Index Rate Period, the percentage of the Index determined by the Remarketing Agent in accordance with Section 76.10; provided, however, that the Index Percentage shall never be less than 65% unless a Favorable Opinion of Bond Counsel is delivered on or before the determination of the Index Percentage by the Remarketing Agent.

Index Spread shall mean (i) with respect to the initial issuance of the 2022C Subordinated Bonds and each maturity of the 2022C Subordinated Bonds, if applicable, the fixed per annum rate specified for such maturity of the 2022C Subordinated Bonds in the Sales Certificate and (ii) upon any Conversion to an Index Rate Period, the fixed per annum rate determined by the Remarketing Agent in accordance with Section 76.10.

Interest Accrual Period shall mean the period during which a 2022C Subordinated Bond accrues interest payable on the next Interest Payment Date applicable thereto. Each Interest Accrual Period for 2022C Subordinated Bonds shall be the period commencing on (and including) the last Interest Payment Date to which interest has been paid (or, if no interest has been paid in such Interest Rate Mode, commencing on (and including) the date of original authentication and delivery of the 2022C Subordinated Bonds, or the Conversion Date, as the case may be) to (and excluding) the Interest Payment Date on which interest is to be paid. If, at the time of authentication of any 2022C Subordinated Bond, interest is in default or overdue on the 2022C Subordinated Bonds, such 2022C Subordinated Bond shall bear interest from the date to which interest has previously been paid in full or made available for payment in full on Outstanding 2022C Subordinated Bonds.

Interest Payment Date shall mean each date on which interest is to be paid and is: (i) with respect to Flexible Rate Bonds, each Mandatory Purchase Date applicable thereto; (ii) with respect to 2022C Subordinated Bonds in the Daily Mode, Weekly Mode, Direct Purchase Index Mode or Index Mode, the first Business Day of each month; (iii) with respect to 2022C Subordinated Bonds in a Term Rate Mode or Fixed Rate Mode, each February 15 and August 15 (beginning with the first such day which is at least three months after the date of initial issuance of the 2022C Subordinated Bonds or the Conversion Date to such Term Rate Mode, as applicable); (iv) (without duplication as to any Interest Payment Date listed above) any Mandatory Purchase Date; (v) (without duplication as to any Interest Payment Date listed above) each Maturity Date; and (vi) with respect to any Liquidity Provider Bonds, as provided in the Reimbursement Agreement.

Interest Period shall mean, for 2022C Subordinated Bonds in a particular Interest Rate Mode, the period of time that such 2022C Subordinated Bonds bear interest at the rate (per annum) which becomes effective at the beginning of such period, and shall include a Flexible Rate Period, a Daily Rate Period, a Weekly Rate Period, a Direct Purchase Index Rate Effective Period, an Index Rate Effective Period, a Term Rate Period and a Fixed Rate Period.

Interest Rate Mode shall mean, as the context may require, the Flexible Mode, the Daily Mode, the Weekly Mode, the Direct Purchase Index Mode, the Index Mode, the Term Rate Mode or the Fixed Rate Mode.

Liquidity Facility shall mean, with respect to the 2022C Subordinated Bonds, a letter of credit, line of credit, standby bond purchase agreement or other liquidity instrument issued in accordance with the terms hereof and then in effect and providing for the payment of the Purchase Price of Tendered Bonds and, upon replacement of such Liquidity Facility with an Alternate Liquidity Facility, the Alternate Liquidity Facility then in effect.

Liquidity Facility Purchase Account shall mean the account by that name in the Purchase Fund created by Section 78.09.

Liquidity Provider shall mean, with respect to the 2022C Subordinated Bonds, any bank, insurance company, pension fund or other financial institution which provides the Liquidity Facility, if any, then in effect for the 2022C Subordinated Bonds.

Liquidity Provider Bonds shall mean any 2022C Subordinated Bonds purchased by the Liquidity Provider with funds drawn on or advanced under the Liquidity Facility.

Long-Term Mode shall mean a Term Rate Mode or a Fixed Rate Mode.

Mandatory Purchase Date shall mean: (i) with respect to a Flexible Rate Bond, the first Business Day following the last day of each Flexible Rate Period with respect to such Flexible Rate Bond, (ii) with respect to 2022C Subordinated Bonds in the Term Rate Mode, the first Business Day following the last day of each Term Rate Period applicable to such 2022C Subordinated Bonds, (iii) with respect to any 2022C Subordinated Bonds, any Conversion Date applicable to such 2022C Subordinated Bond or the date that otherwise would have been a Conversion Date had one of the conditions precedent to such Conversion Date specified in Section 76.11 not failed to occur, (iv) with respect to any 2022C Subordinated Bonds, any Substitution Date with respect to a Credit Enhancement or Liquidity Facility, (v) with respect to any 2022C Subordinated Bonds, the fifth Business Day prior to the Expiration Date with respect to a Credit Enhancement or Liquidity Facility securing such 2022C Subordinated Bonds, (vi) with respect to any 2022C Subordinated Bonds, the date specified by the Trustee following the occurrence of an event under the Reimbursement Agreement which requires or gives the Credit Provider or Liquidity Provider the option to cause a mandatory tender of the 2022C Subordinated Bonds or terminate the Credit Enhancement or Liquidity Facility upon notice, which date shall be a Business Day not more than five Business Days after the Trustee's receipt of written notice of such event from the Credit Provider or the Liquidity Provider and directing the Trustee to cause a mandatory tender of the 2022C Subordinated Bonds and in no event later than the day preceding the termination date specified by the Credit Provider or the Liquidity Provider; (vii) with respect to any 2022C Subordinated Bonds, the date specified by the Trustee following receipt of written notice by the Trustee from the Credit Provider that the Credit Enhancement will not be reinstated following a drawing to pay interest on the 2022C Subordinated Bonds (other than interest on 2022C Subordinated Bonds no longer Outstanding after such drawing) and directing the Trustee to cause a mandatory tender of the 2022C Subordinated Bonds which date shall be a Business Day not more than five days after the Trustee's receipt of such notice, (viii) with respect to 2022C Subordinated Bonds in the Daily Mode or Weekly Mode, any Business Day specified by the District with the consent of the Liquidity Provider, if any, not less than 20 days after the Trustee's receipt of such notice and in no event later than the day preceding the Expiration Date of the Liquidity Facility, if any, then in effect with respect to such 2022C Subordinated Bonds, (ix) with respect to 2022C Subordinated Bonds in the Index Mode, the first Business Day following the last day of each Index Rate Period applicable to such 2022C Subordinated Bonds, and (x) with respect to 2022C Subordinated Bonds in the Direct Purchase Index Mode, each Bank Purchase Date; provided that, in the event that the Bank (acting in its sole and absolute discretion) for the then existing Direct Purchase Index Rate Period agrees in writing to a new Direct Purchase Index Rate Period, the provisions of this clause (x) shall apply and be interpreted by substituting the Bank Purchase Date for the new Direct Purchase Index Rate Period for the then-current Bank Purchase Date.

Market Agent shall mean the Person appointed by the District to serve as market agent in connection with a conversion to any Direct Purchase Index Rate Period.

Maturity Date shall mean the maturity date or maturity dates of the 2022C Subordinated Bonds set forth in the Sales Certificate, or, if established pursuant to Section 76.11(b)(v) upon a change to the Fixed Rate Mode, the Serial Maturity Dates.

Maximum Rate shall mean (i) with respect to Liquidity Provider Bonds and 2022C Subordinated Bonds in the Direct Purchase Index Mode, a rate of interest per annum not exceeding the maximum non-usurious lawful rate of interest permitted by applicable laws and (ii) with respect to all other 2022C Subordinated Bonds, a rate of interest of twelve percent (12%) per annum unless a lesser rate of interest is specified as the Maximum Rate in the Sales

Certificate for the initial Interest Rate Mode or in writing by the District prior to the first day of any subsequent Interest Rate Mode, Index Rate Period or Term Rate Period.

Moody's shall mean Moody's Investors Service and its successors and assigns, except that if such shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, then the term "Moody's" shall be deemed to refer to any other nationally recognized securities rating agency selected by the District after consultation with the Remarketing Agent.

New Mode shall have the meaning specified in Section 76.11(a).

Notice Parties shall mean the Trustee, the Remarketing Agent, if any, the Paying Agent, the Credit Provider, if any, the Liquidity Provider, if any, the Bank, if any, the Market Agent, if any, and the Calculation Agent, if any.

Opinion of Counsel shall mean a written legal opinion from a firm of attorneys experienced in the matters to be covered in the opinion.

Outstanding, when used with reference to 2022C Subordinated Bonds, shall mean, as of any date, 2022C Subordinated Bonds theretofore or thereupon being authenticated and delivered under this Thirteenth Supplemental Resolution except:

(i) 2022C Subordinated Bonds cancelled by the Trustee, or delivered to the Trustee for cancellation, at or prior to such date;

(ii) 2022C Subordinated Bonds paid or deemed paid pursuant to Section 10.01 of the Subordinate Master Resolution; and

(iii) 2022C Subordinated Bonds in lieu of or in substitution for which other 2022C Subordinated Bonds shall have been authenticated and delivered pursuant to this Thirteenth Supplemental Resolution.

Person shall mean an individual, a corporation, a partnership, an association, a joint venture, a trust, an unincorporated organization or any other entity or organization, including a government or political subdivision or an agency or instrumentality thereof.

Principal Payment Date shall mean any date upon which the principal amount of 2022C Subordinated Bonds is due under the Subordinate Master Resolution, including any Maturity Date, any Serial Maturity Date, any Redemption Date, or the date the maturity of any 2022C Subordinated Bond is accelerated pursuant to the terms of the Subordinate Master Resolution.

Purchase Date shall mean (i) for a 2022C Subordinated Bond in the Daily Mode or the Weekly Mode, any Business Day selected by the Beneficial Owner of said 2022C Subordinated Bond pursuant to the provisions of Section 78.01, and (ii) any Mandatory Purchase Date.

Purchase Fund shall mean the fund by that name created in Section 78.09.

Purchase Price shall mean an amount equal to the principal amount of any 2022C Subordinated Bonds purchased on any Purchase Date, plus accrued interest to but excluding the Purchase Date; provided, however, that (i) if the Purchase Date for any 2022C Subordinated Bond to be purchased is an Interest Payment Date for such 2022C Subordinated Bond, the Purchase Price thereof shall be the principal amount thereof, and interest on such 2022C Subordinated Bond shall be paid to the Holder of such 2022C Subordinated Bond pursuant to the Subordinate Master Resolution and this Thirteenth Supplemental Resolution and (ii) in the case of a purchase on a Conversion Date or proposed Conversion Date which is preceded by a Term Rate Period or an Index Rate Period and which occurs prior to the day originally established as the last day of such preceding Term Rate Period or Index Rate Period, the Purchase Price of any 2022C Subordinated Bond to be purchased on such Conversion Date shall be the Redemption Price which would have been applicable to such 2022C Subordinated Bond if the preceding Term Rate Period or Index Rate Period had continued to the day originally established as its last day, plus accrued interest, if any.

Rate Determination Date shall mean any date on which the interest rate on 2022C Subordinated Bonds shall be determined, which, (i) in the case of the Flexible Mode, shall be the first day of an Interest Period; (ii) in the case of the Daily Mode, shall be each Business Day commencing with the first day (which must be a Business Day) the 2022C Subordinated Bonds become subject to the Daily Mode; (iii) in the case of the Weekly Mode, shall be (A) each Wednesday or, if Wednesday is not a Business Day, then the Business Day next succeeding such Wednesday, and (B) not later than the Business Day preceding a Conversion Date, a Substitution Date or a Mandatory Purchase Date specified in clause (viii) of the definition of Mandatory Purchase Date; (iv) in the case of the Term Rate Mode, shall be a Business Day no later than the Business Day next preceding the first day of an Interest Period, as determined by the Remarketing Agent; (v) in the case of the Direct Purchase Index Mode, each Direct Purchase Index Rate Determination Date; (vi) in the case of the Index Mode, each Index Rate Determination Date, and (vii) in the case of the Fixed Rate Mode, shall be a date determined by the Remarketing Agent which shall be at least one Business Day prior to the Conversion Date.

Rating Agencies shall mean any of Moody's, S&P or Fitch, which is then providing a rating on the 2022C Subordinated Bonds at the request of the District.

Record Date shall mean (i) with respect to 2022C Subordinated Bonds in a Daily Mode, Weekly Mode, Flexible Mode, Direct Purchase Index Mode or Index Mode, the last Business Day before an Interest Payment Date, and (ii) with respect to 2022C Subordinated Bonds in a Term Rate Mode or Fixed Rate Mode, the fifteenth (15th) day (whether or not a Business Day) next preceding each Interest Payment Date.

Redemption Date shall mean the date fixed for redemption of 2022C Subordinated Bonds subject to redemption in any notice of redemption given in accordance with the terms of the Subordinate Master Resolution.

Redemption Price shall mean an amount equal to the principal of and premium, if any, and accrued interest, if any, on the 2022C Subordinated Bonds to be paid on the Redemption Date.

Reimbursement Agreement shall mean any reimbursement agreement, credit agreement, line of credit agreement, standby purchase agreement or other agreement by and between a Credit Provider or Liquidity Provider, as applicable, and the District.

Remarketing Agent shall mean any investment banking firm which may be appointed with respect to the 2022C Subordinated Bonds pursuant to Section 79.01.

Remarketing Agreement shall mean any agreement relating to the 2022C Subordinated Bonds by and between the District and a Remarketing Agent, as it may be amended or supplemented from time to time in accordance with its terms.

Remarketing Proceeds Account shall mean the account by that name in the Purchase Fund created in Section 78.09.

Representations Letter shall mean the Letter of Representations from the District to the Securities Depository in connection with the 2022C Subordinated Bonds in a book-entry system, as supplemented and amended from time to time.

Sales Certificate shall mean a written certificate of the District executed by the Chief Executive Officer and General Manager of the District, any Member of the Executive Committee of the District, the Treasurer of the District, the Secretary of the District or the Chief Financial Officer of the District or the designee of any of them prior to the issuance of the 2022C Subordinated Bonds setting forth the principal amount, Maturity Date or Maturity Dates, initial interest rate or rates, and such other matters with respect to the 2022C Subordinated Bonds as such officer may deem appropriate, as provided in Section 76.02.

S&P shall mean S&P Global Ratings and its successors and assigns, except that if such shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, then the term “S&P” shall be deemed to refer to any other nationally recognized securities rating agency selected by the District after consultation with the Remarketing Agent, if any.

S&P Municipal Bond 7 Day High Grade Rate Index shall mean for a Rate Determination Date, the level of the “S&P Municipal Bond 7 Day High Grade Rate Index” (formerly known as the J.J. Kenny Index) maintained by Standard and Poor’s for a one-week maturity as published each day.

Securities Depository shall mean The Depository Trust Company, and such other securities depository as the District may designate in a certificate of the District delivered to the Trustee.

Serial Bonds shall mean the 2022C Subordinated Bonds maturing on the Serial Maturity Dates, as determined pursuant to Section 76.11(b).

Serial Maturity Dates shall mean the dates on which the Serial Bonds mature, as determined pursuant to Section 76.11(b).

Serial Payments shall mean the payments to be made in payment of the principal of the Serial Bonds on the Serial Maturity Dates.

Short-Term Mode shall mean the Daily Mode, the Weekly Mode or the Flexible Mode.

SIFMA Index shall mean, for any applicable Rate Determination Date, the level of the index which is issued weekly and which is compiled from the weekly interest rate resets of tax-exempt variable rate issues included in a database maintained by Municipal Market Data which meet specific criteria established from time to time by SIFMA and issued on Wednesday of each week, or if any Wednesday is not a Business Day, the next succeeding Business Day. If the SIFMA Index is no longer published, then "SIFMA Index" shall mean the S&P Municipal Bond 7 Day High Grade Rate Index. If the S&P Municipal Bond 7 Day High Grade Rate Index is no longer published, then "SIFMA Index" shall mean the prevailing rate determined by the Calculation Agent for tax-exempt state and local government bonds meeting criteria determined in good faith by the Calculation Agent to be comparable under the circumstances to the criteria used by SIFMA to determine the SIFMA Index immediately prior to the date on which SIFMA ceased publication of the SIFMA Index. Notwithstanding the foregoing, if the SIFMA Index as determined as provided above would be less than 0.0%, then the SIFMA Index will be deemed to be 0.0%.

Substitution Date shall mean the date upon which an Alternate Credit Enhancement or Alternate Liquidity Facility is scheduled to be substituted for a Credit Enhancement or Liquidity Facility then in effect.

Taxable Date shall mean the date on which interest on the 2022C Subordinated Bonds is first includable in gross income of the Holder (including, without limitation, any previous Holder) thereof as a result of an Event of Taxability as such a date is established pursuant to a Determination of Taxability.

Taxable Rate shall mean an interest rate per annum at all times equal to the product of the Direct Purchase Index Rate then in effect multiplied by the Taxable Rate Factor.

Taxable Rate Factor shall have the meaning set forth in the applicable Continuing Covenant Agreement.

Tendered Bonds shall mean 2022C Subordinated Bonds tendered for purchase by the Holders or Beneficial Owners thereof pursuant to Section 78.01 or subject to mandatory tender for purchase on a Mandatory Purchase Date pursuant to Section 78.02.

Tender Notice shall mean a notice delivered by Electronic Means or in writing with respect to a 2022C Subordinated Bond that states (i) the principal amount of such 2022C Subordinated Bond to be purchased pursuant to Section 78.01, (ii) the Purchase Date on which such 2022C Subordinated Bond is to be purchased, (iii) applicable payment instructions with respect to the 2022C Subordinated Bonds being tendered for purchase and (iv) an irrevocable demand for such purchase.

Tender Notice Deadline with respect to a 2022C Subordinated Bond shall mean (i) during a Daily Mode with respect to such 2022C Subordinated Bond, 11:00 a.m. on any Business Day and (ii) during a Weekly Mode with respect to such 2022C Subordinated Bond, 5:00 p.m. on a Business Day not less than seven days prior to the applicable Purchase Date.

Term Rate shall mean the per annum interest rate for 2022C Subordinated Bonds in the Term Rate Mode determined pursuant to Section 76.07(a).

Term Rate Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at the Term Rate.

Term Rate Period shall mean the period from (and including) the date on which the 2022C Subordinated Bonds begin to bear interest in a Term Rate Mode to (but excluding) the commencement date of the next succeeding Interest Period, including another Term Rate Period.

2022 Tax Certificate shall mean the Tax Certificate executed and delivered by the District in connection with the issuance of the 2022C Subordinated Bonds, as amended or supplemented from time to time in accordance with its terms.

Weekly Mode shall mean the Interest Rate Mode during which the 2022C Subordinated Bonds bear interest at the Weekly Rate.

Weekly Rate shall mean the per annum interest rate on 2022C Subordinated Bonds in the Weekly Mode determined pursuant to Section 76.06(b).

Weekly Rate Period shall mean the period during which a 2022C Subordinated Bond in the Weekly Mode shall bear a Weekly Rate, which shall be the period commencing on Thursday of each week to and including Wednesday of the following week, except (i) the first Weekly Rate Period which shall be from the Conversion Date on which the Interest Rate Mode for the 2022C Subordinated Bonds is changed to a Weekly Mode to and including the Wednesday of the following week and (ii) the last Weekly Rate Period which shall end on the day preceding the earliest to occur of the Conversion Date on which the Interest Rate Mode for the 2022C Subordinated Bonds is changed from the Weekly Mode to a different Interest Rate Mode, the Maturity Date or the Mandatory Purchase Date for such 2022C Subordinated Bond.

ARTICLE LXXVI

THE 2022C SUBORDINATED BONDS

Section 76.01. Authorization and Purpose of 2022C Subordinated Bonds. The Board hereby authorizes the issuance of a series of revenue bonds of the District in accordance with the Subordinate Master Resolution, designated as "Subordinated Electric Revenue Refunding Bonds, 2022 Series C" (the "2022C Subordinated Bonds") for the purpose of (i) refunding the Refunded Bonds and (ii) paying costs of issuance (to the extent set forth in the Sales Certificate).

Section 76.02. Terms, Registration, Denominations, Medium, Method and Place of Payment and Dating of 2022C Subordinated Bonds.

(a) The 2022C Subordinated Bonds shall be issued in the aggregate principal amount which, together with the aggregate principal amount of the District's Electric Revenue Refunding Bonds, 2022 Series J, if any, issued and delivered at the same time shall not exceed $170,000,000, shall bear interest at such initial rate or rates for such initial Interest Period, shall bear interest in such initial Interest Rate Mode, shall mature and become payable as to principal on such Maturity Date or Maturity Dates (not to exceed forty (40) years from the date of issuance of the 2022C Subordinated Bonds) in the amount and be subject to such mandatory sinking fund account payments on such mandatory sinking fund account payment dates, if any, all as set forth in the Sales Certificate. In addition to the provisions required pursuant to the terms of this Thirteenth Supplemental Resolution to be specified in the Sales Certificate, the Sales Certificate may contain such provisions, in a form approved by the District's Bond Counsel and the District's counsel, as the officer executing the Sales Certificate may deem necessary or desirable and consistent with the purpose of this Thirteenth Supplemental Resolution, including provisions (i) adding additional covenants and agreements to be observed by the District, (ii) curing, correcting, amending or supplementing any ambiguous, defective or ineffective provision contained in the Subordinate Master Resolution or this Thirteenth Supplemental Resolution, or (iii) amending or supplementing any provision contained herein to the extent necessary to provide for the issuance of the 2022C Subordinated Bonds if, in the judgment of such officer such provision is reasonable. The Chief Executive Officer and General Manager of the District, any Member of the Executive Committee of the District, the Treasurer of the District, the Secretary of the District or the Chief Financial Officer of the District, or the designee of any of them, is hereby authorized and instructed to execute and deliver the Sales Certificate and, upon execution and delivery thereof, the Sales Certificate shall be incorporated herein and in the Subordinate Master Resolution by reference. The execution and delivery of the Sales Certificate shall be conclusive evidence that, where any judgment or determination of reasonableness is required to be made by the person signing said certificate, such judgment or determination has been made.

(b) The 2022C Subordinated Bonds shall be issued in the form of fully registered 2022C Subordinated Bonds in Authorized Denominations and no provision of the Subordinate Master Resolution relating to coupon bonds or coupons shall apply to the 2022C Subordinated Bonds. 2022C Subordinated Bonds (other than 2022C Subordinated Bonds in the Direct Purchase Index Mode) shall be issued in the form of one single certificated bond in the aggregate principal amount of the 2022C Subordinated Bonds and shall be registered as set forth in Section 80.04 of this Thirteenth Supplemental Resolution. 2022C Subordinated Bonds in the Direct Purchase Index Mode shall be issued in the form of one single certificated bond in the aggregate principal amount of the 2022C Subordinated Bonds and shall be registered in the name of the Holder thereof or as otherwise directed by such Holder. Registered ownership of the 2022C Subordinated Bonds, or any portion thereof, may not thereafter be transferred except as set forth in the Continuing Covenant Agreement (during any time that the 2022C Subordinated Bonds are in the Direct Purchase Index Mode), Section 2.05 of the Subordinate Master Resolution and Section 80.04 of this Thirteenth Supplemental Resolution. Each 2022C Subordinated Bond in the Direct Purchase Index Mode shall contain a legend indicating that the transferability of such 2022C Subordinated Bond is subject to the restrictions set forth in this Thirteenth Supplemental Resolution.

(c) The 2022C Subordinated Bonds shall be dated as of the date of their initial issuance and shall be numbered in such manner as is determined by the Trustee.

(d) The principal of and premium, if any, and interest on the 2022C Subordinated Bonds shall be payable in lawful money of the United States of America.

(e) Interest on the 2022C Subordinated Bonds shall be paid on each Interest Payment Date by the Paying Agent during a Daily Mode, Weekly Mode, Term Rate Mode, Index Mode or Fixed Rate Mode by check mailed on the date on which due to the Holders of the 2022C Subordinated Bonds at the close of business on the Record Date for the 2022C Subordinated Bonds in respect of such Interest Payment Date at the registered addresses of the Holders of the 2022C Subordinated Bonds as shall appear on the registration books of the Trustee. In the case of (i) 2022C Subordinated Bonds in a Direct Purchase Index Mode or Flexible Mode or (ii) any Holder of 2022C Subordinated Bonds in any Interest Rate Mode other than a Direct Purchase Index Mode or Flexible Mode in an aggregate principal amount in excess of $1,000,000 as shown on the registration books of the Trustee who, prior to the Record Date for the 2022C Subordinated Bonds next preceding any Interest Payment Date, shall have provided the Paying Agent with written with written wire transfer instructions, interest payable on such 2022C Subordinated Bonds shall be paid on each Interest Payment Date in accordance with the wire transfer instructions provided by the Holder of such 2022C Subordinated Bond; provided, however, that during any Flexible Rate Period, except for 2022C Subordinated Bonds registered in the name of the Securities Depository (or its nominee), interest on any such 2022C Subordinated Bond shall be payable only upon surrender of such 2022C Subordinated Bond at the office of the Paying Agent.

(f) The principal of and premium, if any, on each 2022C Subordinated Bond shall be payable on the Principal Payment Date of such 2022C Subordinated Bond upon surrender thereof at the office of the Paying Agent; provided that the Paying Agent may agree with the Holder of any 2022C Subordinated Bond (and hereby does so agree with the Bank during any Direct Purchase Index Rate Period) that such Holder may, in lieu of surrendering the same for a new 2022C Subordinated Bond, endorse on such 2022C Subordinated Bond a record of partial payment of the principal of such 2022C Subordinated Bond in the form set forth below (which shall be typed or printed on such 2022C Subordinated Bond):

PAYMENTS ON ACCOUNT OF PRINCIPAL

Payment Date	Principal Amount Paid	Balance of Principal Amount Unpaid	Signature of Holder

The Paying Agent shall maintain a record of each such partial payment made in accordance with the foregoing agreement and such record of the Paying Agent shall be conclusive. Such partial payment shall be valid upon payment of the amount thereof to the Holder of such 2022C Subordinated Bond, and the District, the Trustee and the Paying Agent shall be fully released and discharged from all liability to the extent of such payment regardless of whether such endorsement shall or shall not have been made upon such 2022C Subordinated Bond by the Holder thereof and regardless of any error or omission in such endorsement.

(g) Except as may be specifically set forth herein, the Paying Agent, the Trustee, the Remarketing Agent, if any, and the District may treat the Holder of a 2022C Subordinated Bond as the absolute owner thereof for all purposes, whether or not such 2022C Subordinated Bond shall be overdue, and the Paying Agent, the Trustee, the Remarketing Agent, if any, and the District shall not be affected by any knowledge or notice to the contrary. Payment of the principal of and premium, if any, and interest on each 2022C Subordinated Bond shall be made only to such Holder, which payments shall be valid and effectual to satisfy and discharge the liability of such 2022C Subordinated Bond to the extent of the sum or sums so paid. All 2022C Subordinated Bonds paid at maturity or on earlier redemption pursuant to the provisions of this Section shall be cancelled by the Paying Agent.

(h) Each 2022C Subordinated Bond shall bear interest at the applicable rate or rates during each applicable Interest Accrual Period until the entire Principal Amount thereof has been paid.

Section 76.03. Payment of Principal and Interest of 2022C Subordinated Bonds; Acceptance of Terms and Conditions.

(a) The interest on each 2022C Subordinated Bond shall become due and payable on the Interest Payment Dates with respect to such 2022C Subordinated Bond to and including the Maturity Date of such 2022C Subordinated Bond, and on each Redemption Date and on the date of any acceleration prior thereto. The principal of each 2022C Subordinated Bond shall become due and payable on the Principal Payment Date of such 2022C Subordinated Bond.

(b) By the acceptance of its 2022C Subordinated Bond, the Holder thereof shall be deemed to have agreed to all the terms and provisions of such 2022C Subordinated Bond as specified in such 2022C Subordinated Bond and the Subordinate Master Resolution, including without limitation the applicable Interest Periods, interest rates (including any applicable

Alternate Rate), Purchase Dates, Mandatory Purchase Dates, Purchase Prices, mandatory and optional purchase and redemption provisions applicable to such 2022C Subordinated Bond, method and timing of purchase, redemption and payment. Such Holder further agrees that if, on any date upon which its 2022C Subordinated Bond is to be purchased, redeemed or paid at maturity or earlier due date, funds are on deposit with the Paying Agent or the Trustee to pay the full amount due on such 2022C Subordinated Bond, then such Holder shall have no rights under the Subordinate Master Resolution other than to receive such full amount due with respect to such 2022C Subordinated Bond and that interest on such 2022C Subordinated Bond shall cease to accrue as of such date.

(c) While any 2022C Subordinated Bonds are Liquidity Provider Bonds, such Liquidity Provider Bonds shall bear interest and be payable at the times, in the manner and in the amounts required under the Liquidity Facility securing such 2022C Subordinated Bonds or the Reimbursement Agreement related thereto.

Section 76.04. <u>Calculation and Payment of Interest; Change in Interest Rate Mode; Maximum Rate</u>.

(a) When a Direct Purchase Index Mode or Index Mode is in effect and the Direct Purchase Index or the Index, as applicable, is the SIFMA Index, interest shall be calculated on the basis of a 365/366-day year for the actual number of days elapsed. When a Direct Purchase Index Mode or Index Mode is in effect and the Direct Purchase Index or the Index, as applicable, is an index other than the SIFMA Index, interest shall be calculated on the basis specified in writing by the District on or before the first day of the applicable Direct Purchase Index Rate Period or Index Rate Period. When a Short-Term Mode is in effect, interest shall be calculated on the basis of a 365/366-day year for the actual number of days elapsed. When a Term Rate Mode or a Fixed Rate Mode is in effect, interest shall be calculated on the basis of a 360-day year comprised of twelve 30-day months. Payment of unpaid interest accrued on each 2022C Subordinated Bond during each Interest Accrual Period shall be made on the applicable Interest Payment Date for such 2022C Subordinated Bond to the Holder of record of such 2022C Subordinated Bond on the applicable Record Date.

(b) The 2022C Subordinated Bonds in any Interest Rate Mode other than a Fixed Rate Mode may be changed to any other Interest Rate Mode at the times and in the manner hereinafter provided. Subsequent to such change in Interest Rate Mode (other than a change to a Fixed Rate Mode), the 2022C Subordinated Bonds may again be changed to a different Interest Rate Mode at the times and in the manner hereinafter provided. A Fixed Rate Mode shall be in effect until the Maturity Date, or acceleration thereof prior to the Maturity Date, and the 2022C Subordinated Bonds in a Fixed Rate Mode may not be changed to any other Interest Rate Mode.

(c) Subject to Section 76.09(b)(iii), no 2022C Subordinated Bonds shall bear interest at an interest rate higher than the Maximum Rate with respect thereto.

(d) In the absence of manifest error, the determination of interest rates (including any determination of rates in connection with a New Mode) and Interest Periods by the Remarketing Agent or the Calculation Agent, as applicable, as provided herein, and the record of interest rates maintained by the Paying Agent shall be conclusive and binding upon the

Remarketing Agent, the Paying Agent, the Trustee, the District, the Holders and the Beneficial Owners.

Section 76.05. Determination of Flexible Rates and Interest Periods During Flexible Mode. An Interest Period for the Flexible Rate Bonds shall be of such duration of from one to 270 calendar days, ending on either a day which immediately precedes a Business Day or the day immediately preceding the Maturity Date, as the Remarketing Agent shall determine in accordance with the provisions of this Section. A Flexible Rate Bond may have an Interest Period, and bear interest at a Flexible Rate, different than another Flexible Rate Bond. In making the determinations with respect to Interest Periods, subject to limitations imposed by the second preceding sentence and in Section 76.04 hereof, on each Rate Determination Date for a Flexible Rate Bond, the Remarketing Agent shall select for such 2022C Subordinated Bond the Interest Period which would result in the Remarketing Agent being able to remarket such 2022C Subordinated Bond at par in the secondary market at the lowest average interest cost for all 2022C Subordinated Bonds; provided, however, that if the Remarketing Agent has received notice from the District that such 2022C Subordinated Bonds are to be changed from the Flexible Mode to any other Interest Rate Mode, the Remarketing Agent shall select Interest Periods which do not extend beyond the proposed Conversion Date.

Except while the 2022C Subordinated Bonds are registered in a Book-Entry System, in order to receive payment of the Purchase Price the Holder of any Flexible Rate Bond must present such Flexible Rate Bond to the Trustee, by 12:00 noon on the Rate Determination Date, in which case the Trustee shall pay the Purchase Price to such Holder by 3:00 p.m. on the same day.

By 1:00 p.m. on each Rate Determination Date, the Remarketing Agent, with respect to each Flexible Rate Bond which is subject to adjustment on such date, shall determine the Flexible Rate(s) for the Interest Periods then selected for such Flexible Rate Bond and shall give notice by Electronic Means to the Paying Agent and the District of the Interest Period, the Purchase Date(s) and the Flexible Rate(s). The Remarketing Agent shall make the Flexible Rate and Interest Period available after 2:00 p.m. on each Rate Determination Date by telephone or Electronic Means to the Trustee or any other Paying Agent without request, and to any Beneficial Owner or Notice Party requesting such information.

Section 76.06. **<u>Determination of Interest Rates During the Daily Mode and the Weekly Mode</u>**. The interest rate for 2022C Subordinated Bonds in the Daily Mode or Weekly Mode shall be the rate of interest per annum determined by the Remarketing Agent on and as of the applicable Rate Determination Date as the minimum rate of interest which, in the opinion of the Remarketing Agent under then-existing market conditions, would result in the sale of such 2022C Subordinated Bonds in the Daily Rate Period or Weekly Rate Period, as applicable, at a price equal to the principal amount thereof, plus interest, if any, accrued through the Rate Determination Date during the then current Interest Accrual Period. In making any such determination the Remarketing Agent shall not take into account the per annum rate of interest that would be applicable to Liquidity Provider Bonds pursuant to the terms of the applicable Liquidity Facility or related Reimbursement Agreement.

(a) During the Daily Mode, the Remarketing Agent shall establish the Daily Rate by 10:00 a.m. on each Rate Determination Date. The Daily Rate for any day during the Daily Mode which is not a Business Day shall be the Daily Rate established on the immediately preceding Rate Determination Date. The Remarketing Agent shall make the Daily Rate available no less frequently than once per week by Electronic Means to each Notice Party requesting such rate.

(b) During the Weekly Mode, the Remarketing Agent shall establish the Weekly Rate by 4:00 p.m. on each Rate Determination Date. The Weekly Rate shall be in effect during the applicable Weekly Rate Period. The Remarketing Agent shall make the Weekly Rate available after 5:00 p.m. on the Business Day following the Rate Determination Date by Electronic Means to each Notice Party requesting such rate.

Section 76.07. **<u>Determination of Term Rates and Fixed Rates</u>**.

(a) <u>Term Rates</u>. The Term Rate shall be determined by the Remarketing Agent not later than 4:00 p.m. on the Rate Determination Date. The Term Rate shall be the minimum rate which, in the sole judgment of the Remarketing Agent, would result in a sale of such 2022C Subordinated Bonds at a price equal to the principal amount thereof on the Rate Determination Date for the Interest Period selected, and the Call Protection Date specified, by the District in writing delivered to the Remarketing Agent before such Rate Determination Date. No Interest Period in the Term Rate Mode may extend beyond the Maturity Date. The Remarketing Agent shall make the Term Rate available by telephone or Electronic Means after 5:00 p.m. on the Rate Determination Date to any Notice Party requesting such Term Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such rate by Electronic Means.

(b) Fixed Rates. The Remarketing Agent shall determine the Fixed Rate for 2022C Subordinated Bonds being converted to the Fixed Rate Mode in the manner and at the times as follows: not later than 4:00 p.m. on the applicable Rate Determination Date, the Remarketing Agent shall determine the Fixed Rate (or Fixed Rates, if such 2022C Subordinated Bonds will have Serial Maturity Dates in accordance with Section 76.11(b)(v)). Except as set forth in Section 76.11(b)(v), the Fixed Rate shall be the minimum interest rate which, in the sole judgment of the Remarketing Agent, will result in a sale of such 2022C Subordinated Bonds at a price equal to the principal amount thereof on the Rate Determination Date. The Remarketing Agent shall make the Fixed Rate available by telephone or by Electronic Means after 5:00 p.m. on the Rate Determination Date to any Notice Party requesting such Fixed Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such Fixed Rate by Electronic Means. Subject to Section 76.11(b)(v), the Fixed Rate so established shall remain in effect until the Maturity Date of such 2022C Subordinated Bonds.

Section 76.08. Alternate Rates. The following provisions shall apply in the event (i) the Remarketing Agent fails or is unable to determine the interest rate or Interest Period for 2022C Subordinated Bonds (other than 2022C Subordinated Bonds in the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode), (ii) the method by which the Remarketing Agent determines the interest rate or Interest Period with respect to 2022C Subordinated Bonds in any Interest Rate Mode other than the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode shall be held to be unenforceable by a court of law of competent jurisdiction or (iii) other than with respect to 2022C Subordinated Bonds in the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode, if the Remarketing Agent suspends its remarketing effort in accordance with the Remarketing Agreement. These provisions shall continue to apply until such time as the Remarketing Agent again makes such determinations. In the case of clause (ii) above, the Remarketing Agent shall again make such determination at such time as there is delivered to the Remarketing Agent and the District an opinion of Bond Counsel to the effect that there are no longer any legal prohibitions against such determinations. The following shall be the methods by which the interest rates and, in the case of the Flexible Rate Mode, the Interest Periods, shall be determined for 2022C Subordinated Bonds as to which any of the events described in clauses (i), (ii) or (iii) shall be applicable. Such methods shall be applicable from and after the date any of the events described in clauses (i), (ii) or (iii) first become applicable to such 2022C Subordinated Bonds until such time as the events described in clauses (i), (ii) or (iii) are no longer applicable to such 2022C Subordinated Bonds.

(a) For Flexible Rate Bonds, the next Interest Period shall be from, and including, the first day following the last day of the current Interest Period for such Flexible Rate Bonds to, but excluding, the next succeeding Business Day and thereafter shall commence on each Business Day and extend to, but exclude, the next succeeding Business Day. For each such Interest Period, the interest rate for such 2022C Subordinated Bonds shall be the applicable Alternate Rate in effect on the Business Day that begins an Interest Period.

(b) For 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode, such 2022C Subordinated Bonds shall bear interest during each subsequent Interest Period at the Alternate Rate in effect on the first day of such Interest Period.

Section 76.09. Determination of Direct Purchase Index Rates.

(a) During each Direct Purchase Index Rate Period, the 2022C Subordinated Bonds shall, subject to subsection (b) of this Section 76.09, bear interest at the Direct Purchase Index Rate. The Calculation Agent shall determine the Direct Purchase Index Rate on each Direct Purchase Index Rate Determination Date occurring during any Direct Purchase Index Rate Period. The Direct Purchase Index Rate shall be the sum of (i) the product of the Direct Purchase Index multiplied by the Applicable Factor, plus (ii) the Applicable Spread. Each Direct Purchase Index Rate shall be effective, and interest shall accrue on the 2022C Subordinated Bonds at such Direct Purchase Index Rate each day during the applicable Direct Purchase Index Rate Effective Period. On or before any Conversion Date upon which a Direct Purchase Index Rate Period will begin, the District shall designate the Direct Purchase Index to be in effect during such Direct Purchase Index Rate Period. The Applicable Factor and Applicable Spread for a Direct Purchase Index Rate Period shall be determined by the Market Agent such that the applicable Direct Purchase Index Rate shall be the interest rate per annum (based upon tax exempt obligations comparable, in the judgment of the Market Agent, to the 2022C Subordinated Bonds and known to the Market Agent to have been priced or traded under the prevailing market conditions) to be the minimum interest rate at which a Person will agree to purchase the 2022C Subordinated Bonds on the Conversion Date at a price (without regard to accrued interest) equal to the principal amount thereof. Unless otherwise specified in the Continuing Covenant Agreement applicable to a Direct Purchase Index Rate Period, the Direct Purchase Index Rate shall be rounded to the nearest fifth decimal place. Promptly following the determination of the Direct Purchase Index Rate, the Calculation Agent shall give notice thereof to the District, the Trustee and the Paying Agent. If the Direct Purchase Index Rate is not determined by the Calculation Agent on the Direct Purchase Index Rate Determination Date, the rate of interest born on such 2022C Subordinated Bonds bearing interest at a Direct Purchase Index Rate shall be the rate in effect on the immediately preceding Direct Purchase Index Rate Reset Date until the Calculation Agent next determines the Direct Purchase Index Rate as required hereunder.

(b) Adjustments to Direct Purchase Index Rates.

(i) Taxable Rate. Notwithstanding anything in the Subordinate Master Resolution or this Thirteenth Supplemental Resolution to the contrary, including, without limitation, Section 78.02(b), but subject to Section 76.04(c) and Section 76.09(b)(ii) and (iii), from and after any Taxable Date, the interest rate on 2022C Subordinated Bonds in a Direct Purchase Index Mode shall be established at a rate at all times equal to the Taxable Rate.

(ii) Default Rate. Notwithstanding anything in the Subordinate Master Resolution or this Thirteenth Supplemental Resolution to the contrary, including, without limitation, Section 78.02(b), but subject to Section 76.04(c) and Section 76.09(b)(iii), from and after the effective date of any "Event of Default" under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution and during the continuance thereof, the interest rate for 2022C Subordinated Bonds in a Direct Purchase Index Mode shall be established at a rate at all times equal to the greater of (A) the Default Rate and (B) the interest rate that otherwise would be applicable to the 2022C

Subordinated Bonds but for the provisions of this paragraph, payable on demand to the Bank. Interest shall accrue and be paid on both defaulted interest and defaulted principal.

(iii) Excess Interest. Notwithstanding anything in the Subordinate Master Resolution or this Thirteenth Supplemental Resolution to the contrary, if during a Direct Purchase Index Mode the rate of interest on the 2022C Subordinated Bonds exceeds the Maximum Rate for such 2022C Subordinated Bonds, then (A) such 2022C Subordinated Bonds shall bear interest at the Maximum Rate and (B) interest on such 2022C Subordinated Bonds calculated at the rate equal to the difference between (1) the rate of interest for such 2022C Subordinated Bonds as calculated pursuant to this Section 76.09 and (2) the Maximum Rate (the "Excess Interest") shall be deferred until such date as the rate of interest borne by such 2022C Subordinated Bonds as calculated pursuant to this Section 76.09 is below the Maximum Rate, at which time Excess Interest shall be payable with respect to such 2022C Subordinated Bonds. Payments of deferred Excess Interest shall no longer be due and payable upon the earlier to occur of the date on which such 2022C Subordinated Bonds are redeemed or tendered for purchase in accordance with this Thirteenth Supplemental Resolution and the redemption price or purchase price, as applicable, is paid in full or the principal of and interest on such 2022C Subordinated Bonds is otherwise paid in full.

(iv) Amortization Period. Notwithstanding anything herein to the contrary, but subject to Section 76.04(c) and Section 76.09(b)(i), (ii) and (iii) during any Amortization Period, the 2022C Subordinated Bonds shall bear interest at the Bank Rate.

Section 76.10. Determination of Index Rates. During each Index Rate Period, the 2022C Subordinated Bonds shall bear interest at the Index Rate. The Calculation Agent shall determine the Index Rate for each maturity of the 2022C Subordinated Bonds on each Index Rate Determination Date occurring during any Index Rate Period. The Index Rate for each maturity of the 2022C Subordinated Bonds shall be the sum of (i) the product of the Index multiplied by the Index Percentage, plus (ii) the Index Spread for such maturity of the 2022C Subordinated Bonds. Each Index Rate shall be effective, and interest shall accrue on the 2022C Subordinated Bonds at such Index Rate each day during the applicable Index Rate Effective Period. If the 2022C Subordinated Bonds are initially issued in the Index Mode, the District shall specify the Index, Index Percentage, Index Spreads and Call Protection Date for the Index Rate Period commencing on the date of issuance of the 2022C Subordinated Bonds and the length of the Index Rate Period commencing on the date of issuance of the 2022C Subordinated Bonds in the Sales Certificate. On or before any Conversion Date upon which an Index Rate Period will begin, the Corporation shall specify the length of such Index Rate Period and designate the Index and Call Protection Date to be in effect during such Index Rate Period and the Remarketing Agent shall determine the Index Percentage and Index Spread that would result in a sale of the 2022C Subordinated Bonds at a price (without regard to accrued interest) equal to principal amount thereof on the Conversion Date for such Index Rate Period. Each Index, Index Percentage and Index Spread shall be in effect through the last day of the applicable Index Rate Period and shall be applied by the Calculation Agent in determining the Index Rate on each Index Rate Determination Date during such Index Rate Period. All percentages resulting from the calculation of the Index Rate shall be rounded, if necessary, to the nearest ten-thousandth of a percentage point with five hundred thousandths of a percentage point rounded upward. All dollar amounts used in or resulting from the calculation of the Index Rate shall be rounded to the nearest cent with one-half cent being rounded upward. The Calculation Agent shall make each Index Rate available by telephone or Electronic Means after 5:00 p.m. on the applicable Index Rate Determination Date to any Notice Party requesting such Index Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such rate by Electronic Means. If the Index Rate is not determined by the Calculation Agent on the applicable Index Rate Determination Date, the rate of interest born on such 2022C Subordinated Bonds bearing interest at an Index Rate shall be the rate in effect on the immediately preceding Index Rate Reset Date until the Calculation Agent next determines the Index Rate as required hereunder.

Section 76.11. Changes in Interest Rate Mode, Term Rate Period, Index Rate Period and Direct Purchase Index Rate Period. Subject to the provisions of this Section, the District may effect a change in Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period with respect to the 2022C Subordinated Bonds by following the procedures set forth in this Section.

(a) Changes to Interest Rate Modes Other Than Fixed Rate Mode; Changes in Term Rate Period, Index Rate Period and Direct Purchase Index Rate Period. The Interest Rate Mode for the 2022C Subordinated Bonds (other than the 2022C Subordinated Bonds in the Fixed Rate Mode) may be changed from one Interest Rate Mode to another Interest Rate Mode (other than the Fixed Rate Mode) and the Term Rate Period, Index Rate Period and Direct Purchase Index Rate Period for the 2022C Subordinated Bonds may be changed, as follows:

(i) Notice to Notice Parties; Notice to Holders. No later than a Business Day which is at least two Business Days prior to the date on which the Trustee is required to notify the Holders of the 2022C Subordinated Bonds preceding the proposed Conversion Date, the District shall give written notice to the Notice Parties of its intention to effect a change in the Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period from the Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period then prevailing (for purposes of this Section, the "Current Mode") to another Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period (for purposes of this Section, the "New Mode") specified in such written notice. Notice of the proposed change in Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period shall be given by the Trustee by mail to the Holders of the 2022C Subordinated Bonds not less than the 10th day next preceding the proposed Conversion Date, provided that no notice need be given for a Conversion Date occurring on the Business Day following the last day of a Flexible Rate Period, an Index Rate Period or a Term Rate Period or on a Substitution Date. Such notice shall state: (1) the proposed Conversion Date; (2) that the 2022C Subordinated Bonds will be subject to mandatory tender for purchase on the proposed Conversion Date (regardless of whether all of the conditions to the change in the Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period are satisfied); and (3) the Purchase Price of the 2022C Subordinated Bonds and the place of delivery for purchase of the 2022C Subordinated Bonds; provided that, if the proposed change is from one Direct Purchase Index Rate Period to a new Direct Purchase Index Rate Period and any Holder of the 2022C Subordinated Bonds shall continue to be a Holder of 2022C Subordinated Bonds in the new Direct Purchase Index Rate Period, the Holder may elect to retain its 2022C Subordinated Bonds by filing with the District and the Trustee not less than five days prior to the proposed Conversion Date a written notice identifying such 2022C Subordinated Bonds and the principal amount it wishes to retain.

(ii) Determination of Interest Rates. The New Mode shall commence on the Conversion Date and the interest rate(s) (together, in the case of a change to the Flexible Mode, with the Interest Period(s)) shall be determined in the manner provided in Sections 76.05, 76.06, 76.07, 76.09 and 76.10, as applicable.

(iii) Conditions Precedent.

(1) The Conversion Date shall be:

(A) in the case of a change from the Flexible Mode, the Business Day next succeeding the date on which all Flexible Rate Periods determined for the 2022C Subordinated Bonds end;

(B) in the case of a change from the Daily Mode or the Weekly Mode, any Business Day;

(C) in the case of a change from the Term Rate Mode to another Interest Rate Mode, or from one Term Rate Period to a new Term Rate Period, any day on which the applicable 2022C Subordinated Bonds would be subject to optional redemption if the conversion did not occur or the day immediately following the last day of the current Term Rate Period;

(D) in the case of a change from the Index Mode to another Interest Rate Mode, or from one Index Rate Period to a new Index Rate Period, any day on which the applicable 2022C Subordinated Bonds would be subject to optional redemption if the conversion did not occur or the day immediately following the last day of the current Index Rate Period; and

(E) in the case of a change from the Direct Purchase Index Mode or from one Direct Purchase Index Rate Period to another Direct Purchase Index Rate Period, any Business Day, subject to any limitations, conditions or requirements set forth in the Continuing Covenant Agreement.

(2) If the 2022C Subordinated Bonds to be converted are Flexible Rate Bonds, no Interest Period with respect to such 2022C Subordinated Bonds set after delivery by the District to the Remarketing Agent of the notice of the intention to effect a change in Interest Rate Mode shall extend beyond the proposed Conversion Date.

(3) The following items shall have been delivered to the District and the Trustee on or prior to the Conversion Date:

(A) a Favorable Opinion of Bond Counsel dated the Conversion Date; and

(B) if there is to be a Liquidity Facility or an Alternate Liquidity Facility or Credit Enhancement or an Alternate Credit Enhancement delivered in connection with such change, the items required by Section 78.08(d).

(4) If no Liquidity Facility is in effect to provide funds for the purchase of 2022C Subordinated Bonds on the Conversion Date, the remarketing proceeds available on the Conversion Date and the amounts required to be paid by the District pursuant to Section 78.04 shall not be less than the amount required to purchase all of the 2022C Subordinated Bonds on the Conversion Date at the Purchase Price.

(b) Change to Fixed Rate Mode. At the option of the District, the Interest Rate Mode for the 2022C Subordinated Bonds may be changed to the Fixed Rate Mode as provided in this Section 76.11(b). On any Business Day which is at least two Business Days prior to the date on which the Trustee is required to notify the Holders of the 2022C Subordinated Bonds before the proposed Conversion Date pursuant to clause (ii) of this subsection (b), the District shall give written notice to the Notice Parties stating that the Interest Rate Mode will be changed to the Fixed Rate Mode and setting forth the proposed Conversion Date. In addition, such notice shall state whether some or all of the 2022C Subordinated Bonds to be converted shall be converted to Serial Bonds and, if so, the applicable Serial Maturity Dates and Serial Payments, all as determined pursuant to clause (v) of this subsection (b). Any such change in Interest Rate Mode shall be made as follows:

(i) Conversion Date. The Conversion Date shall be:

(1) in the case of a change from the Flexible Mode, the Business Day next succeeding the date on which all Flexible Rate Periods determined for the 2022C Subordinated Bonds end;

(2) in the case of a change from the Daily Mode or the Weekly Mode, any Business Day;

(3) in the case of a change from the Term Rate Mode, any day on which the applicable 2022C Subordinated Bonds would be subject to optional redemption if the conversion did not occur or the day immediately following the last day of the current Term Rate Period;

(4) in the case of a change from the Index Mode, any day on which the applicable 2022C Subordinated Bonds would be subject to optional redemption if the conversion did not occur or the day immediately following the last day of the current Index Rate Period; and

(5) in the case of a change from the Direct Purchase Index Mode, any Business Day, subject to any limitations, conditions or requirements set forth in the Continuing Covenant Agreement.

(ii) Notice to Holders. Not less than the 10th day next preceding the Conversion Date, the Trustee shall mail, in the name of the District, a notice of such proposed change to the Holders of the 2022C Subordinated Bonds stating that the Interest Rate Mode will be changed to the Fixed Rate Mode, the proposed Conversion Date and that such Holder is required to tender such Holder's 2022C Subordinated Bonds for purchase on such proposed Conversion Date.

(iii) General Provisions Applying to Change to Fixed Rate Mode. The change to the Fixed Rate Mode shall not occur unless the following items shall have been delivered to the District and the Trustee and the following conditions shall have been satisfied, in each case on or prior to the Conversion Date:

(1) a Favorable Opinion of Bond Counsel dated the Conversion Date;

(2) if there is to be Credit Enhancement or Alternate Credit Enhancement delivered in connection with such change, the items required by Section 78.08(d) in connection with the delivery of Credit Enhancement or Alternate Credit Enhancement; and

(3) if no Liquidity Facility is in effect to provide funds for the purchase of 2022C Subordinated Bonds on the Conversion Date, the remarketing proceeds available on the Conversion Date and the amounts required to be paid by the District pursuant to Section 78.04 shall not be less than the amount required to purchase all of the 2022C Subordinated Bonds on the Conversion Date at the Purchase Price.

(iv) Determination of Interest Rate. The Fixed Rate (or Fixed Rates in the case of Serial Bonds) for the 2022C Subordinated Bonds to be converted to the Fixed Rate Mode shall be established by the Remarketing Agent on the Rate Determination Date applicable thereto pursuant to the provisions of Section 76.07(b). Such Fixed Rate or Fixed Rates shall remain in effect until the Maturity Date or Serial Maturity Dates, as applicable, of such 2022C Subordinated Bonds. Such determination shall be conclusive and binding upon the District, the Trustee, the Credit Provider, if any, and the Holders of the 2022C Subordinated Bonds to which such rate will be applicable. Not later than 5:00 p.m. on the date of determination of the Fixed Rate, the Remarketing Agent shall notify the District, the Trustee and the Credit Provider, if any, of such rate by telephone.

(v) Serialization and Sinking Fund Account Redemption; Price. Upon conversion of the 2022C Subordinated Bonds to the Fixed Rate Mode, the 2022C Subordinated Bonds shall be remarketed at par, shall mature on the same Maturity Date and be subject to the same mandatory sinking fund account redemption, if any, and optional redemption provisions as set forth in this Thirteenth Supplemental Resolution prior to the Conversion; provided, however, that if the District shall deliver to the Trustee a Favorable Opinion of Bond Counsel, the District may elect to (1) have some of the 2022C Subordinated Bonds be Serial Bonds and some subject to mandatory sinking fund account redemption even if such 2022C Subordinated Bonds were not Serial Bonds or subject to mandatory sinking fund account redemption prior to such change, (2) change the optional redemption dates and/or premiums set forth in Section 77.03(b), and/or (3) sell some or all of the 2022C Subordinated Bonds at a premium or a discount to par.

(c) Failure to Satisfy Conditions Precedent to an Interest Rate Mode Change. In the event the conditions described above in subsections (a) or (b), as applicable, of this Section have not been satisfied by the applicable Conversion Date, then the New Mode shall not take effect (although any mandatory tender shall be made on such date if notice has been sent to the Holders stating that such 2022C Subordinated Bonds would be subject to mandatory purchase on such date). If the failed change in Interest Rate Mode was from the Flexible Mode, such 2022C Subordinated Bonds shall remain in the Flexible Mode with interest rates and Interest Periods to be established by the Remarketing Agent on the failed Conversion Date in accordance with Section 76.05. If the failed change in Interest Rate Mode was from the Daily Mode, such 2022C Subordinated Bonds shall remain in the Daily Mode, and if the failed change in Interest Rate Mode was from the Weekly Mode, such 2022C Subordinated Bonds shall remain in the Weekly Mode, in each case with interest rates established in accordance with the applicable provisions of Section 76.06 on and as of the failed Conversion Date. If the failed change in Interest Rate Mode was from the Term Rate Mode, then such 2022C Subordinated Bonds shall remain in the Term Rate Mode with interest rates established in accordance with the applicable provisions of Section 76.07. If the failed change in Interest Rate Mode was from the Direct Purchase Index Mode, then the 2022C Subordinated Bonds shall remain in the Direct Purchase Index Mode, with interest rates established in accordance with the applicable provisions of Section 76.09. If the failed change in Interest Rate Mode was from the Index Mode, then the 2022C Subordinated Bonds shall remain in the Index Mode, with interest rates established in accordance with the applicable provisions of Section 76.10.

(d) Rescission of Election. Notwithstanding anything herein to the contrary, the District may rescind any election by it to change an Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period as described above prior to the Conversion Date by giving written notice thereof to the Notice Parties prior to 10:00 a.m. on the Business Day preceding such Conversion Date. If the Trustee receives notice of such rescission prior to the time the Trustee has given notice to the Holders of the 2022C Subordinated Bonds, then such notice of change in Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period shall be of no force and effect. If the Trustee receives notice from the District of rescission of a change in Interest Rate Mode, Term Rate Period, Index Rate Period or Direct Purchase Index Rate Period after the Trustee has given notice thereof to the Holders of the 2022C Subordinated Bonds, then, if the proposed Conversion Date would have been a Mandatory Purchase Date, such date shall continue to be a Mandatory Purchase Date and the Interest Rate Mode for the 2022C Subordinated Bonds shall be determined as set forth in the remainder of this paragraph. If the proposed change in Interest Rate Mode was from the Flexible Mode, such 2022C Subordinated Bonds shall remain in the Flexible Mode with interest rates and Interest Periods to be established by the Remarketing Agent on the proposed Conversion Date in accordance with Section 76.05. If the proposed change in Interest Rate Mode was from the Daily Mode, such 2022C Subordinated Bonds shall remain in the Daily Mode, and if the proposed change in Interest Rate Mode was from the Weekly Mode, such 2022C Subordinated Bonds shall remain in the Weekly Mode, in each case with interest rates established in accordance with the applicable provisions of Section 76.06 on and as of the proposed Conversion Date. If the proposed change in Interest Rate Mode was from the Term Rate Mode, then such 2022C Subordinated Bonds shall remain in the Term Rate Mode with interest rates established in accordance with the applicable provisions of Section 76.07. If the proposed change in Interest Rate Mode was from the Direct Purchase Index Mode, then the 2022C Subordinated Bonds shall remain in the Direct Purchase Index Mode, with interest rates established in accordance with the applicable provisions of Section 76.09. If the proposed change in Interest Rate Mode was from the Index Mode, then the 2022C Subordinated Bonds shall remain in the Index Mode, with interest rates established in accordance with the applicable provisions of Section 76.10.

ARTICLE LXXVII

REDEMPTION OF 2022C SUBORDINATED BONDS

Section 77.01. Optional Redemption of Flexible Rate Bonds. 2022C Subordinated Bonds in the Flexible Mode are not subject to optional redemption prior to their respective Purchase Dates. 2022C Subordinated Bonds in the Flexible Mode shall be subject to redemption at the option of the District in whole or in part on their respective Purchase Dates at a Redemption Price equal to the principal amount thereof.

Section 77.02. Optional Redemption of 2022C Subordinated Bonds in the Daily Mode and the Weekly Mode. 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode are subject to optional redemption by the District, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations) on any Business Day, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

Section 77.03. Optional Redemption of 2022C Subordinated Bonds in the Term Rate Mode, Index Mode or Fixed Rate Mode.

(a) 2022C Subordinated Bonds in the Term Rate Mode or the Index Mode shall be subject to redemption, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations), on any date on or after the Call Protection Date for each Term Rate Period or Index Rate Period applicable to the 2022C Subordinated Bonds in the Term Rate Mode or Index Mode, at the option of the District at a Redemption Price equal to the principal amount, or portions thereof, of the 2022C Subordinated Bonds to be redeemed, without premium, plus accrued interest, if any, to the Redemption Date.

(b) 2022C Subordinated Bonds in the Term Rate Mode or Fixed Rate Mode with a Term Rate Period or Fixed Rate Period of greater than or equal to ten years are subject to redemption in whole or in part on any date on or after the tenth anniversary of the commencement of the Term Rate Period or Fixed Rate Period (and if in part, in such order of maturity as the District shall specify and within a maturity by lot in any manner which the Trustee deems fair) at a Redemption Price equal to the principal amount, or portions thereof, of the 2022C Subordinated Bonds to be redeemed, without premium, plus accrued interest, if any, to the Redemption Date.

(c) The District, in connection with a change to a Long-Term Mode, may waive or otherwise alter its rights to direct the redemption of any such 2022C Subordinated Bonds so changed to a Long-Term Mode; provided that notice describing the waiver or alteration shall be submitted to the Trustee, together with a Favorable Opinion of Bond Counsel, addressed to it.

(d) Unless a Credit Provider Failure has occurred and is continuing, if a Credit Enhancement is then in effect and the Redemption Price includes any premium, the right of the District to direct an optional redemption of 2022C Subordinated Bonds in a Long-Term Mode is subject to the condition that the Trustee has received, prior to the date on which notice of redemption is required to be given to Owners, either Available Moneys or written confirmation from the Credit Provider that it can draw under the Credit Enhancement on the proposed redemption date in an aggregate amount sufficient to cover the principal of and premium and interest due on the Redemption Date.

Section 77.04. <u>Optional and Mandatory Redemption of 2022C Subordinated Bonds in the Direct Purchase Index Mode</u>.

(a) Subject to any limitations, conditions or requirements set forth in the applicable Continuing Covenant Agreement, 2022C Subordinated Bonds in the Direct Purchase Index Mode are subject to optional redemption by the District, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations) on any date, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

(b) 2022C Subordinated Bonds in the Direct Purchase Index Mode are subject to mandatory redemption on the dates, in the amounts and in the manner set forth in the applicable Continuing Covenant Agreement, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

Section 77.05. <u>Mandatory Sinking Fund Account Redemption of 2022C Subordinated Bonds and Redemption of Liquidity Provider Bonds</u>.

(a) The 2022C Subordinated Bonds shall be subject to redemption prior to maturity from mandatory sinking fund account payments for the 2022C Subordinated Bonds on the dates, if any, specified in the Sales Certificate, at a Redemption Price equal to the principal amount of the 2022C Subordinated Bonds, or portions thereof, to be redeemed, plus accrued interest, if any, to the Redemption Date, without premium. The mandatory sinking fund account payments for the 2022C Subordinated Bonds shall be in the amounts and payable on the dates set forth in the Sales Certificate.

(b) Liquidity Provider Bonds are subject to redemption in accordance with the terms of the applicable Liquidity Facility or related Reimbursement Agreement.

Section 77.06. <u>Funds for Redemption of 2022C Subordinated Bonds</u>. Unless a Credit Provider Failure has occurred and is continuing, if Credit Enhancement is in effect with respect to the 2022C Subordinated Bonds, the Redemption Price of 2022C Subordinated Bonds (other than Liquidity Provider Bonds) shall be paid solely from (1) moneys obtained from a drawing on the Credit Enhancement securing the 2022C Subordinated Bonds pursuant to Section 78.08(a) or (2) Available Moneys.

Section 77.07. <u>Selection of 2022C Subordinated Bonds for Redemption.</u> Whenever provision is made for the redemption of less than all of the 2022C Subordinated Bonds of any one maturity, the Trustee shall select the 2022C Subordinated Bonds to be redeemed, from the Outstanding 2022C Subordinated Bonds of such maturity not previously called for redemption, by lot in any manner which the Trustee deems fair; provided, however, that Liquidity Provider Bonds shall be redeemed prior to the redemption of other 2022C Subordinated Bonds; provided further, however, that during a Direct Purchase Index Rate Period, the 2022C Subordinated Bonds shall be redeemed pro rata. The Trustee shall promptly notify the District in writing of the numbers of the 2022C Subordinated Bonds so selected for redemption.

Section 77.08. **Notice of Redemption**. Notice of redemption shall be mailed by first-class mail by the Trustee, not less than twenty (20) days (ten (10) days in the case of 2022C Subordinated Bonds in the Daily Mode, Weekly Mode, Direct Purchase Index Mode or Flexible Mode) nor more than sixty (60) days prior to the redemption date, to the Holder of any 2022C Subordinated Bond called for redemption, but neither failure to receive such notice nor any defect in any notice so mailed shall affect the sufficiency of the proceedings for the redemption of any of the 2022C Subordinated Bonds; provided that no notice of redemption shall be required for mandatory redemptions of the 2022C Subordinated Bonds in the Direct Purchase Index Mode. Each notice of redemption shall state the redemption date, the place of redemption and the principal amount of the 2022C Subordinated Bonds to be redeemed, and shall also state that the interest on the 2022C Subordinated Bonds in such notice designated for redemption shall cease to accrue from and after such redemption date and that on said date there will become due and payable on each of said 2022C Subordinated Bonds the principal amount thereof to be redeemed, interest accrued thereon to the redemption date and the premium, if any, thereon (such premium to be specified). Each notice of optional redemption shall also state that redemption is conditioned upon receipt by the Trustee of sufficient funds on the redemption date to pay the Redemption Price of the 2022C Subordinated Bonds to be redeemed.

Notice of optional redemption shall be given by the Trustee for and on behalf of the District, at the written request of the District (which request shall be given to the Trustee (unless waived by the Trustee) at least twenty-five (25) days prior to the date fixed for redemption or such shorter period as is acceptable to the Trustee). Any notice of optional redemption may be rescinded by written notice given to the Trustee by the District no later than two Business Days prior to the date specified for redemption.

Notwithstanding the foregoing, notice of redemption shall not be required for 2022C Subordinated Bonds redeemed on a Mandatory Purchase Date.

Section 77.09. **Partial Redemption of 2022C Subordinated Bond**. Upon surrender of any 2022C Subordinated Bond redeemed in part only, the District shall execute and the Trustee shall deliver to the registered owner thereof, at the expense of the District, a new 2022C Subordinated Bond or Bonds, of the same maturity, of Authorized Denominations in aggregate principal amount equal to the unredeemed portion of the 2022C Subordinated Bond surrendered.

Section 77.10. **Effect of Redemption**. Notice of redemption having been duly given as aforesaid, and moneys for payment of the Redemption Price being held by the Trustee, the 2022C Subordinated Bonds so to be redeemed shall, on the date designated in such notice, become due and payable at the Redemption Price specified in such notice; and from and after the date so designated interest on the 2022C Subordinated Bonds so designated for redemption shall cease to accrue and the Holders and Beneficial Owners of said 2022C Subordinated Bonds shall have no rights in respect thereof, except to receive payment of the Redemption Price thereof.

Section 77.11. Disposition of Redeemed 2022C Subordinated Bonds. All 2022C Subordinated Bonds redeemed pursuant to the provisions of this Article LXXVII shall be delivered to and cancelled by the Trustee and shall thereafter be delivered by the Trustee to, or upon the order of, the District, and no 2022C Subordinated Bonds shall be issued in place thereof.

ARTICLE LXXVIII

PURCHASE OF 2022C SUBORDINATED BONDS

Section 78.01. Optional Tenders of 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode. Subject to Section 78.06, the Beneficial Owners of 2022C Subordinated Bonds in a Daily Mode or a Weekly Mode may elect to have their 2022C Subordinated Bonds (or portions of those 2022C Subordinated Bonds, provided that no 2022C Subordinated Bonds remain Outstanding in other than Authorized Denominations) purchased on any Business Day at a price equal to the Purchase Price, upon delivery of a Tender Notice to the Trustee by the Tender Notice Deadline. Immediately upon receipt of a Tender Notice, the Trustee shall notify the Remarketing Agent and provide the Remarketing Agent with a copy of such Tender Notice.

Section 78.02. Mandatory Purchase on Mandatory Purchase Date; Amortization Period During Direct Purchase Index Mode.

(a) The 2022C Subordinated Bonds shall be subject to mandatory purchase on each Mandatory Purchase Date. The Trustee shall give notice of such mandatory purchase by mail to the Holders of the 2022C Subordinated Bonds subject to mandatory purchase no less than ten (10) days prior to the Mandatory Purchase Date described in clauses (iii), (iv), (v), (viii) and (x) of the definition of Mandatory Purchase Date and no less than 3 days prior to the Mandatory Purchase Date described in clauses (vi) and (vii) of the definition of Mandatory Purchase Date (provided that in the instance of a Mandatory Purchase Date resulting from clause (iii) of the definition of Bank Purchase Date, no such notice shall be required). No notice shall be given of the Mandatory Purchase Date at the end of each Interest Period for Flexible Rate Bonds. Any notice shall state the Mandatory Purchase Date, the Purchase Price, and that interest on 2022C Subordinated Bonds subject to mandatory purchase shall cease to accrue from and after the Mandatory Purchase Date. The failure to mail such notice with respect to any 2022C Subordinated Bond shall not affect the validity of the mandatory purchase of any other 2022C Subordinated Bond with respect to which notice was so mailed. Any notice mailed will be conclusively presumed to have been given, whether or not actually received by any Holder or Beneficial Owner. The Trustee shall also give a copy of such notice to the Rating Agencies.

(b) Notwithstanding subparagraph (a) above and anything to the contrary in this Thirteenth Supplemental Resolution, in the event the 2022C Subordinated Bonds in the Direct Purchase Index Mode are not purchased or remarketed on a Bank Purchase Date and the conditions precedent to any Amortization Period set forth in the Continuing Covenant Agreement, if any, are satisfied (and if no such conditions precedent are set forth in the Continuing Covenant Agreement, then on the condition that no Event of Default under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution has occurred and is continuing), then the 2022C Subordinated Bonds shall be subject to special mandatory redemption on the following terms: (i) the 2022C Subordinated Bonds shall bear interest at the Bank Rate, unless an Event of Default under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution has occurred and is continuing, in which case the 2022C Subordinated Bonds shall bear interest at the Default Rate, (ii) interest on the 2022C Subordinated Bonds shall be payable on each Amortization Interest Payment Date, and (iii) the principal of the 2022C Subordinated Bonds shall be payable on each Amortization Principal Payment Date as provided in the Continuing Covenant Agreement. Notwithstanding anything herein to the contrary, during the Amortization Period, the 2022C Subordinated Bonds may be subject to optional redemption or purchase at the sole option of the District at any time with notice as and to the extent provided in the Continuing Covenant Agreement.

Section 78.03. Remarketing of 2022C Subordinated Bonds; Notices.

(a) Remarketing of 2022C Subordinated Bonds. The Remarketing Agent shall use its best efforts pursuant to the terms and conditions of the Remarketing Agreement to offer for sale:

(i) all 2022C Subordinated Bonds or portions thereof as to which a Tender Notice has been delivered pursuant to Section 78.01; and

(ii) all 2022C Subordinated Bonds required to be purchased on a Mandatory Purchase Date described in clauses (i), (ii), (iii), (iv), (viii) or (ix) of the definition thereof; and

(iii) any Liquidity Provider Bonds (A) purchased on a Purchase Date described in clause (i) or (ii) above, (B) with respect to which the Liquidity Provider has provided notice to the Trustee and the Remarketing Agent that it has reinstated the Available Amount, (C) with respect to which an Alternate Liquidity Facility and Alternate Credit Enhancement is in effect (if such funds were secured by a Credit Enhancement prior to becoming Liquidity Provider Bonds, which Credit Enhancement is no longer in effect), or (D) which are being marketed as Fixed Rate Bonds.

The Remarketing Agent shall not remarket 2022C Subordinated Bonds to the District or any affiliate thereof. In connection with the remarketing of any 2022C Subordinated Bonds with respect to which notice of redemption or notice of mandatory purchase has been given, the Remarketing Agent shall notify each person to which such 2022C Subordinated Bonds are remarketed of such notice of redemption or notice of mandatory purchase.

Anything in this Thirteenth Supplemental Resolution to the contrary notwithstanding, if there shall have occurred and be continuing either a Credit Provider Failure or a Liquidity Provider Failure with respect to a Series of 2022C Subordinated Bonds, the Remarketing Agent shall not remarket such 2022C Subordinated Bonds. All other provisions of this Thirteenth Supplemental Resolution, including without limitation, those relating to the setting of interest rates and Interest Periods and mandatory and optional purchases, shall remain in full force and effect during the continuance of such Credit Provider Failure or Liquidity Provider Failure.

(b) Notice of Remarketing; Registration Instructions; New Bonds. On each date on which a 2022C Subordinated Bond is to be purchased pursuant to this Article LXXVIII:

(i) the Remarketing Agent shall notify the Trustee by Electronic Means by 11:30 a.m. if it has been unable to remarket any tendered 2022C Subordinated Bonds, and shall include in such notice the principal amount of 2022C Subordinated Bonds it has been unable to remarket;

(ii) the Remarketing Agent shall notify the Trustee by Electronic Means not later than 1:00 p.m. of the names of the purchasers of the successfully remarketed 2022C Subordinated Bonds and such information as may be necessary to register the 2022C Subordinated Bonds and the registration instructions with respect thereto;

(iii) the Remarketing Agent shall cause the proceeds of the remarketing by such Remarketing Agent of tendered 2022C Subordinated Bonds to be paid to the Trustee in immediately available funds not later than 12:00 noon on the Purchase Date for such 2022C Subordinated Bonds; and

(iv) if the 2022C Subordinated Bonds are not in the Book-Entry System, the Trustee shall authenticate new 2022C Subordinated Bonds for the respective purchasers thereof which shall be available for pick-up by the Remarketing Agent not later than 2:30 p.m.

(c) Draw on Liquidity Facility or Request for Funds. On each date on which a 2022C Subordinated Bond is to be purchased pursuant to this Article LXXVIII, if (i) the Remarketing Agent shall have given notice to the Trustee pursuant to clause (b)(i) above that it has been unable to remarket any of the 2022C Subordinated Bonds or (ii) the Trustee has not received from the Remarketing Agent an amount sufficient to pay the Purchase Price of tendered Bonds, by 12:00 noon on the Purchase Date, then the Trustee shall draw on the applicable Liquidity Facility (or if no Liquidity Facility, request funds from the District) by 12:15 p.m. in an amount equal to the Purchase Price of all such 2022C Subordinated Bonds which have not been successfully remarketed, requesting payment not later than 2:45 p.m. on the Purchase Date. Subject to Section 78.04, if a Liquidity Facility is in effect, the Trustee shall also give the District notice by 2:45 p.m. on the Purchase Date if it does not have funds in the Remarketing Proceeds Account and the Liquidity Facility Purchase Account sufficient to pay the Purchase Price of 2022C Subordinated Bonds tendered on such Purchase Date. Any draw on a Liquidity Facility to be made on a Substitution Date shall be on the Liquidity Facility being replaced.

Section 78.04. Source of Funds for Purchase of 2022C Subordinated Bonds. By 3:00 p.m. on the date on which a 2022C Subordinated Bond is to be purchased pursuant to this Article LXXVIII, and except as set forth in Section 78.06(b)(ii), the Trustee shall purchase tendered 2022C Subordinated Bonds from the tendering Holders at the applicable Purchase Price by wire transfer in immediately available funds. Funds for the payment of such Purchase Price shall be derived solely from the following sources in the order of priority indicated and neither the Trustee nor the Remarketing Agent shall be obligated to provide funds from any other source:

(a) immediately available funds on deposit in the Remarketing Proceeds Account established for the 2022C Subordinated Bonds;

(b) immediately available funds on deposit in the Liquidity Facility Purchase Account established for the 2022C Subordinated Bonds; and

(c) moneys of the District on deposit in the District Purchase Account established for the 2022C Subordinated Bonds.

If no Liquidity Facility is in effect with respect to the 2022C Subordinated Bonds, then the District shall be obligated to deposit amounts into the District Purchase Account established for the 2022C Subordinated Bonds sufficient to pay the Purchase Price to the extent that amounts on deposit in the Remarketing Proceeds Account established for the 2022C Subordinated Bonds are insufficient therefor. If a Liquidity Facility is in effect with respect to the 2022C Subordinated Bonds, then the District may, but shall not be obligated to, deposit amounts into the District Purchase Account established for the 2022C Subordinated Bonds sufficient to pay the Purchase Price to the extent that amounts on deposit in the Remarketing Proceeds Account established for the 2022C Subordinated Bonds and the Liquidity Facility Purchase Account established for the 2022C Subordinated Bonds are insufficient therefor. If so specified in the Sales Certificate with respect to the initial Interest Rate Mode or in writing by the District prior to the first day of any subsequent Interest Rate Mode, Index Rate Period or Term Rate Period, the failure of the District to deposit amounts into the District Purchase Account when the District is obligated to deposit such amounts under this Section 78.04 shall constitute an "event of default" under Section 9.01 of the Subordinate Master Resolution.

Section 78.05. Delivery of Subordinated Bonds. On each date on which a 2022C Subordinated Bond is to be purchased pursuant to this Article LXXVIII, such 2022C Subordinated Bond shall be delivered as follows:

(a) 2022C Subordinated Bonds sold by the Remarketing Agent and described in Section 78.04(a) shall be delivered by the Remarketing Agent to the purchasers of such 2022C Subordinated Bonds by 3:00 p.m.;

(b) 2022C Subordinated Bonds purchased by the Trustee with moneys described in Section 78.04(b) shall be registered immediately in the name of the Liquidity Provider or its nominee (which may be the Securities Depository) or as otherwise specified in writing by the Liquidity Provider and held as specified in writing by the Liquidity Provider, in either case on or before 3:00 p.m.; and

(c) 2022C Subordinated Bonds purchased by the District with moneys described in Section 78.04(c) shall be registered immediately in the name of the District or its nominee on or before 3:00 p.m. 2022C Subordinated Bonds so owned by the District shall continue to be Outstanding under the terms of the Subordinate Master Resolution and be subject to all of the terms and conditions of the Subordinate Master Resolution and shall be subject to remarketing by the Remarketing Agent.

When any Liquidity Provider Bonds are remarketed, the Trustee shall not release 2022C Subordinated Bonds so remarketed to the Remarketing Agent until the Trustee has received confirmation that the Liquidity Facility has been reinstated.

Section 78.06. Book-Entry Tenders.

(a) Notwithstanding any other provision of this Article LXXVIII to the contrary, all tenders for purchase during any period in which the 2022C Subordinated Bonds are registered in the name of any Securities Depository or its nominee shall be subject to the terms and conditions set forth in the Representations Letter and to any regulations promulgated by the Securities Depository. During any period that the 2022C Subordinated Bonds are registered in the name of DTC or its nominee, the tender option rights of holders of 2022C Subordinated Bonds may be exercised only by a Direct Participant of DTC acting, directly or indirectly, on behalf of a Beneficial Owner of 2022C Subordinated Bonds by giving notice of its election to tender 2022C Subordinated Bonds or portions thereof at the times and in the manner described above. Beneficial Owners will not have any rights to tender 2022C Subordinated Bonds directly to the Trustee. Procedures under which a Beneficial Owner may direct a Direct Participant or DTC, or an Indirect Participant of DTC acting through a Director Participant of DTC, to exercise a tender option right in respect of 2022C Subordinated Bonds or portions thereof in an amount equal to all or a portion of such Beneficial Owner's beneficial ownership interest therein shall be governed by standing instructions and customary practices determined by such Direct Participant or Indirect Participant. During any period that the 2022C Subordinated Bonds are registered in the name of DTC or its nominee, delivery of 2022C Subordinated Bonds required to be tendered for purchase shall be effected by the transfer by a Direct Participant on the applicable Purchase Date of a book-entry credit to the account of the Trustee of a beneficial ownership interest in such 2022C Subordinated Bonds.

(b) Notwithstanding anything expressed or implied herein to the contrary, during any period that a Book-Entry System for the 2022C Subordinated Bonds is maintained by the District:

(i) there shall be no requirement of physical delivery to or by the Trustee or the Remarketing Agent of:

(1) any 2022C Subordinated Bonds subject to mandatory or optional purchase as a condition to the payment of the Purchase Price therefor;

(2) any 2022C Subordinated Bonds that have become Liquidity Provider Bonds; or

(3) any remarketing proceeds of such 2022C Subordinated Bonds or Liquidity Provider Bonds; and

(ii) except as provided in (iii) below, neither the Trustee nor the Paying Agent shall have any responsibility for paying the Purchase Price of any tendered 2022C Subordinated Bond or for remitting remarketing proceeds to any Person; and

(iii) the Trustee's sole responsibilities in connection with the purchase and remarketing of a tendered 2022C Subordinated Bond shall be to:

(1) draw upon the Liquidity Facility to pay the Purchase Price of 2022C Subordinated Bond in the manner provided herein and to remit the amount so drawn to or upon the order of the Securities Depository for the benefit of the tendering Beneficial Owners; and

(2) remit any proceeds derived from the remarketing of a Liquidity Provider Bond and any unused proceeds from a drawing on the Liquidity Facility to the Liquidity Provider.

Section 78.07. <u>No Book-Entry System</u>. During any period that the 2022C Subordinated Bonds shall not be in a Book-Entry System, the following procedures shall be followed:

(a) 2022C Subordinated Bonds shall be delivered (with all necessary endorsements) at or before 12:00 noon on the Purchase Date at the office of the Paying Agent in New York, New York; provided, however, that payment of the Purchase Price shall be made pursuant to this Section only if the 2022C Subordinated Bond so delivered to the Paying Agent conforms in all respects to the description thereof in the notice described in this Section. Payment of the Purchase Price with respect to purchases under this Section shall be made to the Holders of tendered 2022C Subordinated Bonds by wire transfer in immediately available funds by the Paying Agent by 3:00 p.m. on the Purchase Date.

(b) If a 2022C Subordinated Bond to be purchased pursuant to this Article LXXVIII is not delivered by the Holder to the Paying Agent by 12:00 noon on the date in which such 2022C Subordinated Bond is to be purchased, the Paying Agent shall hold any funds received for the purchase of those 2022C Subordinated Bonds in trust in a separate account and shall pay such funds to the former Holders of the 2022C Subordinated Bonds upon presentation of the 2022C Subordinated Bonds. Such undelivered 2022C Subordinated Bonds shall cease to accrue interest as to the former Holders on such purchase date and moneys representing the Purchase Price shall be available against delivery of those 2022C Subordinated Bonds at the Principal Office of the Paying Agent; provided, however, that any funds which shall be so held by the Paying Agent and which remain unclaimed by the former Holder of a 2022C Subordinated Bond not presented for purchase for a period of two years after delivery of such funds to the Paying Agent, shall, to the extent permitted by law, upon request in writing by the District and the furnishing of security or indemnity to the Paying Agent's satisfaction, be paid to the District free of any trust or lien and thereafter the former Holder of such 2022C Subordinated Bond shall look only to the District and then only to the extent of the amounts so received by the District without any interest thereon and the Paying Agent shall have no further responsibility with respect to such moneys or payment of the Purchase Price of such 2022C Subordinated Bonds. The Paying Agent shall authenticate a replacement 2022C Subordinated Bond for any undelivered 2022C Subordinated Bond which may then be remarketed by the Remarketing Agent.

(c) The Paying Agent shall hold all 2022C Subordinated Bonds properly tendered to it for purchase hereunder as agent and bailee of, and in escrow for the benefit of, the respective Holders of the 2022C Subordinated Bonds which shall have so tendered such 2022C Subordinated Bonds until moneys representing the Purchase Price of such 2022C Subordinated Bonds shall have been delivered to or for the account of or to the order of such Holders.

Section 78.08. Credit Enhancement and Liquidity Facility.

(a) While a Credit Enhancement is in effect with respect to the 2022C Subordinated Bonds, the Trustee shall, on the Business Day preceding each Interest Payment Date and Principal Payment Date draw on the Credit Enhancement in accordance with the terms thereof so as to receive thereunder with respect to the 2022C Subordinated Bonds secured by the Credit Enhancement by 1:00 p.m. on said Interest Payment Date and Principal Payment Date, an amount, in immediately available funds, equal to the amount of interest and principal payable on such 2022C Subordinated Bonds on such Interest Payment Date and Principal Payment Date. The proceeds of such draws shall be deposited in a separate account in the Subordinated Bond Interest and Principal Fund and shall be applied to pay principal of and interest on such 2022C Subordinated Bonds prior to the application of any other funds held by the Trustee therefor. Amounts held in such account shall be held uninvested and separate and apart from all other funds and accounts. Such accounts shall at all times be Eligible Accounts.

(b) If a Liquidity Facility is in effect with respect to the 2022C Subordinated Bonds, on each date on which a 2022C Subordinated Bond is to be purchased, the Trustee, by demand given by Electronic Means by 12:15 p.m., shall draw on the Liquidity Facility in accordance with the terms thereof so as to receive thereunder by 2:45 p.m. on such date an amount, in immediately available funds, sufficient, together with the proceeds of the remarketing of such 2022C Subordinated Bonds on such date, to enable the Trustee to pay the Purchase Price in connection therewith. The Trustee shall deposit said proceeds in the Liquidity Facility Purchase Account established for the 2022C Subordinated Bonds pursuant to Section 78.09(b) hereof.

(c) Notwithstanding the foregoing paragraphs of this Section, if the Credit Provider and the Liquidity Provider are the same entity, the Trustee shall not draw on the Credit Enhancement with respect to any payments due or made in connection with Liquidity Provider Bonds. In no event shall the Trustee draw on the Credit Enhancement or Liquidity Facility with respect to any payments made or made in connection with 2022C Subordinated Bonds not covered by the Credit Enhancement or Liquidity Facility or 2022C Subordinated Bonds owned by the District.

(d) The District may provide an Alternate Credit Enhancement or Alternate Liquidity Facility on any day on which 2022C Subordinated Bonds to be secured by such Alternate Credit Enhancement or Alternate Liquidity Facility are subject to redemption at par and not later than the fifth (5th) Business Day prior to the Expiration Date of the Credit Enhancement or Liquidity Facility then in effect and securing such 2022C Subordinated Bonds.

The District shall give the Notice Parties written notice of the proposed substitution of an Alternate Credit Enhancement or Alternate Liquidity Facility no less than two (2) Business Days prior to the date on which the Trustee is required to provide notice of the proposed substitution to the Holders of the 2022C Subordinated Bonds. The Trustee shall give notice of such Substitution Date in accordance with Section 78.02. On or before the Substitution Date there shall be delivered to the Trustee (i) the Alternate Credit Enhancement or the Alternate Liquidity Facility in substitution for the Credit Enhancement or Liquidity Facility then in effect, (ii) a Favorable Opinion of Bond Counsel, (iii) a written Opinion of Counsel for the provider of the Alternate Credit Enhancement or Alternate Liquidity Facility, as applicable, to the effect that such Alternate Credit Enhancement or Alternate Liquidity Facility is a valid, legal and binding obligation of the provider thereof, and (iv) unless waived by such entity, written evidence satisfactory to the Credit Provider and the Liquidity Provider of the provision for purchase from the Liquidity Provider of all Liquidity Provider Bonds, at a price equal to the principal amount thereof plus accrued and unpaid interest, and payment of all amounts due to the Credit Provider and the Liquidity Provider under the applicable Reimbursement Agreement(s) on or before the effective date of such Alternate Credit Enhancement or Alternate Liquidity Facility. Upon the satisfaction of the conditions described in the preceding sentence, the Trustee shall accept such Alternate Credit Enhancement or Alternate Liquidity Facility on the close of business on the Substitution Date and shall surrender the Credit Enhancement or Liquidity Facility then in effect to the provider thereof on the Substitution Date; provided, however, that the Trustee shall not surrender the Credit Enhancement or Liquidity Facility then in effect unless and until the Trustee has received all amounts drawn thereunder. If any condition to the substitution is not satisfied, the substitution shall not occur but the 2022C Subordinated Bonds shall remain subject to mandatory purchase on the proposed Substitution Date.

(e) In the event of an extension of the Expiration Date, the District shall give to the Notice Parties, a written notice of the new Expiration Date at least fifteen (15) days prior to the fifth Business Day prior to the Expiration Date in effect prior to such extension.

(f) The references to Credit Enhancement and Liquidity Facility and Credit Provider and Liquidity Provider shall be disregarded during any period during which a Credit Enhancement or Liquidity Facility, as applicable, is not in effect.

(g) The Trustee shall not have any lien on or security interest in any amounts drawn under a Credit Enhancement or a Liquidity Facility or any amounts on deposit in the account described in Section 78.08(a) above in which proceeds of draws on a Credit Enhancement are deposited or a Liquidity Facility Purchase Account.

(h) If at any time during the term of a Credit Enhancement and/or Liquidity Facility any successor Trustee shall be appointed and qualified under the Subordinate Master Resolution, the resigning or removed Trustee shall request that the Credit Provider and/or Liquidity Provider, as applicable, transfer such Credit Enhancement and/or Liquidity Facility to the successor Trustee and such resignation or removal of the Trustee shall not be effective until the Credit Enhancement and/or Liquidity Facility has been duly transferred (including the payment of any required transfer fee) to such successor Trustee. If the resigning or removed Trustee fails to make this request, the successor Trustee shall do so before accepting appointment.

(i) The Trustee may accept, hold and draw upon a Credit Enhancement and/or a Liquidity Facility issued by itself or by any of its corporate affiliates to provide security and a source of payment for the 2022C Subordinated Bonds. The Trustee covenants that it shall at all times maintain adequate controls to manage any potential conflict of interest. Notwithstanding any other provision herein to the contrary, while the Credit Provider and/or Liquidity Provider is the Trustee or an affiliate of the Trustee and such Credit Provider and/or Liquidity Provider has not failed to honor a properly presented draw on the Credit Enhancement and/or Liquidity Facility, the Trustee shall have no discretion with respect to the acceleration of the 2022C Subordinated Bonds and shall do so only upon the written direction of such Credit Provider and/or Liquidity Provider and as otherwise permitted by the Subordinate Master Resolution. The Trustee shall immediately tender its resignation and take prompt steps to have a successor trustee appointed satisfying the requirements of the Subordinate Master Resolution if such affiliated Credit Provider and/or Liquidity Provider shall fail at any time to honor a properly presented and conforming draw on the Credit Enhancement and/or Liquidity Facility.

Section 78.09. Purchase Fund. There is hereby established and there shall be maintained with the Trustee a separate fund to be known as the "Purchase Fund." The Trustee shall further establish separate accounts within the Purchase Fund to be known as the "Liquidity Facility Purchase Account", the "Remarketing Proceeds Account" and the "District Purchase Account". At any time at which there is a Liquidity Facility in effect with respect to the 2022C Subordinated Bonds, the Purchase Fund shall be required to be an Eligible Account.

(a) Remarketing Proceeds Account. Upon receipt of the proceeds of a remarketing of a 2022C Subordinated Bond on the date such 2022C Subordinated Bond is to be purchased, the Trustee shall deposit such proceeds in the Remarketing Proceeds Account for application to the Purchase Price of such 2022C Subordinated Bond. Notwithstanding the foregoing, upon the receipt of the proceeds of a remarketing of Liquidity Provider Bonds, the Trustee shall immediately pay such proceeds to the Liquidity Provider to the extent of any amount owing to the Liquidity Provider.

(b) Liquidity Facility Purchase Account. Upon receipt of the immediately available funds pursuant to Section 78.08(b), the Trustee shall deposit such money in the Liquidity Facility Purchase Account for application to the Purchase Price of the 2022C Subordinated Bonds to the extent that the moneys on deposit in the Remarketing Proceeds Account shall not be sufficient. Any amounts deposited in the Liquidity Facility Purchase Account and not needed with respect to the Purchase Price of any 2022C Subordinated Bonds shall be immediately returned to the Liquidity Provider.

(c) District Purchase Account. Upon receipt of funds from the District pursuant to Section 78.04, the Trustee shall deposit such funds in the District Purchase Account for application to the Purchase Price of the 2022C Subordinated Bonds. Any amounts deposited in the District Purchase Account and not needed with respect to the Purchase Price for any 2022C Subordinated Bonds shall be immediately returned to the District.

(d) Investment. Amounts held in the Liquidity Facility Purchase Account, the Remarketing Proceeds Account and the District Purchase Account by the Trustee shall be held uninvested and separate and apart from all other funds and accounts.

Section 78.10. <u>Inadequate Funds for Tenders</u>.

(a) If moneys sufficient to pay the Purchase Price of all Tendered Bonds to be purchased on any Purchase Date are not available (1) no purchase shall be consummated of Tendered Bonds on such Purchase Date; (2) all Tendered Bonds shall be returned to the Holders thereof; and (3) all remarketing proceeds with respect to the 2022C Subordinated Bonds shall be returned to the Remarketing Agent for return to the Persons providing such moneys. Thereafter, the Trustee shall continue to take all such action available to it to obtain remarketing proceeds with respect to all Tendered Bonds from the Remarketing Agent and sufficient other funds from the Liquidity Provider, if any, or, subject to Section 78.04, the District to effect a subsequent successful remarketing or purchase of any Tendered Bonds.

(b) All Tendered Bonds (other than Liquidity Provider Bonds and 2022C Subordinated Bonds in the Direct Purchase Index Mode) shall bear interest at the Maximum Rate (or such lower interest rate or rates specified in the Sales Certificate for the initial Interest Rate Mode or in writing by the District prior to the first day of any subsequent Interest Rate Mode, Index Rate Period or Term Rate Period) during the period of time from and including the applicable Purchase Date to (but not including) the date that all such Tendered Bonds are successfully remarketed, redeemed, purchased or paid (the "Delayed Remarketing Period").

(c) The District may direct the conversion of the Tendered Bonds to a different Interest Rate Mode, Index Rate Period or Term Rate Period during the Delayed Remarketing Period in accordance with Section 76.11 hereof; provided that the District shall not be required to comply with the notice requirements described in Section 76.11.

(d) Subject to the terms of the Remarketing Agreement, if any, the Remarketing Agent shall continue to use its best efforts to remarket all of the Tendered Bonds at rates up to and including the Maximum Rate.

(e) During the Delayed Remarketing Period, the Trustee may, upon direction of the District, apply amounts on deposit in the Redemption Fund to the redemption of such Tendered Bonds, as a whole or in part on any Business Day during the Delayed Remarketing Period, at a redemption price equal to the principal amount thereof, together with interest accrued thereon to the date fixed for redemption, without premium. Notwithstanding Section 77.08 to the contrary, the Trustee shall give five Business Days' notice of such redemption to the Holders of the 2022C Subordinated Bonds to be redeemed.

(f) During the Delayed Remarketing Period, interest on such Tendered Bonds (other than 2022C Subordinated Bonds in the Direct Purchase Index Mode) shall be paid to the Holders thereof (i) on the first Business Day of each calendar month occurring during the Delayed Remarketing Period and (ii) on the last day of the Delayed Remarketing Period.

ARTICLE LXXIX

REMARKETING AGENT

Section 79.01. <u>Appointment of Remarketing Agent</u>.

(a) The Remarketing Agent shall be appointed pursuant to the Remarketing Agreement to remarket 2022C Subordinated Bonds pursuant to this Thirteenth Supplemental Resolution and perform the other duties of the Remarketing Agent described hereunder, and to keep such books and records as shall be consistent with prudent industry practice and to make such books and records available for inspection by the District and the Trustee at all reasonable times. The Remarketing Agent shall act as such under the Remarketing Agreement.

(b) The Remarketing Agent may at any time resign and be discharged of the duties and obligations created by this Thirteenth Supplemental Resolution as set forth in the Remarketing Agreement. The Remarketing Agent may suspend its remarketing efforts as set forth in the Remarketing Agreement. The Remarketing Agent may be removed at any time, at the direction of the District as set forth in the Remarketing Agreement. Any successor Remarketing Agent shall be selected by the District, and shall be a member of the Financial Industry Regulatory Authority, or its successors, shall have a capitalization of at least fifteen million dollars ($15,000,000), shall be authorized by law to perform all the duties set forth in this Thirteenth Supplemental Resolution and shall be acceptable to the Credit Provider and Liquidity Provider. The District's delivery to the Trustee of a certificate setting forth the effective date of the appointment of a successor Remarketing Agent and the name of such successor shall be conclusive evidence that (i) if applicable, the predecessor Remarketing Agent has been removed in accordance with the provisions of this Thirteenth Supplemental Resolution and (ii) such successor has been appointed and is qualified to act as Remarketing Agent under the terms of this Thirteenth Supplemental Resolution.

(c) If the Remarketing Agent consolidates with, merges or converts into, or transfers all or substantially all of its assets (or, in the case of a bank, national banking association or trust company, its corporate assets) to, another corporation, the resulting, surviving or transferee corporation without any further act shall be the successor Remarketing Agent.

ARTICLE LXXX

MISCELLANEOUS

Section 80.01. <u>2022C Subordinated Sinking Fund Account; Payments of Interest, Principal and Redemption Price and Defeasance While Credit Enhancement in Effect</u>.

(a) An account is hereby established within the Subordinated Bonds Interest and Principal Fund to be designated the "Series 2022C Sinking Fund Account." The Treasurer shall deposit in the Series 2022C Sinking Fund Account the mandatory sinking fund account payments in the amounts, on the mandatory sinking fund account payment dates, set forth in

Section 77.05(a) and shall transfer such amounts to the Trustee on such date for application as provided in Section 80.01(b).

(b) On each mandatory sinking fund account payment date established for the 2022C Subordinated Bonds, the Trustee shall apply the mandatory sinking fund account payment required on that date to the redemption (or payment at maturity, as the case may be) of the 2022C Subordinated Bonds for which the mandatory sinking fund account payment has been made, upon the notice and in the manner provided in Section 77.08; provided that, at any time prior to giving such notice of such redemption, the Trustee shall, upon direction of the District, apply such moneys to the purchase of such 2022C Subordinated Bonds at public or private sale, as and when and at such prices (including brokerage and other charges, but excluding accrued interest) as the District may direct, except that the purchase price (excluding accrued interest) shall not exceed the par amount of such 2022C Subordinated Bonds. If, during the twelve-month period immediately preceding said mandatory sinking fund account payment date, the Trustee has purchased 2022C Subordinated Bonds with moneys in the Series 2022C Sinking Fund Account, or, during said period and prior to giving said notice of redemption, the District has deposited 2022C Subordinated Bonds with the Trustee, such 2022C Subordinated Bonds so purchased or deposited or redeemed shall be applied, to the extent of the full principal amount thereof, to reduce said mandatory sinking fund account payment. All 2022C Subordinated Bonds purchased or deposited pursuant to this subsection shall be cancelled and destroyed by the Trustee. All 2022C Subordinated Bonds purchased from the Series 2022C Sinking Fund Account or deposited by the District with the Trustee shall be allocated first to the next succeeding mandatory sinking fund account payment, then to the remaining mandatory sinking fund account payments as selected by the District.

(c) Any moneys remaining in the Series 2022C Sinking Fund Account after all 2022C Subordinated Bonds have been retired shall be returned to the District for any lawful District use.

(d) Notwithstanding the foregoing provisions of this Section 80.01 or Section 5.02 or any other provision of the Subordinate Master Resolution, unless a Credit Provider Failure has occurred and is continuing, if Credit Enhancement is in effect with respect to the 2022C Subordinated Bonds, the principal and Redemption Price of, and interest on, the 2022C Subordinated Bonds shall be paid solely (1) first, from moneys obtained from a drawing on the Credit Enhancement pursuant to Section 78.08(a) and (2) second, in the event moneys are not available pursuant to clause (1) for such purpose for any reason, from Available Moneys and moneys on deposit in the Series 2022C Sinking Fund Account shall be withdrawn by the Trustee and used solely for the purpose reimbursing the Credit Provider for drawings under the Credit Enhancement. To the extent the Credit Provider honors a drawing under the Credit Enhancement for the purpose of paying the principal or Redemption Price of, or interest on, the 2022C Subordinated Bonds, the District shall receive a credit against its obligation to make deposits into the Subordinated Bonds Interest and Principal Fund and shall not be required to transfer funds to the Trustee in the amount of such drawing.

(e) Notwithstanding the provisions of Article X of the Subordinate Master Resolution, unless a Credit Provider Failure has occurred and is continuing, if Credit Enhancement is in effect with respect to the 2022C Subordinated Bonds, 2022C Subordinated

Bonds shall not be deemed defeased or otherwise paid or satisfied unless such 2022C Subordinated Bonds are defeased with (1) moneys obtained from a drawing on the Credit Enhancement pursuant to Section 78.08(a), (2) Available Moneys or (3) Defeasance Securities acquired with moneys described in (1) or (2). Any Defeasance Securities used to defease 2022C Subordinated Bonds for which Credit Enhancement is in effect shall be not callable by the issuer thereof prior to maturity and shall mature no later than the earlier of (x) the first day upon which such 2022C Subordinated Bonds may be tendered or (y) the first day upon which such 2022C Subordinated Bonds may be redeemed. For purpose of Article X of the Subordinate Master Resolution, interest on the 2022C Subordinated Bonds shall be calculated based on an assumed interest rate equal to the Maximum Rate for periods for which the actual interest rate on the 2022C Subordinated Bonds cannot be determined.

Section 80.02. Form and Execution of 2022C Subordinated Bonds. The 2022C Subordinated Bonds, and the certificate of authentication and registration to be executed thereon, shall be in substantially the form set forth as Exhibit A to this Thirteenth Supplemental Resolution.

The 2022C Subordinated Bonds shall be executed in the name and on behalf of the District with the manual or facsimile signature of the President or Vice President of its Board of Directors. The 2022C Subordinated Bonds shall then be delivered to the Trustee for authentication by it. In case any officer who shall have signed any of the 2022C Subordinated Bonds shall cease to be such officer of the District before the 2022C Subordinated Bonds so signed shall have been authenticated or delivered by the Trustee or issued by the District, such 2022C Subordinated Bonds may nevertheless be authenticated, delivered and issued and, upon such authentication, delivery and issue, shall be as binding upon the District as though those who signed the same had continued to be such officer of the District, and also any 2022C Subordinated Bond may be signed on behalf of the District by such person as at the actual date of execution of such 2022C Subordinated Bond shall be the proper officer of the District although at the nominal date of such 2022C Subordinated Bond any such person shall not have been such officer of the District.

Only such of the 2022C Subordinated Bonds as shall bear thereon a certificate of authentication substantially in the form set forth in Exhibit A to this Thirteenth Supplemental Resolution, manually executed by an authorized signatory of the Trustee, shall be valid or obligatory for any purpose or entitled to the benefits of the Subordinate Master Resolution, and such certificate of the Trustee shall be conclusive evidence that the 2022C Subordinated Bonds so authenticated have been duly executed, authenticated and delivered hereunder and are entitled to the benefits of the Subordinate Master Resolution.

Section 80.03. Issuance of 2022C Subordinated Bonds. At any time after the adoption of this Thirteenth Supplemental Resolution, the District may execute and deliver the 2022C Subordinated Bonds in the aggregate principal amount set forth in the Sales Certificate. The Trustee shall authenticate and deliver the 2022C Subordinated Bonds upon written order of the District. The proceeds of the sale of the 2022C Subordinated Bonds shall be deposited and applied as set forth in the Sales Certificate.

Section 80.04. __Use of Depository__. Notwithstanding any provision of the Subordinate Master Resolution or this Thirteenth Supplemental Resolution to the contrary:

(a) The 2022C Subordinated Bonds shall be initially issued as provided in Section 76.02; provided, that 2022C Subordinated Bonds in the Direct Purchase Index Mode shall be issued in definitive certificated form registered in the name of the Holder thereof or as otherwise directed by the Holder. 2022C Subordinated Bonds in any other Interest Rate Mode shall be registered in the name of Cede & Co. or as otherwise directed by the Securities Depository and registered ownership thereof, or any portion thereof, may not thereafter be transferred except:

(i) To any successor of DTC or its nominee, or to any substitute depository designated pursuant to clause (ii) of this subsection (a) ("substitute depository"); provided that any successor of DTC or substitute depository shall be qualified under any applicable laws to provide the service proposed to be provided by it;

(ii) To any substitute depository not objected to by the Trustee, upon (1) the resignation of DTC or its successor (or any substitute depository or its successor) from its functions as depository or (2) a determination by the District that DTC or its successor (or any substitute depository or its successor) is no longer able to carry out its functions as depository; provided that any such substitute depository shall be qualified under any applicable laws to provide the services proposed to be provided by it; or

(iii) To any person as provided below, upon (1) the resignation of DTC or its successor (or substitute depository or its successor) from its functions as depository; provided that no substitute depository which is not objected to by the Trustee can be obtained or (2) a determination by the District that it is in the best interests of the District to remove DTC or its successor (or any substitute depository or its successor) from its functions as depository.

(b) In the case of any transfer pursuant to clause (i) or clause (ii) of subsection 80.04(a) hereof, upon receipt of all outstanding 2022C Subordinated Bonds by the Trustee, together with a Certificate of the District to the Trustee, a single new 2022C Subordinated Bond shall be executed and delivered for each maturity of 2022C Subordinated Bonds then outstanding registered in the name of such successor or such substitute depository, or their nominees, as the case may be, all as specified in such Certificate of the District. In the case of any transfer pursuant to clause (iii) of subsection 80.04(a) hereof, upon receipt of all outstanding 2022C Subordinated Bonds by the Trustee together with a Certificate of the District to the Trustee, new 2022C Subordinated Bonds shall be executed and delivered in such denominations and registered in the names of such persons as are requested in such a Certificate of the District, subject to the limitations of Section 80.04(a) hereof, provided the Trustee shall not be required to deliver such new 2022C Subordinated Bonds within a period less than 60 days from the date of receipt of such a Certificate of the District. Subsequent to any transfer pursuant to clause (iii) of subsection 80.04(a) hereof, the 2022C Subordinated Bonds shall be transferred as provided in Article II of the Subordinate Master Resolution.

(c) In the case of partial redemption or an advance refunding of the 2022C Subordinated Bonds evidencing all or a portion of the principal maturing in a particular year, DTC shall make an appropriate notation on the 2022C Subordinated Bonds indicating the date and amounts of such reduction in principal. The Trustee shall incur no liability for the failure or any error by DTC in making such notation and the records of the Trustee shall be determinative of the outstanding principal amount of 2022C Subordinated Bonds.

(d) The District and the Trustee shall be entitled to treat the person in whose name any 2022C Subordinated Bond is registered as the Bondholder thereof for all purposes of the Subordinate Master Resolution and any applicable laws, notwithstanding any notice to the contrary received by the Trustee or the District; and the District and the Trustee shall have no responsibility for transmitting payments to, communicating with, notifying, or otherwise dealing with, any Beneficial Owners of the 2022C Subordinated Bonds. Neither the District nor the Trustee will have any responsibility or obligations, legal or otherwise, to the Beneficial Owners or to any other party including DTC or its successor (or substitute depository or its successor), except for the Holder of any 2022C Subordinated Bond.

(e) During any period that the Outstanding 2022C Subordinated Bonds are registered in the name of Cede & Co. or its registered assigns, the District and the Trustee (to the extent funds are provided to it by the District) shall cooperate with Cede & Co., as sole registered Bondholder, and its registered assigns, in effecting payment of the principal of and redemption premium, if any, and interest on the 2022C Subordinated Bonds by arranging for payment in such manner that funds for such payments are properly identified and are made immediately available on the date they are due.

Section 80.05. Tax Covenants.

(a) The District shall at all times do and perform all acts and things permitted by law which are necessary or desirable in order to assure that interest paid on the 2022C Subordinated Bonds (or any of them) will be excluded from gross income for federal income tax purposes and shall take no action that would result in such interest not being excluded from gross income for federal income tax purposes. Without limiting the generality of the foregoing, the District agrees to comply with the provisions of the 2022 Tax Certificate. This covenant shall survive payment in full or defeasance of the 2022C Subordinated Bonds.

(b) Without limiting the generality of the foregoing, the District agrees that there shall be paid from time to time all amounts required to be rebated to the United States of America pursuant to Section 148(f) of the Internal Revenue Code of 1986 (the "Code") and any temporary, proposed or final United States Treasury Regulations as may be applicable to the 2022C Subordinated Bonds from time to time (the "Rebate Requirement"). The District specifically covenants to pay or cause to be paid the Rebate Requirement as provided in the 2022 Tax Certificate to the United States of America from any Net Subordinate Revenues lawfully available to the District. This covenant shall survive payment in full or defeasance of the 2022C Subordinated Bonds. Capitalized terms in this Section not otherwise defined in the Subordinate Master Resolution or this Thirteenth Supplemental Resolution shall have the meanings ascribed to them in the 2022 Tax Certificate.

(c) The District shall establish, maintain and hold in trust a fund separate from any other fund established and maintained hereunder designated the Rebate Fund. The District shall cause to be deposited in the Rebate Fund the Rebate Requirement as provided in the 2022 Tax Certificate. Subject to the provisions of this Section, moneys held in the Rebate Fund are hereby pledged to secure payments to the United States government, and the District and the Bondholders shall have no rights in or claim to such moneys.

(d) In accordance with the 2022 Tax Certificate, the District shall remit part or all of the balance held in the Rebate Fund to the United States government as so directed.

(e) Notwithstanding any provision of this Section, if the District shall obtain an opinion of counsel of recognized national standing in the field of obligations the interest on which is excluded from gross income for purposes of federal income taxation to the effect that any specified action required under this Section is no longer required, or to the effect that some different action is required, to maintain the exclusion from gross income of the interest on the 2022C Subordinated Bonds under Section 103 of the Code, the District may rely conclusively on such opinion in complying with the provisions hereof, and the agreements and covenants hereunder shall be deemed to be modified to that extent without the necessity of an amendment of the Subordinate Master Resolution or this Thirteenth Supplemental Resolution or the consent at any time of the Bondholders.

Section 80.06. Rights of Credit Provider.

(a) Unless a Credit Provider Failure has occurred and is continuing, the Credit Provider shall be deemed the sole Holder of the 2022C Subordinated Bonds for the purpose of directing the Trustee with respect to the exercise of remedies and the declaration or waiver of Events of Default pursuant to Article IX of the Subordinate Resolution.

(b) Unless a Credit Provider Failure has occurred and is continuing, the Subordinate Master Resolution and this Thirteenth Supplemental Resolution shall not be amended without the written consent of the Credit Provider.

(c) Unless a Credit Provider Failure has occurred and is continuing, the District shall not appoint a successor Remarketing Agent or Trustee without the written consent of the Credit Provider.

Section 80.07. Limitations on Rights of Trustee.

(a) Proceeds of drawings on the Credit Enhancement and the Liquidity Facility and moneys on deposit in the Purchase Fund shall be used solely for the purposes set forth herein, and the Trustee shall have no lien on such proceeds or money, nor shall such proceeds or moneys be used for, the payment of the fees and/or expenses of the Trustee.

(b) The Trustee shall draw on the Credit Enhancement and the Liquidity Facility at the times and in the manner provided herein and therein and shall have no right to seek or obtain indemnification from the District, the Holders or any other party as a condition of making any such drawing.

Section 80.08. Terms of 2022C Subordinated Bonds Subject to the Subordinate Master Resolution.

(a) Except as in this Thirteenth Supplemental Resolution expressly provided, every term and condition contained in the Subordinate Master Resolution shall apply to this Thirteenth Supplemental Resolution and to the 2022C Subordinated Bonds with the same force and effect as if the same were herein set forth at length, with such omissions, variations and modifications thereof as may be appropriate to make the same conform to this Thirteenth Supplemental Resolution.

(b) This Thirteenth Supplemental Resolution and all the terms and provisions herein contained shall form part of the Subordinate Master Resolution as fully and with the same effect as if all such terms and provisions had been set forth in the Subordinate Master Resolution. The Subordinate Master Resolution is hereby ratified and confirmed and shall continue in full force and effect in accordance with the terms and provisions thereof, as supplemented and amended hereby.

Section 80.09. Resolution of Trust to Remain in Effect. Save and except as supplemented by this Thirteenth Supplemental Resolution, the Subordinate Master Resolution shall remain in full force and effect.

Section 80.10. Notice to Rating Agencies. (a) The District shall provide or cause to be provided prompt notice of the following events to the Rating Agencies, if any:

(1) the expiration, termination, extension or substitution of any Credit Enhancement or Liquidity Facility relating to the 2022C Subordinated Bonds;

(2) any optional redemption (as a whole or in part), mandatory purchase or acceleration of the 2022C Subordinated Bonds;

(3) any Conversion of the 2022C Subordinated Bonds;

(4) any amendment, modification or supplement of or to the Subordinate Master Resolution or any Credit Enhancement or Liquidity Facility relating to the 2022C Subordinated Bonds (which notice shall be provided or caused to be provided at least ten days prior to the effective date thereof);

(5) any change in the party instructed to draw on any Credit Enhancement or Liquidity Facility relating to the 2022C Subordinated Bonds;

(6) any removal or resignation of the Trustee or the Remarketing Agent; or

(7) any legal defeasance of the 2022C Subordinated Bonds.

(b) The District and the Trustee shall provide or cause to be provided to the Rating Agencies any information reasonably requested by such Rating Agency to maintain its rating, if any, on the 2022C Subordinated Bonds.

Section 80.11. Continuing Disclosure. The District hereby covenants and agrees that it will comply with and carry out all of the provisions of any Continuing Disclosure Agreement executed in connection with the 2022C Subordinated Bonds. Notwithstanding any other provision of the Subordinate Master Resolution or this Thirteenth Supplemental Resolution, failure of the District to comply with any such Continuing Disclosure Agreement shall not be considered an Event of Default; however, the Trustee shall, at the written request of any Participating Underwriter (as defined in any such Continuing Disclosure Agreement) or the Holders of at least 25% aggregate principal amount of Outstanding 2022C Subordinated Bonds upon receipt of indemnity satisfactory to the Trustee or any Holder of 2022C Subordinated Bonds or Beneficial Owner may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the District to comply with its obligations under this Section. For purposes of this Section, "Beneficial Owner" means any person which has or shares the power, directly or indirectly, to make investment decisions concerning ownership of any 2022C Subordinated Bonds (including persons holding 2022C Subordinated Bonds through nominees, depositories or other intermediaries).

Section 80.12. Designation of Credit Provider and Liquidity Provider Reimbursement Obligations as Parity Subordinated Debt; Authorization and Issuance of Revolving Notes. For the avoidance of doubt, the District hereby designates as Parity Subordinated Debt any and all obligations of the District pursuant to any Credit Enhancement, Liquidity Facility, or Reimbursement Agreement to reimburse each Credit Provider or Liquidity Provider for drawings or other advances on or pursuant to the related Credit Enhancement or Liquidity Facility, including, without limitation, any accrued interest on such drawings or advances, all as set forth in the related Credit Enhancement, Liquidity Facility, or Reimbursement Agreement (collectively, the "Reimbursement Obligations"). In order to more fully evidence the Reimbursement Obligations as Parity Subordinated Debt, the Board hereby authorizes the issuance from time to time of one or more revenue bonds pursuant to the Act in substantially the form of and with the terms stated in the form of the revolving note set forth as Exhibit B to this Thirteenth Supplemental Resolution (each a "Revolving Note"). At the time of each delivery of a Credit Enhancement or Liquidity Facility pursuant to the terms of this Thirteenth Supplemental Resolution, the District shall deliver a Revolving Note to the related Credit Provider or Liquidity Provider with a stated amount equal to the Available Amount under such Credit Enhancement or Liquidity Facility and with all blanks and brackets filled in as appropriate and with such other changes as may be necessary or appropriate to conform to the terms of such Credit Enhancement, Liquidity Facility, or Reimbursement Agreement.

Approved: May 19, 2022

INTRODUCED: DIRECTOR HERBER				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

EXHIBIT A

FORM OF 2022C SUBORDINATED BOND

[TO BE CONFORMED TO SALES CERTIFICATE]

No. R-_ $______________

SACRAMENTO MUNICIPAL UTILITY DISTRICT
SUBORDINATED ELECTRIC REVENUE REFUNDING BOND
2022 SERIES C

Maturity	Interest Per Annum	Date	CUSIP
August 15, 20__	Variable	______, 2022	

REGISTERED OWNER: _____________

PRINCIPAL AMOUNT: _____________ DOLLARS

SACRAMENTO MUNICIPAL UTILITY DISTRICT, a municipal utility district duly organized and existing under and pursuant to the laws of the State of California (the "District"), for value received, hereby promises to pay (but only out of the Net Subordinated Revenues hereinafter referred to) to the registered owner named above or registered assigns, on the maturity date specified above, the principal sum specified above together with interest thereon from ______, 2022, until the principal hereof shall have been paid, at the interest rates per annum determined as set forth below, payable on each Interest Payment Date, as defined below. The principal of and premium, if any, and interest on the 2022C Subordinated Bonds, as defined below, shall be payable in lawful money of the United States of America. Interest on the 2022C Subordinated Bonds shall be paid on each Interest Payment Date, as defined below, by the Paying Agent during a Daily Mode, Weekly Mode, Term Rate Mode, Index Mode or Fixed Rate Mode, by check mailed on the date on which due to the Holders of the 2022C Subordinated Bonds at the close of business on the Record Date for the 2022C Subordinated Bonds in respect of such Interest Payment Date at the registered addresses of the Holders of the 2022C Subordinated Bonds as shall appear on the registration books of the Trustee. In the case of (i) 2022C Subordinated Bonds in a Direct Purchase Index Mode or Flexible Mode or (ii) any Holder of 2022C Subordinated Bonds in any Interest Rate Mode other than a Direct Purchase Index Mode or Flexible Mode in an aggregate principal amount in excess of $1,000,000 as shown on the registration books of the Trustee who, prior to the Record Date for the 2022C Subordinated Bonds next preceding any Interest Payment Date, shall have provided the Paying Agent with written wire transfer instructions, interest payable on such 2022C Subordinated Bonds shall be paid on each Interest Payment Date in accordance with the wire transfer instructions provided by the Holder of such 2022C Subordinated Bond; provided, however, that during any Flexible Rate Period, except for 2022C Subordinated Bonds registered in the name of the Securities Depository (or its nominee), interest on any such 2022C Subordinated Bond shall be payable only upon surrender of such 2022C Subordinated Bond at the office of the Paying Agent. The principal of and premium, if any, on each 2022C Subordinated Bond shall be payable on the Principal Payment Date of such 2022C Subordinated Bond upon surrender thereof at the office of the Paying Agent, subject to the terms of the Thirteenth Supplemental Resolution, as defined below.

This Bond is one of a duly authorized issue of Sacramento Municipal Utility District Subordinated Electric Revenue Bonds (hereinafter called the "Subordinated Bonds") designated as Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022C Subordinated Bonds"). The Subordinated Bonds are not limited in aggregate principal amount, except as otherwise provided in the Subordinate Resolution hereinafter mentioned, and consist or may consist of one or more series of varying denominations, dates, maturities, interest rates and other provisions, as in said Subordinate Resolution provided, all issued and to be issued pursuant to the provisions of the Revenue Bond Law of 1941 as made applicable by Article 6a of Chapter 6, Division 6, of the California Public Utilities Code and Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (hereinafter called the "Act"). This 2022C Subordinated Bond is issued pursuant to Resolution No. 85-11-1 of the District, adopted November 7, 1985, providing for the issuance of the Subordinated Bonds, as amended and restated by Resolution No. 01-06-10 of the District, adopted on June 21, 2001 (as amended and restated, the "Subordinate Master Resolution"), and as supplemented and amended by resolutions to date, including by a Thirteenth Supplemental Resolution, adopted May 19, 2022, authorizing the issuance of the 2022C Subordinated Bonds (said resolution as amended, restated and supplemented and the Thirteenth Supplemental Resolution being hereinafter collectively called the "Subordinate Resolution"). Reference is hereby made to the Subordinate Resolution and the Act for a description of the terms on which the Subordinated Bonds are issued and to be issued, the provisions with regard to the nature and extent of the Revenues, as that term is defined in the Subordinate Resolution, and the rights of the registered owners of the Subordinated Bonds; and all the terms of the Subordinate Resolution and the Act are hereby incorporated herein and constitute a contract between the District and the registered owner from time to time of this 2022C Subordinated Bond, and to all the provisions thereof the registered owner of this 2022C Subordinated Bond, by its acceptance hereof, consents and agrees. Additional bonds may be issued on a parity with the Subordinated Bonds of this authorized issue, but only subject to the conditions and limitations contained in the Subordinate Resolution. Capitalized terms used, but not defined herein shall have the meaning given such terms in the Subordinate Resolution.

The Subordinated Bonds and the interest thereon, together with the Parity Subordinated Debt (as defined in the Subordinate Resolution) heretofore or hereafter issued by the District, and the interest thereon, are payable from, and are secured by a charge and lien on, the Net Subordinated Revenues derived by the District from the Electric System (as those terms are defined in the Subordinate Resolution). The District covenants and warrants that for the payment of the Subordinated Bonds, and interest thereon, there have been created and will be maintained by the District special funds into which there shall be deposited from Net Subordinated Revenues available for that purpose sums sufficient to pay the principal of, and interest on, all of the Subordinated Bonds, as such principal and interest become due, and as an irrevocable charge the District has allocated Net Subordinated Revenues to such payment, all in accordance with the Subordinate Resolution.

The Subordinated Bonds, including the 2022C Subordinated Bonds, are expressly subordinated in right of payment to the prior payment in full of all Parity Bonds, as that term is defined in Resolution No. 6649 of the District, adopted on January 7, 1971 (the "Senior Bond Resolution"), including the District's Electric Revenue Bonds. The holder of this 2022C Subordinated Bond, by acceptance hereof, authorizes and directs the Trustee on its behalf to take such action as may be necessary or appropriate to effectuate the subordination provided in this paragraph and in the Subordinate Resolution and appoints the Trustee its attorney-in-fact for any and all such purposes.

The Subordinated Bonds are special obligations of the District, and are payable, both as to principal and interest, out of the Net Subordinated Revenues pertaining to the Electric System, and not out of any other fund or moneys of the District. No holder of this Bond shall ever have the right to compel any exercise of the taxing power of the District to pay this Bond or the interest hereon.

The term of the 2022C Subordinated Bonds will be divided into consecutive Interest Periods during each of which the 2022C Subordinated Bonds shall bear interest at a Flexible Rate or Flexible Rates, a Daily Rate, a Weekly Rate, a Direct Purchase Index Rate, a Term Rate, an Index Rate or a Fixed Rate or Fixed Rates. The 2022C Subordinated Bonds shall initially bear interest at the Index Rate for an initial Index Rate Period ending on [______, 20__]. The Interest Rate Mode, Term Rate Period, Index Rate Period and Direct Purchase Index Rate Period for the 2022C Subordinated Bonds thereafter may be changed from time to time as provided in the Subordinate Resolution. As hereinafter described, the 2022C Subordinated Bonds are subject to mandatory purchase on any Conversion Date.

Interest on the 2022C Subordinated Bonds is to be paid on: (i) with respect to Flexible Rate Bonds, each Mandatory Purchase Date applicable thereto; (ii) with respect to 2022C Subordinated Bonds in the Daily Mode, Weekly Mode, Direct Purchase Index Mode or Index Mode, the first Business Day of each month; (iii) with respect to 2022C Subordinated Bonds in a Term Rate Mode or Fixed Rate Mode, each February 15 and August 15 (beginning with the first such day which is at least three months after the date of initial issuance of the 2022C Subordinated Bonds or the Conversion Date to such Term Rate Mode, as applicable); (iv) (without duplication as to any Interest Payment Date listed above) any Mandatory Purchase Date; (v) (without duplication as to any Interest Payment Date listed above) each Maturity Date; and (vi) with respect to any Liquidity Provider Bonds, as provided in the Reimbursement Agreement (each an "Interest Payment Date").

The interest rate on the 2022C Subordinated Bonds shall be determined as follows:

<u>Determination of Flexible Rates and Interest Periods During Flexible Mode</u>. An Interest Period for the Flexible Rate Bonds shall be of such duration of from one to 270 calendar days, ending on either a day which immediately precedes a Business Day or the day immediately preceding the Maturity Date, as the Remarketing Agent shall determine in accordance with the provisions of this Section. A Flexible Rate Bond may have an Interest Period, and bear interest at a Flexible Rate, different than another Flexible Rate Bond. In making the determinations with respect to Interest Periods, subject to limitations imposed by the second preceding sentence and in Section 76.04 of the Thirteenth Supplemental Resolution, on each Rate Determination Date

for a Flexible Rate Bond, the Remarketing Agent shall select for such 2022C Subordinated Bond the Interest Period which would result in the Remarketing Agent being able to remarket such 2022C Subordinated Bond at par in the secondary market at the lowest average interest cost for all 2022C Subordinated Bonds; provided, however, that if the Remarketing Agent has received notice from the District that such 2022C Subordinated Bonds are to be changed from the Flexible Mode to any other Interest Rate Mode, the Remarketing Agent shall select Interest Periods which do not extend beyond the proposed Conversion Date.

Except while the 2022C Subordinated Bonds are registered in a Book-Entry System, in order to receive payment of the Purchase Price the Holder of any Flexible Rate Bond must present such Flexible Rate Bond to the Trustee, by 12:00 noon on the Rate Determination Date, in which case the Trustee shall pay the Purchase Price to such Holder by 3:00 p.m. on the same day.

By 1:00 p.m. on each Rate Determination Date, the Remarketing Agent, with respect to each Flexible Rate Bond which is subject to adjustment on such date, shall determine the Flexible Rate(s) for the Interest Periods then selected for such Flexible Rate Bond and shall give notice by Electronic Means to the Paying Agent and the District of the Interest Period, the Purchase Date(s) and the Flexible Rate(s). The Remarketing Agent shall make the Flexible Rate and Interest Period available after 2:00 p.m. on each Rate Determination Date by telephone or Electronic Means to the Trustee or any other Paying Agent without request, and to any Beneficial Owner or Notice Party requesting such information.

<u>Determination of Interest Rates During the Daily Mode and the Weekly Mode</u>. The interest rate for 2022C Subordinated Bonds in the Daily Mode or Weekly Mode shall be the rate of interest per annum determined by the Remarketing Agent on and as of the applicable Rate Determination Date as the minimum rate of interest which, in the opinion of the Remarketing Agent under then-existing market conditions, would result in the sale of such 2022C Subordinated Bonds in the Daily Rate Period or Weekly Rate Period, as applicable, at a price equal to the principal amount thereof, plus interest, if any, accrued through the Rate Determination Date during the then current Interest Accrual Period.

During the Daily Mode, the Remarketing Agent shall establish the Daily Rate by 10:00 a.m. on each Rate Determination Date. The Daily Rate for any day during the Daily Mode which is not a Business Day shall be the Daily Rate established on the immediately preceding Rate Determination Date. The Remarketing Agent shall make the Daily Rate available no less frequently than once per week by Electronic Means to each Notice Party requesting such rate.

During the Weekly Mode, the Remarketing Agent shall establish the Weekly Rate by 4:00 p.m. on each Rate Determination Date. The Weekly Rate shall be in effect during the applicable Weekly Rate Period. The Remarketing Agent shall make the Weekly Rate available after 5:00 p.m. on the Business Day following the Rate Determination Date by Electronic Means to each Notice Party requesting such rate.

<u>Term Rates</u>. The Term Rate shall be determined by the Remarketing Agent not later than 4:00 p.m. on the Rate Determination Date. The Term Rate shall be the minimum rate which, in the sole judgment of the Remarketing Agent, would result in a sale of such 2022C Subordinated

Bonds at a price equal to the principal amount thereof on the Rate Determination Date for the Interest Period selected by the District in writing delivered to the Remarketing Agent before such Rate Determination Date. No Interest Period in the Term Rate Mode may extend beyond the Maturity Date. The Remarketing Agent shall make the Term Rate available by telephone or Electronic Means after 5:00 p.m. on the Rate Determination Date to any Notice Party requesting such Term Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such rate by Electronic Means.

Fixed Rates. The Remarketing Agent shall determine the Fixed Rate for 2022C Subordinated Bonds being converted to the Fixed Rate Mode in the manner and at the times as follows: not later than 4:00 p.m. on the applicable Rate Determination Date, the Remarketing Agent shall determine the Fixed Rate (or Fixed Rates, if such 2022C Subordinated Bonds will have Serial Maturity Dates in accordance with Section 76.11(b)(v) of the Thirteenth Supplemental Resolution). Except as set forth in Section 76.11(b)(v) of the Thirteenth Supplemental Resolution, the Fixed Rate shall be the minimum interest rate which, in the sole judgment of the Remarketing Agent, will result in a sale of such 2022C Subordinated Bonds at a price equal to the principal amount thereof on the Rate Determination Date. The Remarketing Agent shall make the Fixed Rate available by telephone or by Electronic Means after 5:00 p.m. on the Rate Determination Date to any Notice Party requesting such Fixed Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such Fixed Rate by Electronic Means. Subject to Section 76.11(b)(v) of the Thirteenth Supplemental Resolution, the Fixed Rate so established shall remain in effect until the Maturity Date of such 2022C Subordinated Bonds.

Alternate Rates. The following provisions shall apply in the event (i) the Remarketing Agent fails or is unable to determine the interest rate or Interest Period for 2022C Subordinated Bonds (other than 2022C Subordinated Bonds in the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode), (ii) the method by which the Remarketing Agent determines the interest rate or Interest Period with respect to 2022C Subordinated Bonds in any Interest Rate Mode other than the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode shall be held to be unenforceable by a court of law of competent jurisdiction or (iii) other than with respect to 2022C Subordinated Bonds in the Direct Purchase Index Mode, the Index Mode or the Term Rate Mode, if the Remarketing Agent suspends its remarketing effort in accordance with the Remarketing Agreement. These provisions shall continue to apply until such time as the Remarketing Agent again makes such determinations. In the case of clause (ii) above, the Remarketing Agent shall again make such determination at such time as there is delivered to the Remarketing Agent and the District an opinion of Bond Counsel to the effect that there are no longer any legal prohibitions against such determinations. The following shall be the methods by which the interest rates and, in the case of the Flexible Rate Mode, the Interest Periods, shall be determined for 2022C Subordinated Bonds as to which any of the events described in clauses (i), (ii) or (iii) shall be applicable. Such methods shall be applicable from and after the date any of the events described in clauses (i), (ii) or (iii) first become applicable to such 2022C Subordinated Bonds until such time as the events described in clauses (i), (ii) or (iii) are no longer applicable to such 2022C Subordinated Bonds.

For Flexible Rate Bonds, the next Interest Period shall be from, and including, the first day following the last day of the current Interest Period for such Flexible Rate Bonds to, but excluding, the next succeeding Business Day and thereafter shall commence on each Business

Day and extend to, but exclude, the next succeeding Business Day. For each such Interest Period, the interest rate for such 2022C Subordinated Bonds shall be the applicable Alternate Rate in effect on the Business Day that begins an Interest Period.

For 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode, such 2022C Subordinated Bonds shall bear interest during each subsequent Interest Period at the Alternate Rate in effect on the first day of such Interest Period.

Direct Purchase Index Rates.

(a) During each Direct Purchase Index Rate Period, the 2022C Subordinated Bonds shall, subject to subparagraph (b) below, bear interest at the Direct Purchase Index Rate. The Calculation Agent shall determine the Direct Purchase Index Rate on each Direct Purchase Index Rate Determination Date occurring during any Direct Purchase Index Rate Period. The Direct Purchase Index Rate shall be the sum of (i) the product of the Direct Purchase Index multiplied by the Applicable Factor, plus (ii) the Applicable Spread. Each Direct Purchase Index Rate shall be effective, and interest shall accrue on the 2022C Subordinated Bonds at such Direct Purchase Index Rate each day during the applicable Direct Purchase Index Rate Effective Period. On or before any Conversion Date upon which a Direct Purchase Index Rate Period will begin, the District shall designate the Direct Purchase Index to be in effect during such Direct Purchase Index Rate Period. The Applicable Factor and Applicable Spread for a Direct Purchase Index Rate Period shall be determined by the Market Agent such that the applicable Direct Purchase Index Rate shall be the interest rate per annum (based upon tax exempt obligations comparable, in the judgment of the Market Agent, to the 2022C Subordinated Bonds and known to the Market Agent to have been priced or traded under the prevailing market conditions) to be the minimum interest rate at which a Person will agree to purchase the 2022C Subordinated Bonds on the Conversion Date at a price (without regard to accrued interest) equal to the principal amount thereof. Unless otherwise specified in the Continuing Covenant Agreement applicable to a Direct Purchase Index Rate Period, the Direct Purchase Index Rate shall be rounded to the nearest fifth decimal place. Promptly following the determination of the Direct Purchase Index Rate, the Calculation Agent shall give notice thereof to the District, the Trustee and the Paying Agent. If the Direct Purchase Index Rate is not determined by the Calculation Agent on the Direct Purchase Index Rate Determination Date, the rate of interest born on such 2022C Subordinated Bonds bearing interest at a Direct Purchase Index Rate shall be the rate in effect on the immediately preceding Direct Purchase Index Rate Reset Date until the Calculation Agent next determines the Direct Purchase Index Rate as required hereunder.

(b) Adjustments to Direct Purchase Index Rates.

(i) Taxable Rate. Notwithstanding anything in the Subordinate Resolution to the contrary, including, without limitation, Section 78.02(b) thereof, but subject to Section 76.04(c) and Section 76.09(b)(ii) and (iii) thereof, from and after any Taxable Date, the interest rate on 2022C Subordinated Bonds in a Direct Purchase Index Mode shall be established at a rate at all times equal to the Taxable Rate.

(ii) Default Rate. Notwithstanding anything in the Subordinate Resolution to the contrary, including, without limitation, Section 78.02(b) thereof, but subject to

Section 76.04(c) and Section 76.09(b)(iii) thereof, from and after the effective date of any "Event of Default" under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution and during the continuance thereof, the interest rate for 2022C Subordinated Bonds in a Direct Purchase Index Mode shall be established at a rate at all times equal to the greater of (A) the Default Rate and (B) the interest rate that otherwise would be applicable to the 2022C Subordinated Bonds but for the provisions of this paragraph, payable on demand to the Bank. Interest shall accrue and be paid on both defaulted interest and defaulted principal.

(iii) Excess Interest. Notwithstanding anything in the Subordinate Resolution to the contrary, if during a Direct Purchase Index Mode the rate of interest on the 2022C Subordinated Bonds exceeds the Maximum Rate for such 2022C Subordinated Bonds, then (A) such 2022C Subordinated Bonds shall bear interest at the Maximum Rate and (B) interest on such 2022C Subordinated Bonds calculated at the rate equal to the difference between (1) the rate of interest for such 2022C Subordinated Bonds as otherwise calculated pursuant to the above provisions and (2) the Maximum Rate (the "Excess Interest") shall be deferred until such date as the rate of interest borne by such 2022C Subordinated Bonds as otherwise calculated pursuant to the above provisions is below the Maximum Rate, at which time Excess Interest shall be payable with respect to such 2022C Subordinated Bonds. Payments of deferred Excess Interest shall no longer be due and payable upon the earlier to occur of the date on which such 2022C Subordinated Bonds are redeemed or tendered for purchase in accordance with the Thirteenth Supplemental Resolution and the redemption price or purchase price, as applicable, is paid in full or the principal of and interest on such 2022C Subordinated Bonds is otherwise paid in full.

(iv) Amortization Period. Notwithstanding anything in the Subordinate Resolution to the contrary, but subject to Section 76.04(c) and Section 76.09(b)(i), (ii) and (iii) thereof, during any Amortization Period, the 2022C Subordinated Bonds shall bear interest at the Bank Rate.

Index Rates. During each Index Rate Period, the 2022C Subordinated Bonds shall bear interest at the Index Rate. The Calculation Agent shall determine the Index Rate for each maturity of the 2022C Subordinated Bonds on each Index Rate Determination Date occurring during any Index Rate Period. The Index Rate for each maturity of the 2022C Subordinated Bonds shall be the sum of (i) the product of the Index multiplied by the Index Percentage, plus (ii) the Index Spread for such maturity of the 2022C Subordinated Bonds. Each Index Rate shall be effective, and interest shall accrue on the 2022C Subordinated Bonds at such Index Rate each day during the applicable Index Rate Effective Period. If the 2022C Subordinated Bonds are initially issued in the Index Mode, the District shall specify the Index, Index Percentage, Index Spreads and Call Protection Date for the Index Rate Period commencing on the date of issuance of the 2022C Subordinated Bonds and the length of the Index Rate Period commencing on the date of issuance of the 2022C Subordinated Bonds in the Sales Certificate. On or before any Conversion Date upon which an Index Rate Period will begin, the Corporation shall specify the length of such Index Rate Period and designate the Index and Call Protection Date to be in effect during such Index Rate Period and the Remarketing Agent shall determine the Index Percentage and Index Spread that would result in a sale of the 2022C Subordinated Bonds at a price (without regard to accrued interest) equal to principal amount thereof on the Conversion Date for such Index Rate Period. Each Index, Index Percentage and Index Spread shall be in effect through the last day of the applicable Index Rate Period and shall be applied by the Calculation Agent in determining the Index Rate on each Index Rate Determination Date during such Index Rate Period. All percentages resulting from the calculation of the Index Rate shall be rounded, if necessary, to the nearest ten-thousandth of a percentage point with five hundred thousandths of a percentage point rounded upward. All dollar amounts used in or resulting from the calculation of the Index Rate shall be rounded to the nearest cent with one-half cent being rounded upward. The Calculation Agent shall make each Index Rate available by telephone or Electronic Means after 5:00 p.m. on the applicable Index Rate Determination Date to any Notice Party requesting such Index Rate. Upon request of any Notice Party, the Paying Agent shall give notice of such rate by Electronic Means. If the Index Rate is not determined by the Calculation Agent on the applicable Index Rate Determination Date, the rate of interest born on such 2022C Subordinated Bonds bearing interest at an Index Rate shall be the rate in effect on the immediately preceding Index Rate Reset Date until the Calculation Agent next determines the Index Rate as required hereunder.

Optional Tenders of 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode. Subject to Section 78.06, the Beneficial Owners of 2022C Subordinated Bonds in a Daily Mode or a Weekly Mode may elect to have their 2022C Subordinated Bonds (or portions of those 2022C Subordinated Bonds, provided that no 2022C Subordinated Bonds remain Outstanding in other than Authorized Denominations) purchased on any Business Day at a price equal to the Purchase Price, upon delivery of a Tender Notice to the Trustee by the Tender Notice Deadline. Immediately upon receipt of a Tender Notice, the Trustee shall notify the Remarketing Agent and provide the Remarketing Agent with a copy of such Tender Notice.

Mandatory Purchase on Mandatory Purchase Date; Amortization Period During Direct Purchase Index Mode. The 2022C Subordinated Bonds shall be subject to mandatory purchase on each Mandatory Purchase Date. The Trustee shall give notice of such mandatory purchase by mail to the Holders of the 2022C Subordinated Bonds subject to mandatory purchase no less than ten (10) days prior to the Mandatory Purchase Date described in clauses (iii), (iv), (v), (viii) and (x) of the definition of Mandatory Purchase Date and no less than 3 days prior to the Mandatory Purchase Date described in clauses (vi) and (vii) of the definition of Mandatory Purchase Date (provided that in the instance of a Mandatory Purchase Date resulting from clause (iii) of the definition of Bank Purchase Date, no such notice shall be required). No notice shall be given of the Mandatory Purchase Date at the end of each Interest Period for Flexible Rate Bonds. Any notice shall state the Mandatory Purchase Date, the Purchase Price, and that interest on 2022C Subordinated Bonds subject to mandatory purchase shall cease to accrue from and after the Mandatory Purchase Date. The failure to mail such notice with respect to any 2022C Subordinated Bond shall not affect the validity of the mandatory purchase of any other 2022C Subordinated Bond with respect to which notice was so mailed. Any notice mailed will be conclusively presumed to have been given, whether or not actually received by any Holder or Beneficial Owner. The Trustee shall also give a copy of such notice to the Rating Agencies.

The term "Mandatory Purchase Date" means: (i) with respect to a Flexible Rate Bond, the first Business Day following the last day of each Flexible Rate Period with respect to such Flexible Rate Bond, (ii) with respect to 2022C Subordinated Bonds in the Term Rate Mode, the first Business Day following the last day of each Term Rate Period applicable to such 2022C Subordinated Bonds, (iii) with respect to any 2022C Subordinated Bonds, any Conversion Date applicable to such 2022C Subordinated Bond or the date that otherwise would have been a Conversion Date had one of the conditions precedent to such Conversion Date specified in Section 76.11 not failed to occur, (iv) with respect to any 2022C Subordinated Bonds, any Substitution Date with respect to a Credit Enhancement or Liquidity Facility, (v) with respect to any 2022C Subordinated Bonds, the fifth Business Day prior to the Expiration Date with respect to a Credit Enhancement or Liquidity Facility securing such 2022C Subordinated Bonds, (vi) with respect to any 2022C Subordinated Bonds, the date specified by the Trustee following the occurrence of an event under the Reimbursement Agreement which requires or gives the Credit Provider or Liquidity Provider the option to cause a mandatory tender of the 2022C Subordinated Bonds or terminate the Credit Enhancement or Liquidity Facility upon notice, which date shall be a Business Day not more than five Business Days after the Trustee's receipt of written notice of such event from the Credit Provider or the Liquidity Provider and directing the Trustee to cause a mandatory tender of the 2022C Subordinated Bonds and in no event later than the day preceding the termination date specified by the Credit Provider or the Liquidity Provider; (vii) with respect to any 2022C Subordinated Bonds, the date specified by the Trustee following receipt of written notice by the Trustee from the Credit Provider that the Credit Enhancement will not be reinstated following a drawing to pay interest on the 2022C Subordinated Bonds (other than interest on 2022C Subordinated Bonds no longer Outstanding after such drawing) and directing the Trustee to cause a mandatory tender of the 2022C Subordinated Bonds which date shall be a Business Day not more than five days after the Trustee's receipt of such notice, (viii) with respect to 2022C Subordinated Bonds in the Daily Mode or Weekly Mode, any Business Day specified by the District with the consent of the Liquidity Provider, if any, not less than 20 days after the Trustee's receipt of such notice and in no event later than the day preceding the Expiration Date of the Liquidity Facility, if any, then in effect with respect to such 2022C Subordinated Bonds, (ix) with respect to 2022C Subordinated Bonds in the Index Mode, the first Business Day following the last day of each Index Rate Period applicable to such 2022C Subordinated Bonds, and (x) with respect to 2022C Subordinated Bonds in the Direct Purchase Index Mode, each Bank Purchase Date; provided that, in the event that the Bank (acting in its sole and absolute discretion) for the then existing Direct Purchase Index Rate Period agrees in writing to a new Direct Purchase Index Rate Period, the provisions of this clause (x) shall apply and be interpreted by substituting the Bank Purchase Date for the new Direct Purchase Index Rate Period for the then-current Bank Purchase Date.

Notwithstanding the above paragraphs and anything to the contrary in the Thirteenth Supplemental Resolution, in the event the 2022C Subordinated Bonds in the Direct Purchase Index Mode are not purchased or remarketed on a Bank Purchase Date and the conditions precedent to any Amortization Period set forth in the Continuing Covenant Agreement, if any, are satisfied (and if no such conditions precedent are set forth in the Continuing Covenant Agreement, then on the condition that no Event of Default under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution has occurred and is continuing), then the 2022C Subordinated Bonds shall be subject to special mandatory redemption on the following terms: (i) the 2022C Subordinated Bonds shall bear interest at the Bank Rate, unless an Event of Default under and as defined in the Continuing Covenant Agreement or the Subordinate Master Resolution has occurred and is continuing), in which case the 2022C Subordinated Bonds shall bear interest at the Default Rate, (ii) interest on the 2022C

Subordinated Bonds shall be payable on each Amortization Interest Payment Date, and (iii) the principal of the 2022C Subordinated Bonds shall be payable on each Amortization Principal Payment Date as provided in the Continuing Covenant Agreement. Notwithstanding anything herein to the contrary, during the Amortization Period, the 2022C Subordinated Bonds may be subject to redemption or purchase at the sole option of the District at any time without notice as and to the extent provided in the Continuing Covenant Agreement.

Optional Redemption of Flexible Rate Bonds. 2022C Subordinated Bonds in the Flexible Mode are not subject to optional redemption prior to their respective Purchase Dates. 2022C Subordinated Bonds in the Flexible Mode shall be subject to redemption at the option of the District in whole or in part on their respective Purchase Dates at a Redemption Price equal to the principal amount thereof.

Optional Redemption of 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode. 2022C Subordinated Bonds in the Daily Mode or the Weekly Mode are subject to optional redemption by the District, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations) on any Business Day, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

Optional Redemption of 2022C Subordinated Bonds in the Term Rate Mode, Index Mode or Fixed Rate Mode.

2022C Subordinated Bonds in the Term Rate Mode or the Index Mode shall be subject to redemption, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations), on any date on or after the Call Protection Date for each Term Rate Period or Index Rate Period applicable to the 2022C Subordinated Bonds in the Term Rate Mode or Index Mode, at the option of the District at a Redemption Price equal to the principal amount, or portions thereof, of the 2022C Subordinated Bonds to be redeemed, without premium, plus accrued interest, if any, to the Redemption Date.

2022C Subordinated Bonds in the Term Rate Mode or Fixed Rate Mode with a Term Rate Period or Fixed Rate Period of greater than or equal to ten years are subject to redemption in whole or in part on any date on or after the tenth anniversary of the commencement of the Term Rate Period or Fixed Rate Period (and if in part, in such order of maturity as the District shall specify and within a maturity by lot in any manner which the Trustee deems fair) at a Redemption Price equal to the principal amount, or portions thereof, of the 2022C Subordinated Bonds to be redeemed, without premium, plus accrued interest, if any, to the Redemption Date.

The District, in connection with a change to a Long-Term Mode, may waive or otherwise alter its rights to direct the redemption of any such 2022C Subordinated Bonds so changed to a Long-Term Mode; provided that notice describing the waiver or alteration shall be submitted to the Trustee, together with a Favorable Opinion of Bond Counsel, addressed to it.

Unless a Credit Provider Failure has occurred and is continuing, if a Credit Enhancement is then in effect and the Redemption Price includes any premium, the right of the District to direct an optional redemption of 2022C Subordinated Bonds in a Long-Term Mode is subject to the condition that the Trustee has received, prior to the date on which notice of redemption is required to be given to Owners, either Available Moneys or written confirmation from the Credit Provider that it can draw under the Credit Enhancement on the proposed redemption date in an aggregate amount sufficient to cover the principal of and premium and interest due on the Redemption Date.

Optional and Mandatory Redemption of 2022C Subordinated Bonds in the Direct Purchase Index Mode.

Subject to any limitations, conditions or requirements set forth in the applicable Continuing Covenant Agreement, 2022C Subordinated Bonds in the Direct Purchase Index Mode are subject to optional redemption by the District, in whole or in part (provided that no 2022C Subordinated Bonds shall remain Outstanding in other than Authorized Denominations) on any date, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

2022C Subordinated Bonds in the Direct Purchase Index Mode are subject to mandatory redemption on the dates, in the amounts and in the manner set forth in the applicable Continuing Covenant Agreement, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the Redemption Date.

Mandatory Sinking Fund Account Redemption of 2022C Subordinated Bonds. The 2022C Subordinated Bonds [maturing on August 15, 20[__],] shall be subject to redemption prior to maturity from mandatory sinking fund account payments for such 2022C Subordinated Bonds on August 15 of each year on and after August 15, 20__, at a Redemption Price equal to the principal amount of such 2022C Subordinated Bonds, or portions thereof, to be redeemed, plus accrued interest, if any, to the Redemption Date, without premium. The following shall be the mandatory sinking fund account payments for the 2022C Subordinated Bonds [maturing on August 15, 20[__]]. Such mandatory sinking fund account payments shall be due on August 15 of the years set forth in the following table in the respective amounts set forth opposite such years in said table:

Year	Amount	Year	Amount

* Payment at Maturity

Notice of Redemption. Notice of redemption shall be mailed by first-class mail by the Trustee, not less than twenty (20) days (ten (10) days in the case of 2022C Subordinated Bonds in the Daily Mode, Weekly Mode, Direct Purchase Index Mode or Flexible Mode) nor more than sixty (60) days prior to the redemption date, to the Holder of any 2022C Subordinated Bond called for redemption, but neither failure to receive such notice nor any defect in any notice so mailed shall affect the sufficiency of the proceedings for the redemption of any of the 2022C Subordinated Bonds; provided that no notice of redemption shall be required for mandatory redemptions of the 2022C Subordinated Bonds in the Direct Purchase Index Mode. Each notice of redemption shall state the redemption date, the place of redemption and the principal amount of the 2022C Subordinated Bonds to be redeemed, and shall also state that the interest on the 2022C Subordinated Bonds in such notice designated for redemption shall cease to accrue from and after such redemption date and that on said date there will become due and payable on each of said 2022C Subordinated Bonds the principal amount thereof to be redeemed, interest accrued thereon to the redemption date and the premium, if any, thereon (such premium to be specified). Each notice of optional redemption shall also state that redemption is conditioned upon receipt by the Trustee of sufficient funds on the redemption date to pay the Redemption Price of the 2022C Subordinated Bonds to be redeemed. Any notice of optional redemption may be rescinded by written notice given to the Trustee by the District no later than two Business Days prior to the date specified for redemption. Notwithstanding the foregoing, notice of redemption shall not be required for 2022C Subordinated Bonds redeemed on a Mandatory Purchase Date.

This 2022C Subordinated Bond is transferable by the registered owner hereof, in person or by the attorney of such owner duly authorized in writing, at the principal office of the Trustee but only in the manner, subject to the limitations and upon payment of the charges provided in the Subordinate Resolution, and upon surrender and cancellation of this 2022C Subordinated Bond. Upon such transfer a new fully registered Bond or Subordinated Bonds without coupons, of authorized denomination or denominations, for the same aggregate principal amount and maturity will be issued to the transferee in exchange herefor.

The District and the Trustee may deem and treat the registered owner hereof as the absolute owner hereof for all purposes, and the District and the Trustee shall not be affected by any notice to the contrary.

The rights and obligations of the District and of the holders and registered owners of the Subordinated Bonds may be modified or amended at any time in the manner, to the extent, and upon the terms provided in the Subordinate Resolution, provided that no such modification or amendment shall (i) extend the fixed maturity of any Subordinated Bond, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon, or reduce the amount of any premium payable upon the redemption thereof, without the consent of the holder of each Subordinated Bond so affected, or (ii) reduce the percentage of Subordinated Bonds required for the affirmative vote or written consent to an amendment or modification, without the consent of the holders of all the Subordinated Bonds then outstanding, or (iii) without its written consent thereto, modify any of the rights or obligations of the Trustee.

It is hereby certified and recited that any and all acts, conditions and things required to exist, to happen and to be performed, precedent to and in the incurring of the indebtedness evidenced by this 2022C Subordinated Bond, and in the issuing of this 2022C Subordinated Bond, do exist, have happened and have been performed in due time, form and manner, as required by the Constitution and statutes of the State of California, and that this 2022C Subordinated Bond, together with all other indebtedness of the District pertaining to the Electric System, is within every debt and other limit prescribed by the Constitution and the statues of the State of California, and is not in excess of the amount of Subordinated Bonds permitted to be issued under the Subordinate Resolution.

This 2022C Subordinated Bond shall not be entitled to any benefit under the Subordinate Resolution, or become valid or obligatory for any purpose, until the certificate of authentication hereon endorsed shall have been signed by the Trustee. To the extent of any conflict or inconsistency between any provisions contained in this 2022C Subordinated Bond and the Subordinate Resolution, the provisions of the Subordinate Resolution shall control.

IN WITNESS WHEREOF, SACRAMENTO MUNICIPAL UTILITY DISTRICT has caused this 2022C Subordinated Bond to be executed in its name and on its behalf by the facsimile signature of its President of its Board of Directors and by the facsimile signature of its Treasurer and countersigned by the facsimile signature of its Secretary, and the seal of the District to be reproduced hereon, by facsimile and this 2022C Subordinated Bond to be dated as of the date first written above.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By____
President of the Board of Directors

By____
Treasurer of the District

(SEAL)

Countersigned:

____
Secretary of the District

CERTIFICATE OF AUTHENTICATION AND REGISTRATION

This is one of the Subordinated Bonds described in the within-mentioned Subordinate Resolution and registered on the date set forth below.

Dated: _______, 2022

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
as Trustee

By____
Authorized Officer

ASSIGNMENT

For value received ________________________ hereby sell, assign and transfer unto__________________ whose taxpayer identification number is ________________ the within-mentioned Bond and hereby irrevocably constitute and appoint ___________________ attorney, to transfer the same on the books of the District at the office of the Trustee, with full power of substitution in the premises.

____

NOTE: The signature to this Assignment must correspond with the name on the face of the within Registered Bond in every particular, without alteration or enlargement or any change whatsoever.

Dated:

Signature Guaranteed by:

____

NOTE: Signature must be guaranteed by an eligible guarantor institution

EXHIBIT B

FORM OF REVOLVING NOTE

SACRAMENTO MUNICIPAL UTILITY DISTRICT
SUBORDINATED ELECTRIC REVENUE REFUNDING BONDS
2022 SERIES C

[Delivery Date] $_________

The Sacramento Municipal Utility District (the "District"), for value received, hereby promises to pay to the order of [Bank] (the "Bank"), pursuant to that certain Reimbursement Agreement dated as of _______ (the "Agreement"), between the District and the Bank, at the office of the Bank at _________________, the aggregate unpaid principal amount of all Reimbursement Obligations (as defined in the Agreement) pursuant to the Agreement on the dates and in the amounts provided for in the Agreement.

The District promises to pay interest on the unpaid principal amount of all Reimbursement Obligations owed to the Bank under the Agreement on the dates and at the rate or rates provided for in the Agreement. All payments of principal and interest shall be made in any coin or currency of the United States of America which at the time of payment is legal tender for public and private debts in immediately available funds. All capitalized terms used herein and not otherwise defined herein shall have the meanings specified in the Agreement.

This Revolving Note is a Revolving Note as referred to in Section 80.12 of Resolution No. 01-06-10 of the District adopted June 21, 2001, amending and restating Resolution No. 85-11-1 of the District adopted November 7, 1985, as amended and supplemented, including as supplemented by Resolution No. _____ of the District adopted May 19, 2022 (the "Thirteenth Supplemental Resolution") (collectively, the "Subordinate Master Resolution"). This Revolving Note evidences the Reimbursement Obligations owed to the Bank by the District pursuant to the Agreement which have been designated by the District as, and constitute, Parity Subordinated Debt under and as defined in the Subordinate Master Resolution and, as such Parity Subordinated Debt, is entitled to the benefits afforded Parity Subordinated Debt and the holders thereof pursuant to the Subordinate Master Resolution and is secured by a lien on the Net Subordinated Revenues as more fully set forth in and subject to the terms of the Subordinate Master Resolution. As provided in the Agreement, the Reimbursement Obligations and this Revolving Note are subject to prepayment, in whole or in part, in accordance with the terms of the Agreement.

The Bank agrees, by acceptance of this Revolving Note, that it will make a notation on the schedule attached hereto of all Reimbursement Obligations evidenced hereby and all principal payments and prepayments made hereunder and of the date to which interest hereon has been paid, all as provided in the Agreement; *provided, however*, that the failure to make any such notation or any error in such notation shall not limit or otherwise affect the obligation of the District hereunder with respect to payments of principal of and interest on this Revolving Note.

This Revolving Note is authorized by the District to be issued to provide for the payment of the principal of and interest on the unpaid principal amount of all Reimbursement Obligations owed to the Bank under the Agreement on the dates and at the rate or rates provided for in the Agreement. This Revolving Note is issued under and pursuant to and in full compliance with the Subordinate Master Resolution and the Thirteenth Supplemental Resolution.

It is hereby certified that all conditions, acts and things essential to the validity of this Revolving Note exist, have happened and have been done and that every requirement of law affecting the issuance hereof has been duly complied with.

IN WITNESS WHEREOF, SMUD, has caused this Revolving Note to be executed by an authorized officer of SMUD and this Revolving Note to be dated as of date set forth above.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By ______________________________
Name: ___________________________
Title: ___________________________

SCHEDULE FOR REVOLVING NOTE
DATED _________
BY SACRAMENTO MUNICIPAL UTILITY DISTRICT
PAYABLE TO [BANK]

Date	Amount of Drawing or Advance Made	Amount of Principal Paid	Date to Which Interest Paid	Due Date	Notation Made by

**RESOLUTION NO. 22-05-11 OF
THE BOARD OF DIRECTORS OF
SACRAMENTO MUNICIPAL UTILITY DISTRICT
AUTHORIZING THE EXECUTION AND DELIVERY OF ONE OR MORE CONTRACTS OF PURCHASE, OFFICIAL STATEMENTS AND CONTINUING DISCLOSURE AGREEMENTS, DISTRIBUTION OF OFFICIAL STATEMENTS, AND CERTAIN OTHER ACTIONS RELATING TO THE ISSUANCE AND SALE OF ONE OR MORE SERIES OR SUBSERIES OF THE DISTRICT'S ELECTRIC REVENUE BONDS AND/OR SUBORDINATED ELECTRIC REVENUE BONDS, THE REFUNDING OF ALL OR A PORTION OF ONE OR MORE SERIES OF THE DISTRICT'S ELECTRIC REVENUE BONDS, THE TERMINATION OF ONE OR MORE INTEREST RATE SWAP AGREEMENTS AND CERTAIN OTHER MATTERS RELATING THERETO**

BE IT RESOLVED, by the Board of Directors of the Sacramento Municipal Utility District (the "District"), as follows:

Section 1. Sale of Bonds. The District's Electric Revenue Refunding Bonds, 2022 Series J and/or Subordinated Electric Revenue Refunding Bonds, 2022 Series C (collectively, the "Bonds"), each in one or more subseries, shall be sold to the underwriters thereof in one or more negotiated sales at the prices and otherwise upon the terms and conditions determined on the sale dates thereof by the Chief Executive Officer and General Manager, any Member of the Executive Committee, the Treasurer, the Secretary or the Chief Financial Officer or the designee of any such officer (each an "Authorized Officer"), as specified in one or more Sales Certificates relating to the Bonds (the "Sales Certificates") authorized under the supplemental resolutions authorizing the issuance of the Bonds adopted by the Board of Directors of the District on the date hereof.

Section 2. Contracts of Purchase. The forms of Contracts of Purchase with respect to the Bonds (the "Contracts of Purchase") between the District and the underwriters named therein (the "Underwriters"), in the forms submitted to this meeting are hereby approved. Any Authorized Officer, acting alone, is authorized and directed to execute and deliver one or more Contracts of Purchase in substantially such forms for the Bonds or any series or subseries thereof on behalf of the District, subject to such additions thereto and changes therein as any Authorized Officer shall approve after consultation with the District's counsel (such approval to be conclusively evidenced by the execution of such Contracts of Purchase).

Section 3. Official Statements. The Official Statements of the District relating to the Bonds (the "Official Statements") in substantially the forms submitted to this meeting are hereby approved. Any Authorized Officer, acting alone, is authorized and directed to execute and deliver the Official Statements relating to the Bonds in substantially such forms on behalf of the District, subject to such additions thereto and changes therein (including any changes to reflect that all or a portion of the Bonds will be issued initially in an interest rate mode other than the index mode) as any Authorized Officer shall approve after consultation with the District's counsel and subject to such further changes as may be consistent with the Sales Certificates (such approval to be conclusively evidenced by the execution of such Official

Statements). The Underwriters are authorized to distribute the Official Statements in preliminary form to persons who may be interested in the purchase of the Bonds and the Official Statements in final form to purchasers of the Bonds.

Section 4. Continuing Disclosure Agreements. The forms of Continuing Disclosure Agreements relating to the Bonds between the District and U.S. Bank Trust Company, National Association, as dissemination agent (the "Continuing Disclosure Agreements") in the forms attached to the Official Statements submitted to this meeting are hereby approved. Any Authorized Officer, acting alone, is authorized and directed to execute and deliver the Continuing Disclosure Agreements in substantially such forms on behalf of the District, subject to such additions thereto and changes therein as any Authorized Officer shall approve after consultation with the District's counsel (such approval to be conclusively evidenced by the execution of such Continuing Disclosure Agreements).

Section 5. Bond Insurance. Any Authorized Officer, acting alone, is hereby authorized to do any and all things and to negotiate, execute, deliver, and perform any and all agreements and documents which they deem necessary or advisable in order to procure bond insurance for all or any portion of the Bonds including without limitation one or more commitments for a bond insurance policy and one or more insurance agreements; provided that such insurance and such agreements and documents are determined by any Authorized Officer to be reasonable under the circumstances and to be consistent with the provisions and intent of this resolution. The power to make such determination is hereby delegated to each Authorized Officer and shall be conclusively evidenced by the execution and delivery of the insurance agreements and insurance commitments. Any actions heretofore taken by any Authorized Officer in furtherance of this Section are hereby ratified, confirmed and approved.

Section 6. Termination of Interest Rate Swap Agreement. The District previously entered into an interest rate swap agreement (the "Interest Rate Swap") to hedge potential interest rate exposure relating to the refunding of its Electric Revenue Bonds anticipated to be refunded by the Bonds (the "Refunded Bonds"). Any Authorized Officer, acting alone, is hereby authorized to do any and all things and to negotiate, execute, deliver, and perform any and all agreements and documents which they deem necessary or advisable in order to terminate all or a portion of the Interest Rate Swap in connection with the issuance of the Bonds and the refunding of the Refunded Bonds. In the event that the Interest Rate Swap is terminated on the condition that the issuance of the Bonds has occurred (or will occur simultaneously with the settlement of the Interest Rate Swap termination) and/or the Refunded Bonds have been refunded (or will be refunded simultaneously with the settlement of the Interest Rate Swap termination) and such issuance and/or refunding does not occur, then any Authorized Officer, acting alone, is hereby authorized to do any and all things and to negotiate, execute, deliver, and perform any and all agreements and documents which they deem necessary or advisable in order to reinstate all or a portion of the terminated Interest Rate Swap; this authorization shall include, but not be limited to, adjusting any fixed rate specified in, and making other changes to the terms of, the Interest Rate Swap in connection with the reinstatement of all or a portion of the terminated Interest Rate Swap.

In the event that all or a portion of the Interest Rate Swap is reinstated and/or adjusted as described above, the Board of Directors of the District hereby finds and determines, pursuant to

Section 5922 of the California Government Code, that due consideration has been given for the creditworthiness of the counterparty to such Interest Rate Swap, including any related guarantee of, or other credit support for, the obligations of such counterparty, if applicable, and that the Interest Rate Swap is designed to reduce the amount or duration of rate, spread or similar risk or result in a lower cost of borrowing when used in combination with the issuance of the Bonds, the Refunded Bonds, and/or one or more series of other revenue bonds to be issued by the District in the future for the purpose of refunding all or a portion of the Refunded Bonds. To the extent that the Interest Rate Swap so reinstated and/or adjusted as described above is inconsistent or in conflict with the District's Resolution No. 99-12-14, adopted on December 16, 1999 (the "Swap Policy") or any other swap policies of the District, the inconsistent or conflicting provisions of the Swap Policy or such other swap policies of the District are hereby waived and shall not be applicable to the Interest Rate Swap reinstated and/or adjusted as described above.

Section 7. Credit Facilities and/or Liquidity Facilities. Any Authorized Officer, acting alone, is hereby authorized to do any and all things and to negotiate, execute, deliver, and perform any and all agreements and documents which they deem necessary or advisable in order to procure a letter of credit, insurance policy, line of credit, surety bond, standby purchase agreement or other security instrument or liquidity instrument providing for or securing the payment of the principal of and interest on all or any portion of the Bonds and/or providing for the payment of the purchase price of tendered Bonds, including without limitation one or more reimbursement agreements, standby purchase agreements, or other credit or liquidity provider agreements and any term sheets, fee letters or fee agreements therefor; provided that such credit facilities and/or liquidity facilities and such agreements and documents are determined by any Authorized Officer to be reasonable under the circumstances and to be consistent with the provisions and intent of this resolution. The power to make such determination is hereby delegated to each Authorized Officer and shall be conclusively evidenced by the execution and delivery of such agreements, term sheets, fee letters and/or fee agreements. Any actions heretofore taken by any Authorized Officer in furtherance of this Section are hereby ratified, confirmed and approved.

Section 8. Remarketing Agents and Remarketing Agreements. Any Authorized Officer, acting alone, is hereby authorized to do any and all things and to negotiate, execute, deliver, and perform any and all agreements and documents which they deem necessary or advisable in order to appoint one or more remarketing agents for all or any portion of the Bonds, including without limitation one or more remarketing agreements; provided that such agreements and documents are determined by any Authorized Officer to be reasonable under the circumstances and to be consistent with the provisions and intent of this resolution. The power to make such determination is hereby delegated to each Authorized Officer and shall be conclusively evidenced by the execution and delivery of such agreements. Any actions heretofore taken by any Authorized Officer in furtherance of this Section are hereby ratified, confirmed and approved.

Section 9. Other Related Actions. The Authorized Officers and other officers of the District are hereby authorized and directed to do any and all things and to negotiate, execute, deliver and perform any and all agreements and documents (including one or more escrow agreements for the purpose of refunding outstanding bonds) which they deem necessary or advisable in order to consummate the issuance, sale and delivery of the Bonds, to provide for credit enhancement of, or liquidity for, the Bonds, and to effectuate the purposes of this resolution and the transactions contemplated hereby and that any actions heretofore taken and any agreements and documents heretofore executed and delivered by the officers of the District to consummate the issuance, sale and delivery of the Bonds, to provide for credit enhancement of, or liquidity for, the Bonds, and to effect the purpose of these resolutions and the transactions contemplated thereby are hereby ratified and confirmed.

Approved: May 19, 2022

INTRODUCED: DIRECTOR HERBER				
SECONDED: DIRECTOR FISHMAN				
DIRECTOR	AYE	NO	ABSTAIN	ABSENT
ROSE	X			
BUI-THOMPSON	X			
FISHMAN	X			
HERBER	X			
KERTH	X			
TAMAYO	X			
SANBORN	X			

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Electric Revenue Refunding Bonds, 2022 Series J

CONTRACT OF PURCHASE

[SALE DATE]

Honorable Board of Directors
Sacramento Municipal Utility District
6201 S Street
Sacramento, California 95817-1899

Dear Directors:

The undersigned Morgan Stanley & Co. LLC, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC (herein collectively called the "Underwriters"), acting for and on behalf of themselves, offer to enter into this Contract of Purchase (the "Contract of Purchase") with the Sacramento Municipal Utility District (the "District") which, upon the District's acceptance, will be binding upon the District and upon the Underwriters. Morgan Stanley & Co. LLC, has been duly authorized to execute this Contract of Purchase and to act hereunder by and based on representations made to it under an Agreement Among Underwriters dated _____, 2022 on behalf of the Underwriters as the Senior Managing Underwriter (the "Senior Underwriter"). This offer is made subject to the District's acceptance on or before 5:00 p.m., Sacramento time, on the date hereof, and if not so accepted, will be subject to withdrawal by the Underwriters upon notice delivered to the District at any time prior to the acceptance hereof by the District.

1. **Purchase, Sale and Delivery of the Bonds.** (a) Subject to the terms and conditions and in reliance upon the representations, warranties and agreements herein set forth, the Underwriters, jointly and severally, hereby agree to purchase from the District, and the District hereby agrees to sell to the Underwriters, all (but not less than all) of the $[PAR] aggregate principal amount of the Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2022 Series J (the "Bonds"), dated [CLOSING DATE], bearing interest (payable on the dates set forth in the Official Statement (as hereinafter defined) of the District relating to the Bonds) in each year until maturity or earlier redemption at the rates per annum and maturing on the dates and in the amounts set forth in the Official Statement. The purchase price for the Bonds shall be

$[PURCHASE PRICE] (consisting of the principal amount of the Bonds of $[PAR] plus [net] original issue premium of $[OIP] and minus an Underwriters' discount of $ [UWD]).

(b) The Bonds shall be substantially in the form described in, shall be issued and secured under the provisions of, and shall be payable as provided in, Resolution No. 6649, adopted by the Board of Directors of the District on January 7, 1971 (the "Master Resolution"), as heretofore amended and supplemented, including the amendments and supplements thereto made by Resolution No. [RESO NO.], adopted by the Board of Directors on [RESO DATE] (the "Sixty-Fifth Supplemental Resolution"). The Master Resolution, as supplemented and amended as described in this Contract of Purchase, is herein called the "Resolution." The Bonds are authorized to be issued pursuant to applicable California law, including the Municipal Utility District Act (Sections 12850 to 12860 of the Public Utilities Code), the Revenue Bond Law of 1941 (Government Code Section 54300 *et seq.*), Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (section 53580 *et seq.*) and the Resolution. The Bonds will be special obligations of the District payable exclusively from, and are secured by a pledge (effected in the manner and to the extent provided in the Resolution) of, the Net Revenues (as defined in the Resolution). The Bonds shall be payable and shall be subject to redemption as provided in the Resolution.

(c) The Bonds are being issued to (i) refund the Refunded Bonds (as defined in the Official Statement), and (ii) pay certain costs associated with the issuance of the Bonds. In connection with the refunding of the Refunded Bonds, the District expects to terminate an interest rate swap agreement that was executed in December of 2019 to hedge potential interest rate exposure relating to the future refunding of the Refunded Bonds. The District expects that it will receive a termination payment for the termination of the interest rate swap agreement. A portion of the proceeds of the Bonds, together with other available funds, will be deposited in an escrow fund established pursuant to an escrow agreement (the "Escrow Agreement") between the District and the Trustee, in its capacity as Escrow Agent (in such capacity, the "Escrow Agent").

(d) The District has heretofore delivered to the Underwriters copies of the Preliminary Official Statement dated [POS DATE], relating to the Bonds (the "Preliminary Official Statement") in connection with the public offering of the Bonds. The Preliminary Official Statement was deemed final by the District as of the date thereof in accordance with paragraph (b)(1) of Rule 15c2-12 of the Securities and Exchange Commission ("Rule 15c2-12"), except for the information not required to be included therein under Rule 15c2-12.

(e) The District shall prepare and deliver to the Underwriters, as promptly as practicable, but in any event not later than two business days prior to the Closing Date (as defined below) or seven business days from the date hereof, a final official statement, with such changes and amendments as may be agreed to by the Underwriters, in such quantities as the Underwriters may reasonably request in order to comply with paragraph (b)(4) of Rule 15c2-12 and the rules of the Municipal Securities Rulemaking Board ("MSRB") (such official statement, including the cover page and Appendices thereto, as the same may be supplemented or amended pursuant to paragraph (i) of Section 2 hereof, is herein referred to as the "Official Statement"). In addition, the District will provide, subject to customary disclaimers regarding the transmission of electronic copies, an electronic copy of the final Official Statement to the Underwriters in the currently required designated electronic format stated in MSRB Rule G-32 and the EMMA Dataport Manual (as defined below). The parties agree that the format in which the Preliminary Official Statement was delivered meets such electronic format requirements.

(f) Within one (1) business day after receipt of the Official Statement from the District, but by no later than the Closing Date, the Underwriters shall, at their own expense submit the Official Statement to EMMA (as defined below). The Underwriters will comply with the provisions of MSRB Rule G-32, including without limitation the submission of Form G-32 and the Official Statement and notify the District of the date on which the Official Statement has been filed with EMMA.

"EMMA" means the MSRB's Electronic Municipal Market Access system, or any other electronic municipal securities information access system designated by the MSRB for collecting and disseminating primary offering documents and information.

"EMMA Dataport Manual" means the document(s) designated as such published by the MSRB from time to time setting forth the processes and procedures with respect to submissions to be made to the primary market disclosure service of EMMA by underwriters under Rule G-32(b).

(g) The District hereby ratifies, confirms and approves the use and distribution by the Underwriters prior to the date hereof of the Preliminary Official Statement and hereby authorizes the Underwriters to use and distribute the Official Statement, the Resolution, and this Contract of Purchase, and all information contained in each, and all other documents, certificates and statements furnished by the District to the Underwriters in connection with the transactions contemplated by this Contract of Purchase, in connection with the offer and sale of the Bonds.

The District will covenant pursuant to a Continuing Disclosure Agreement dated as of the date of the issuance of the Bonds (the "Undertaking"), between the District and U.S. Bank Trust Company, National Association (the "Trustee"), to provide annual reports and certain notices as described in Appendix F of the Official Statement.

(h) The District agrees and acknowledges that: (i) the purchase and sale of the Bonds pursuant to this Contract of Purchase is an arm's-length commercial transaction between the District and the Underwriters, (ii) in connection therewith and with the discussions, undertakings and procedures leading up to the consummation of such transaction, the Underwriters are and have been acting solely as principals and are not acting as the agents or fiduciaries of the District, (iii) the Underwriters have not assumed an advisory or fiduciary responsibility in favor of the District with respect to the offering contemplated hereby or the discussions, undertakings and procedures leading thereto (irrespective of whether the Underwriters have provided other services or are currently providing other services to the District on other matters) and the Underwriters have no contractual obligation to the District with respect to the offering contemplated hereby except the contractual obligations expressly set forth in this Contract of Purchase and (iv) it has consulted its own legal, financial and other advisors to the extent it has deemed appropriate.

(i) At 8:00 A.M., Sacramento time, on [CLOSING DATE] or at such earlier or later time or date as shall be agreed upon by the Underwriters and the District (such time and date being herein referred to as the "Closing Date"), the District will deliver the Bonds to The Depository Trust Company, New York, New York ("DTC"), for the account of the Underwriters, duly executed by the District, and the other documents herein mentioned; and the Underwriters will (i) accept such delivery and pay the purchase price of the Bonds as set forth in paragraph (a) of this Section by wire transfer in San Francisco, California to the order of the District. Delivery of the documents herein mentioned shall be made at the offices of Orrick, Herrington & Sutcliffe LLP, 400 Capitol Mall, Suite 3000, Sacramento, California 95814, or such other place as shall have been mutually agreed upon by the District and the Underwriters, except that the Bonds shall be delivered at the offices of DTC in New York, New York or at such other place and in such manner as shall have been mutually agreed upon by the District and the Underwriters.

The Bonds shall be issued initially in fully registered book-entry eligible form (which may be typewritten) in the form of a single registered bond for each maturity of the Bonds, shall bear CUSIP numbers and shall be registered in the name of Cede & Co., as nominee of DTC.

2. **Representations, Warranties and Agreements of the District.** The District hereby represents, warrants to and agrees with the Underwriters that:

(a) The District is a political subdivision of the State of California duly organized and validly existing pursuant to the Municipal Utility District Act as contained in Public Utilities Code Section 11501 *et seq*. (the "Act") and has, and at the Closing Date will have, full legal right, power and authority (i) to enter into this Contract of Purchase, the Escrow Agreement, and the Undertaking, (ii) to adopt the Resolution, (iii) to pledge the Net Revenues as set forth in the Resolution, (iv) to issue, sell and deliver the Bonds to the Underwriters pursuant to the Resolution as provided herein, (v) to acquire, construct, operate, maintain, improve and finance and refinance its Electric System (as defined in the Resolution) and conduct the business thereof as set forth in and contemplated by the Preliminary Official Statement and the Official Statement, and (vi) to carry out, give effect to and consummate the transactions contemplated by this Contract of Purchase, the Escrow Agreement, the Undertaking, the Resolution, and the Preliminary Official Statement and the Official Statement;

(b) The District has complied, and will at the Closing Date be in compliance, in all material respects, with the Act, the Resolution, and with the obligations in connection with the issuance of the Bonds on its part contained in the Resolution, the Escrow Agreement, the Bonds, the Act, the Undertaking and this Contract of Purchase;

(c) The District has duly and validly adopted the Resolution, has duly authorized and approved the execution and delivery of the Bonds, this Contract of Purchase, the Escrow Agreement, the Undertaking and the Official Statement and has duly authorized and approved the performance by the District of its obligations contained in, and the taking of any and all action as may be necessary to carry out, give effect to and consummate the transactions contemplated by, each of said documents and, at the Closing Date, the Bonds will have been validly issued and delivered, the Resolution, the Escrow Agreement, the Undertaking and this Contract of Purchase will constitute the valid, legal and binding obligations of the District enforceable in accordance with their respective terms (subject to the effect of, and restrictions and limitations imposed by or resulting from, (i) bankruptcy, insolvency, debt adjustment, moratorium, reorganization or other similar laws affecting creditors' rights, and (ii) judicial discretion) and the Resolution will be in full force and effect;

(d) The District is not in breach of or in default under any existing constitutional provision, applicable law or administrative rule or regulation of the State of California, the United States of America, or of any department, division, agency or instrumentality of either or any applicable court or administrative decree or order, or any loan agreement, bond, note, ordinance, resolution, indenture, contract, agreement or other instrument to which the District is a party or to which the District is otherwise subject or bound which in any material way, directly or indirectly, affects the issuance of the Bonds or the validity thereof, the validity or adoption of the Resolution or the execution and delivery of the Bonds, this Contract of Purchase, the Escrow Agreement, the Undertaking or the other instruments contemplated by any of such documents to which the District is a party, and the adoption of the Resolution and compliance with the provisions of each will not, as of the date hereof and as of the Closing Date, conflict with or constitute a breach of or default in any material way under any existing constitutional provision, applicable law or administrative rule or regulation of the State of California, the United States, or of any department, division, agency or instrumentality of either or any applicable court or administrative judgment, decree or order, or any loan agreement, bond, note, ordinance, resolution, indenture, contract, agreement or other instrument to which the District is a party or to which the District or any of the property or assets of the Electric System (as defined in the Resolution) are otherwise subject or bound, and no event which would have a material and adverse effect upon the financial condition of the District has occurred and is continuing which constitutes or with the passage of time or the giving of notice, or both, would constitute a default or event of default by the District under any of the foregoing;

(e) All approvals, consents, authorizations, licenses and permits, elections and orders of or filings or registrations with any governmental authority, legislative body, board, agency or commission having jurisdiction which would constitute a condition precedent to, or the absence of which would materially adversely affect, the due performance by the District of its obligations in connection with the issuance of the Bonds under the Resolution, the Undertaking and this Contract of Purchase have been duly obtained or made and are in full force and effect, except for such approvals, consents and orders as may be required under the “Blue Sky” or other securities laws of any state in connection with the offering and sale of the Bonds; and, except as disclosed in the Preliminary Official Statement and the Official Statement, all authorizations, approvals, licenses, permits, consents and orders of any governmental authority, board, agency or commission having jurisdiction in the matters which are required for the due authorization of, which would constitute a condition precedent to, or the absence of which would materially adversely affect the due performance by the District of its respective obligations under, this Contract of Purchase, the Escrow Agreement, the Undertaking, the Bonds or the Resolution, or which are necessary to permit the District to carry out the transactions contemplated by the Preliminary Official Statement and the Official Statement to acquire, construct, operate, maintain, improve and finance the Electric System have been duly obtained or, where required for future performance, are expected to be obtained;

(f) The Bonds, when issued and delivered in accordance with the Resolution and this Contract of Purchase and paid for by the Underwriters on the Closing Date as provided herein, will be validly issued and outstanding special obligations of the District enforceable against the District in accordance with their terms and entitled to all the benefits and security of the Resolution; and, upon the issuance and delivery of the Bonds, the Resolution will provide, for the benefit of the holders from time to time of the Bonds, a legally valid and binding pledge of and lien on Net Revenues pledged under the Resolution, as provided in and contemplated by the Resolution;

(g) The Preliminary Official Statement, as of its date and as of the date hereof, did not and does not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(h) At the time of the District's acceptance hereof and (unless the Official Statement is amended or supplemented pursuant to paragraph (i) of Section 2 hereof) at all times subsequent to the date of delivery thereof up to and including the Closing Date, the Official Statement will be true, correct, complete and final in all material respects and will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(i) If, after the date of this Contract of Purchase and until 25 days after the end of the "underwriting period" (as defined in Rule 15c2-12), any event shall occur that might cause the Official Statement to contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, the District hereby covenants and agrees, to the extent it has knowledge of such event, to notify the Underwriters (and for the purposes of this clause to provide the Underwriters with such information as they may from time to time reasonably request), and, if in the opinion of the Underwriters and their counsel such event requires the preparation and publication of a supplement or amendment to the Official Statement, at its expense to supplement or amend the Official Statement in a form and manner approved by the Underwriters and furnish to the Underwriters a reasonable number of copies of such supplement or amendment. For purposes of this Contract of Purchase, the District may assume that the end of the "underwriting period" has occurred on the Closing Date unless the District is otherwise notified by the Underwriters on or prior to the Closing Date. If the Underwriters notify the District that the Closing Date is not the end of the "underwriting period", then the Underwriters shall further notify the District of the date that is the end of the "underwriting period" (as defined in Rule 15c2-12);

(j) If the Official Statement is supplemented or amended pursuant to paragraph (i) of Section 2 of this Contract of Purchase, at the time of each supplement or amendment thereto and (unless subsequently again supplemented or amended pursuant to such paragraph) at all times subsequent thereto during the "underwriting period", the Official Statement as so supplemented or amended will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which made, not misleading;

(k) Except as disclosed in the Preliminary Official Statement and the Official Statement, no litigation, action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, regulatory agency, public board or body, is pending or, to the knowledge of the officer of the District executing this Contract of Purchase after due investigation, threatened (i) in any way affecting the corporate existence of the District or the titles of its officers to their respective offices, (ii) affecting or seeking to prohibit, restrain or enjoin the issuance, sale or delivery of any of the Bonds, the application of the proceeds thereof in accordance with the Resolution, or the collection or application of Revenues (as defined in the Resolution) or the collection or application of the Net Revenues pledged to pay the principal of and interest on the Bonds under the Resolution or in any way contesting or affecting the validity or enforceability of any of the Bonds, the Escrow Agreement, the Resolution, the Undertaking, this Contract of Purchase or any action of the District contemplated by any of said documents, (iii) which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution facilities, (iv) contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or the powers of the District or its authority with respect to the Bonds, the adoption of the Resolution, or the execution and delivery of the Undertaking, the Escrow Agreement, or this Contract of Purchase, or any action of the District contemplated by any of said documents, and (v) which would adversely affect the exclusion from gross income for federal income tax purposes of interest paid on the Bonds, nor to the knowledge of the officer of the District executing this Contract of Purchase is there any basis therefor;

(l) The District will furnish such information, execute such instruments and take such other action in cooperation with the Underwriters as the Underwriters may reasonably request (i) to qualify the Bonds for offer and sale under the "Blue Sky" or other securities laws and regulations of such states and other jurisdictions of the United States as the Senior Underwriter may designate, and (ii) to determine the eligibility of the Bonds for investment under the laws of such states and other jurisdictions and will use its best efforts to continue such qualifications in effect so long as required for the distribution of the Bonds; provided that in connection therewith the District shall not be required to execute or file a general or special consent to service of process or qualify to do business in any jurisdiction and will advise the Senior Underwriter promptly of receipt by the District of any written notification with respect to the suspension of the qualification of the Bonds for sale in any jurisdiction or written notification of the initiation or threat of any proceeding for that purpose;

(m) The audited financial statements of the District for the years ending December 31, 2021 and December 31, 2020 heretofore delivered to the Underwriters and incorporated by reference in the Preliminary Official Statement and the Official Statement as Appendix B fairly present the financial position of the District as of the dates indicated and such financial statements have been prepared in conformity with generally accepted accounting principles applied on a consistent basis;

(n) Between the date hereof and the Closing Date, the District will not, without the prior written consent of the Senior Underwriter, offer or issue any bonds, notes or other obligations for borrowed money, or incur any material liabilities, direct or contingent, nor will there be any adverse change of a material nature in the financial position, results of operations or condition, financial or otherwise, of the District, in either case other than in the ordinary course of its business or as disclosed in the Preliminary Official Statement or the Official Statement or as otherwise disclosed to the Senior Underwriter;

(o) The Bonds, the Escrow Agreement, the Resolution and the Undertaking conform to the descriptions thereof contained in the Preliminary Official Statement and the Official Statement;

(p) The District has the legal authority to apply and will apply, or cause to be applied, the proceeds from the sale of the Bonds as provided in and subject to all of the terms and provisions of the Resolution and as described in the Preliminary Official Statement and the Official

Statement, including for payment of District expenses incurred in connection with the negotiation, marketing, issuance and delivery of the Bonds to the extent required by Section 7 (Expenses), and will not take or omit to take any action which action or omission will adversely affect the exclusion from gross income for federal income tax purposes of the interest on the Bonds;

(q) Any certificate signed by any official of the District, and delivered to the Underwriters, shall be deemed a representation and warranty by the District to the Underwriters as to the statements made therein; and

(r) Except as disclosed in the Preliminary Official Statement and the Official Statement, during the last five years the District has complied in all material respects with all previous undertakings required by Rule 15c2-12.

3. **Conditions to the Obligations of the Underwriters.** The obligations of the Underwriters to accept delivery of and pay for the Bonds on the Closing Date shall be subject to the performance by the District of its obligations to be performed hereunder at or prior to the Closing Date and to the fulfillment of the following conditions:

(a) The representations, warranties and covenants of the District contained herein shall be true, complete and correct on the date hereof and as of the Closing Date as if made on the Closing Date;

(b) At the Closing Date, the Resolution shall have been duly adopted and shall be in full force and effect, and shall not have been repealed, amended, modified or supplemented, except as may have been agreed to in writing by the Underwriters, and there shall have been taken in connection therewith, with the issuance of the Bonds and with the transactions contemplated thereby and by this Contract of Purchase, all such actions as, in the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel ("Bond Counsel"), shall be necessary and appropriate;

(c) At the Closing Date, the Official Statement shall not have been amended, modified or supplemented, except as may have been agreed to in writing by the Underwriters;

(d) At or prior to the Closing Date, the Underwriters shall have received copies of the following documents, in each case satisfactory in form and substance to the Underwriters:

(1) The Official Statement executed on behalf of the District by its Chief Executive Officer and General Manager, any Member of its Executive Committee, its Treasurer, its Secretary or its Chief Financial Officer (each an "Authorized Representative");

(2) The Undertaking executed on behalf of the District by an Authorized Representative;

(3) The Sixty-Fifth Supplemental Resolution, with only such supplements or amendments thereto as may have been agreed to by the Underwriters and certified by an authorized officer of the District under its seal as having been duly adopted by the District and as being in full force and effect, and the Resolution, certified by an authorized officer

of the District as being in full force and effect, with such supplements and amendments thereto adopted after the date hereof as may have been agreed to by the Underwriters;

(4) An opinion or opinions relating to the Bonds, dated the Closing Date and addressed to the District, of Bond Counsel, in substantially the form included in the Official Statement as Appendix E, together with a letter or letters of such Bond Counsel, dated the Closing Date and addressed to the Underwriters, to the effect that the foregoing opinion or opinions addressed to the District may be relied upon by the Underwriters to the same extent as if such opinion or opinions were addressed to them;

(5) An opinion or opinions, dated the Closing Date and addressed to the Senior Underwriter, of Bond Counsel, in substantially the form attached hereto as Exhibit E;

(6) An opinion, dated the Closing Date and addressed to the Senior Underwriter, of General Counsel to the District, in substantially the form attached hereto as Exhibit C;

(7) An opinion, dated the Closing Date and addressed to the Underwriters, of Nixon Peabody LLP, as counsel for the Underwriters ("Underwriters' Counsel"), to the effect that (i) the Bonds are exempt from the registration requirements of the Securities Act of 1933, as amended, and the Resolution is exempt from qualification under the Trust Indenture Act of 1939, as amended; (ii) the Continuing Disclosure Agreement complies as to form in all material respects with the requirements of paragraph (b)(5) of the Rule applicable to the primary offering of the Bonds; and (iii) based upon the information made available to them in the course of their participation in the preparation of the Preliminary Official Statement and the Official Statement as counsel to the Underwriters and without having undertaken to determine independently, or assuming any responsibility for, the accuracy, completeness or fairness of the statements contained in the Preliminary Official Statement and the Official Statement, they do not believe that (A) the Preliminary Official Statement, as of its date and as of the date of the Contract of Purchase, and (B) the Official Statement as of its date and as of the Closing Date, contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading (except for the information relating to Cede & Co., DTC or the operation of the book-entry system, the Appendices to the Official Statement, except Appendices D, and F, and summaries thereof and references thereto, and other financial, accounting and statistical data included therein, as to all of which no view need be expressed); and (iii) with respect to such matters as the Underwriters may reasonably require;

(8) A certificate, dated the Closing Date, signed by an Authorized Representative of the District in substantially the form attached hereto as Exhibit D (but in lieu of or in conjunction with such certificate the Underwriters may, in its sole discretion, accept certificates or opinions of General Counsel to the District, or of other counsel acceptable to the Underwriters, that in the opinion of such counsel the issues raised in any pending or threatened litigation referred to in such certificate are without substance or that the contentions of all plaintiffs therein are without merit);

(9) The Escrow Agreement, executed by the District and the Escrow Agent;

(10) An acceptance of and agreement to the provisions of the Sixty-Fourth Supplemental Resolution executed by the Trustee under the Resolution in form and substance acceptable to the Underwriters;

(11) A tax certificate related to the Bonds in substance and form satisfactory to Bond Counsel;

(12) Ratings of the Bonds from S&P Global Ratings ("S&P") of not less than "[AA (stable outlook)]" and from Fitch Ratings, Inc. ("Fitch") of not less than "[AA (stable outlook)]";

(13) A report of [_________], as verification agent (the "Verification Agent") with respect to the sufficiency of amounts deposited pursuant to the Escrow Agreement and an opinion of Bond Counsel respecting the defeasance of the Refunded Bonds;

(14) An opinion of counsel to the Trustee/Escrow Agent, dated the Closing Date, addressed to the Underwriters, to the effect that (i) the Trustee/Escrow Agent is a national banking association duly organized and validly existing under the laws of the United States of America having full power and being qualified to enter into, accept and agree to the provisions of the Resolution and to enter into and perform the Undertaking, (ii) the Undertaking and the Escrow Agreement have been duly authorized, executed and delivered by the Trustee/Escrow Agent and, assuming due authorization, execution and delivery by the other parties thereto, constitutes the valid and binding obligation of the Trustee/Escrow Agent enforceable in accordance with its terms, subject to laws relating to bankruptcy, insolvency, moratorium, reorganization or other similar laws affecting creditors' rights generally, to the application of equitable principals and to the exercise of judicial discretion in appropriate cases, and to enter into and perform the Undertaking and the Escrow Agreement, (iii) all approvals, consents and orders of any governmental authority or agency having jurisdiction in this matter that would constitute a condition precedent to the performance by the Trustee/Escrow Agent of its duties and obligations under the Resolution, the Escrow Agreement, and the Undertaking have been obtained and are in full force and effect, and (iv) the acceptance of the duties and obligations of the Trustee/Escrow Agent under the Resolution, the Escrow Agreement, and the Undertaking and the consummation of the transactions on the part of the Trustee/Escrow Agent contemplated therein, and the compliance by the Trustee/Escrow Agent, as applicable, with the terms, conditions and provisions of such document do not contravene any provisions of applicable law or regulation or any order or decree, writ or injunction or the Articles of Association or Bylaws of the Trustee/Escrow Agent, and, to the best knowledge of such counsel, will not require the consent under or result in a breach of or a default under, any resolution, agreement or other instrument to which the Trustee/Escrow Agent is a party or by which it may be bound;

(15) A copy of the Blanket Letter of Representations to DTC relating to the Bonds signed by DTC and the District; and

(16) Such additional legal opinions, certificates, instruments and other documents as the Underwriters may reasonably request to evidence the truth and accuracy and completeness, as of the date hereof and as of the Closing Date, of the District's representations and warranties contained herein and of the statements and information contained in the Preliminary Official Statement or the Official Statement, and the due performance or satisfaction by the District at or prior to the Closing Date of all agreements then to be performed and all conditions then to be satisfied by the District in connection with the transactions contemplated hereby and by the Resolution and the Preliminary Official Statement or the Official Statement.

If any of the conditions to the obligations of the Underwriters contained in this Section or elsewhere in this Contract of Purchase with respect to the Bonds shall not have been satisfied when and as required herein, all obligations of the Underwriters hereunder with respect to the Bonds may be terminated by the Underwriters at, or at any time prior to, the Closing Date by written notice to the District.

4. **Offering.** The obligations of the District to sell and to deliver the Bonds on the Closing Date to the Underwriters shall be subject to the following conditions:

(a) The entire $[PAR] aggregate principal amount of the Bonds shall be purchased, accepted and paid for by the Underwriters on the Closing Date; and

(b) The District shall receive an Issue Price Certificate of the Senior Underwriter substantially in the form attached hereto as Exhibit F with respect to the Bonds.

5. **Issue Price of the Bonds.**

(a) The Senior Underwriter, on behalf of the Underwriters, agrees to assist the District in establishing the issue price of the Bonds and shall execute and deliver to the District at Closing an "issue price" or similar certificate substantially in the form attached hereto as Exhibit F, together with the supporting pricing wires or equivalent communications, with modifications to such certificate as may be deemed appropriate or necessary, in the reasonable judgment of the Senior Underwriter, the District and Bond Counsel, to accurately reflect, as applicable, the sales price or prices or the initial offering price or prices to the public of the Bonds.

(b) [Except for the maturities set forth in Schedule A attached hereto,] the District will treat the first price at which 10% of each maturity of the Bonds (the "10% test") is sold to the public as the issue price of that maturity (if different interest rates apply within a maturity, each separate CUSIP number within that maturity will be subject to the 10% test).

(c) [The Senior Underwriter confirms that the Underwriters have offered the Bonds to the public on or before the date of this Contract of Purchase at the offering price or prices (the "initial offering price"), or at the corresponding yield or yields, set forth in the final Official Statement. Schedule A sets forth, as of the date of this Contract of Purchase, the maturities, if any, of the Bonds for which the 10% test has not been satisfied and for which the District and the Senior Underwriter, on behalf of the Underwriters, agree that (i) the Senior Underwriter will retain all unsold Bonds of each maturity for which the 10% test has not been satisfied and not allocate any such Bonds to any other Underwriter and (ii) the restrictions set forth in the next sentence shall apply, which will allow the District to treat the initial offering price to the public of each such maturity as of the sale date as the issue price of that maturity (the "hold-the-offering-price rule"). So long as the hold-the-offering-price rule remains applicable to any maturity of the Bonds, the Senior Underwriter will neither offer nor sell unsold Bonds of that maturity to any person at a price that is higher than the initial offering price to the public during the period starting on the sale date and ending on the earlier of the following.

(1) the close of the fifth (5^{th}) business day after the sale date; or

(2) the date on which the Underwriters have sold at least 10% of that maturity of the Bonds to the public at a price that is no higher than the initial offering price to the public.

The Senior Underwriter shall promptly advise the District or the District's municipal advisor when the Underwriters have sold 10% of that maturity of the Bonds to the public at [a price] that is no higher than the initial offering price to the public, if that occurs prior to the close of the fifth (5th) business day after the sale date.

The District acknowledges that, in making the representation set forth in this subsection, the Senior Underwriter will rely on (i) the agreement of each Underwriter to comply with the hold-the-offering-price rule, as set forth in an agreement among underwriters and the related pricing wires, (ii) in the event a selling group has been created in connection with the initial sale of the Bonds to the public, the agreement of each dealer who is a member of the selling group to comply with the hold-the-offering-price rule, as set forth in a selling group agreement and the related pricing wires, and (iii) in the event that an Underwriter is a party to a retail distribution agreement that was employed in connection with the initial sale of the Bonds to the public, the agreement of each broker-dealer that is a party to such agreement to comply with the hold-the-offering-price rule, as set forth in the retail distribution agreement and the related pricing wires. The District further acknowledges that each Underwriter shall be solely liable for its failure to comply with its agreement regarding the hold the offering price rule and that no Underwriter shall be liable for the failure of any other Underwriter, or of any dealer who is a member of a selling group, or of any broker-dealer that is a party to a retail distribution agreement to comply with its agreement regarding the hold-the-offering-price rule as applicable to the Bonds.]

(d) [The Senior Underwriter confirms that:

(1) any agreement among underwriters, any selling group agreement and each retail distribution agreement (to which the Senior Underwriter is a party) relating to the initial sale of the Bonds to the public, together with the related pricing wires, contains or will contain language obligating each Underwriter, each dealer who is a member of the selling group, and each broker-dealer that is a party to such retail distribution agreement, as applicable, to (A)(ii) report the prices at which it sells to the public the unsold Bonds of each maturity allotted to it until it is notified by the Senior Underwriter that either the 10% test has been satisfied as to the Bonds of that maturity or all Bonds of that maturity have been sold to the public and (ii) comply with the hold-the-offering-price rule, if applicable, in each case if and for

so long as directed by the Senior Underwriter and as set forth in the related pricing wires, (B) promptly notify the Representative of any sales of the Bonds that, to its knowledge, are made to a purchaser who is a related party to an underwriter participating in the initial sale of the Bonds to the public (each such term being used as defined below) and (C) acknowledge that, unless otherwise advised by the Underwriter, dealer or broker-dealer, the Representative shall assume that each order submitted by the Underwriter, dealer or broker-dealer is a sale to the public; and

(2) any agreement among underwriters relating to the initial sale of the Bonds to the public, together with the related pricing wires, contains or will contain language obligating each Underwriter that is a party to a retail distribution agreement to be employed in connection with the initial sale of the Bonds to the public to require each broker-dealer that is a party to such retail distribution agreement to (A) report the prices at which it sells to the public the unsold Bonds of each maturity allotted to it until it is notified by the Senior Underwriter or the Underwriter that either the 10% test has been satisfied as to the Bonds of that maturity or all Bonds of that maturity have been sold to the public and (B) comply with the hold-the-offering-price rule, if applicable, in each case if and for so long as directed by the Senior Underwriter or the Underwriter and as set forth in the related pricing wires.]

(e) The Underwriters acknowledge that sales of any Bonds to any person that is a related party to an Underwriter shall not constitute sales to the public for purposes of this section. Further, for purposes of this section:

(1) "public" means any person other than an underwriter or a related party,

(2) "underwriter" means (A) any person that agrees pursuant to a written contract with the District (or with the lead underwriter to form an underwriting syndicate) to participate in the initial sale of the Bonds to the public and (B) any person that agrees pursuant to a written contract directly or indirectly with a person described in clause (A) to participate in the initial sale of the Bonds to the public (including a member of a selling group or a party to a retail distribution agreement participating in the initial sale of the Bonds to the public),

(3) a purchaser of any of the Bonds is a "related party" to an underwriter if the underwriter and the purchaser are subject, directly or indirectly, to (i) more than 50% common ownership of the voting power or the total value of their stock, if both entities are corporations (including direct ownership by one corporation of another), (ii) more than 50% common ownership of their capital interests or profits interests, if both entities are partnerships (including direct ownership by one partnership of another), or (iii) more than 50% common ownership of the value of the outstanding stock of the corporation or the capital interests or profit interests of the partnership, as applicable, if one entity is a corporation and the other entity is a partnership (including direct ownership of the applicable stock or interests by one entity of the other), and

(4) "sale date" means the date of execution of this Contract of Purchase by all parties.

6. **Termination.** The Underwriters shall have the right to terminate their obligations under this Contract of Purchase to purchase, accept delivery of and to pay for the Bonds, if,

(a) between the date hereof and the Closing Date, the market price or marketability, or the ability of the Underwriters to enforce contracts for the sale, at the initial offering prices set forth in the Official Statement, of the Bonds have been materially adversely affected, in the judgment of the Underwriters, (evidenced by a written notice to the District terminating the obligation of the Underwriters to accept delivery of and pay for the Bonds), by reason of any of the following:

(1) (x) any legislation which is (A) enacted by Congress, (B) favorably reported for passage to either House of the Congress of the United States by any Committee of such House to which such legislation has been referred for consideration, or (C) recommended to the Congress for passage by the President of the United States or the Treasury Department, but only, however, if the occurrence of any of the foregoing events is generally accepted by the municipal bond market as potentially affecting the federal tax status of the District, its property or income or the interest on its bonds or notes (including the Bonds), (y) any decision rendered by a court established under Article III of the Constitution of the United States or the Tax Court of the United States, or (z) a final order, ruling, regulation or official statement issued or made by or on behalf of the Treasury Department of the United States or the Internal Revenue Service with the purpose or effect, directly or indirectly, of imposing federal income taxation upon such interest as would be received by the holders of the Bonds, or upon such revenues or other income of the general character expected to be received by the District; provided, however, that the enactment of legislation which only diminishes the value of, as opposed to eliminating the exclusion from gross income for federal income tax purposes will not give the Underwriters the right to terminate their obligations hereunder;

(2) Legislation enacted (or resolution passed) by the Congress or a final order, ruling, regulation or official statement is issued or made by or on behalf of the Securities and Exchange Commission, or any other governmental agency having jurisdiction of the subject matter, to the effect that obligations of the general character of the Bonds are not exempt from registration under or other requirements of the Securities Act of 1933, as amended, or are not exempt from qualification under, or other requirements of, the Trust Indenture Act of 1939, as amended, or that the issuance, offering or sale of the Bonds or obligations of the general character of the Bonds, including any or all underlying arrangements, as contemplated hereby or by the Preliminary Official Statement or the Official Statement, otherwise is or would be in violation of the federal securities laws as amended and then in effect;

(3) the outbreak or escalation of hostilities or the declaration by the United States of a national emergency or war or the occurrence of any other local, national or international calamity, crisis or event relating to the effective operation of the government of or the financial community in the United States or an escalation thereof, including, without limitation, a downgrade of the sovereign debt rating of the United States by any major credit rating agency or payment default on United States Treasury obligations;

(4) the declaration of a general banking moratorium by federal, New York or California authorities, or the general suspension of trading on the New York Stock Exchange or any other national securities exchange, or any material disruption in commercial banking or securities settlement or clearing services;

(5) the imposition by the New York Stock Exchange or other national securities exchange, or any governmental authority, of any material restrictions not now in force with respect to the Bonds or obligations of the general character of the Bonds or securities generally, or the material increase of any such restrictions now in force, including those relating to the net capital requirements of, the Underwriters;

(6) the adoption of any amendment to the federal or California Constitution, decision by any federal or California court, or enactment by any federal or California legislative body materially adversely affecting (i) the District or the right of the District to receive or to pledge any of the Net Revenues, or (ii) the validity or enforceability of this Contract of Purchase, the Bonds or the Resolution;

(7) the adoption of any amendment to the California Constitution, decision by any California court, or enactment by any California legislative body adversely affecting the exemption of state or local income tax upon such interest as would be received by the holders of the Bonds, or

(8) (i) a downgrading or suspension of any rating (without regard to credit enhancement) by Moody's, S&P, or Fitch of any debt securities issued by the District, or (ii) there shall have been any official statement as to a possible downgrading (such as being placed on "credit watch" or "negative outlook" or any similar qualification) of any rating by Moody's, S&P or Fitch of any debt securities issued by the District, including the Bonds.

(b) an event occurs, or information becomes known, which, in the judgment of the Underwriters, makes untrue in any material respect any statement or information contained in the Official Statement, or has the effect that the Official Statement contains any untrue statement of material fact or omits to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

7. **Expenses.** (a) Except as set forth in paragraph (b) of this Section, the Underwriters shall be under no obligation to pay, and the District shall pay, or cause to be paid, all expenses incident to the performance of the District's obligations hereunder including, but not

limited to, the cost of word processing and reproducing, executing and delivering the Bonds to the Underwriters; the cost of preparation, printing (and/or word processing and reproducing), distribution and delivery of the Resolution; the cost of printing and distributing copies of the Preliminary Official Statement and the Official Statement in sufficient quantities for distribution in connection with the sale of the Bonds (including resales in the secondary market); the fees and disbursements of Bond Counsel; the fees and disbursements of Public Financial Management, Inc. for its services as Municipal Advisor to the District; the fees and disbursements of any other engineers, accountants, and any other experts or consultants retained in connection with the issuance of the Bonds; the fees and disbursements of the Trustee/Escrow Agent and Verification Agent; fees charged by the rating agencies for rating the Bonds; any advertising expenses; filing fees; CUSIP charges; or fees and expenses of any credit enhancement; expenses incurred by the Underwriters on behalf of the District relating to food, transportation or lodging for District staff members attending the bond pricing are to be reimbursed by the District through proceeds of the Bonds or available funds of the District (the District's obligations in regard to these expenses survive if delivery of the Bonds fails due to one of the conditions set forth in Section 3 hereof or this Contract of Purchase is terminated pursuant to Section 6 hereof) and any other expenses not specifically enumerated in paragraph (b) of this Section incurred in connection with the issuance of the Bonds.

(b) The District shall be under no obligation to pay, and the Underwriters shall pay (from the expense component of the underwriting discount), the cost of preparation of the Agreement Among Underwriters and the letter of instructions relating thereto and this Contract of Purchase; the cost of wiring funds for the payment of the purchase prices of the Bonds; the fees and expenses of DTC incurred with respect to depositing the Bonds therewith; expenses to qualify the Bonds for sale under any "Blue Sky" laws; fees to the California Debt and Investment Advisory Commission; and all other expenses incurred by the Underwriters in connection with its public offering and distribution of the Bonds not specifically enumerated in paragraph (a) of this Section, including the fees and disbursements of Underwriters' Counsel. Notwithstanding that the fees to the California Debt and Investment Advisory Commission are solely the legal obligation of the Underwriters, the District agrees to reimburse the Underwriters for such fees.

8. **Notices.** Any notice or other communication to be given to the District under this Contract of Purchase may be given by delivering the same in writing to Sacramento Municipal Utility District, at 6201 S Street, Sacramento, California 95817-1899; and any notice or other communication to be given to the Underwriters under this Contract of Purchase may be given by delivering the same in writing to Morgan Stanley & Co. LLC, 555 California Street, 21st Floor, San Francisco, CA 94104 [Attention: John Sheldon, Managing Director].

9. **Parties in Interest.** This Contract of Purchase is made solely for the benefit of the District and the Underwriters (including successors or assigns of any Underwriter) and no other person shall acquire or have any right hereunder or by virtue hereof. The term "successors and assigns" as used in this Section shall not include any purchaser of the Bonds, as such purchaser, from any of the several Underwriters.

10. **Survival of Representations and Warranties.** The representations and warranties of the District, set forth in or made pursuant to this Contract of Purchase, shall not be deemed to have been discharged, satisfied or otherwise rendered void by reason of the closing or

termination of this Contract of Purchase and regardless of any investigations or statements as to the results thereof made by or on behalf of the Underwriters and regardless of delivery of and payment for the Bonds.

11. **Counterparts.** This Contract of Purchase may be executed in several counterparts, which together shall constitute one and the same instrument.

12. **California Law Governs; Venue.** The validity, interpretation and performance of this Contract of Purchase shall be governed by the laws of the State of California. Any action or proceeding to enforce or interpret this Contract of Purchase shall be brought, commenced or prosecuted in the County of Sacramento, California.

[remainder of page intentionally left blank]

13. **Entire Agreement.** This Contract of Purchase when accepted by you in writing as heretofore specified shall constitute the entire agreement between us.

14. **Effectiveness.** This Contract of Purchase shall become effective and binding upon the respective parties hereto upon the execution of the acceptance hereof by an authorized officer of the District and shall be valid and enforceable as of the time of such acceptance.

Very truly yours,

MORGAN STANLEY & CO. LLC
BOFA SECURITIES, INC.,
BARCLAYS CAPITAL INC.
CITIGROUP GLOBAL MARKETS INC.
GOLDMAN SACHS & CO. LLC, and
J.P. MORGAN SECURITIES LLC

BY: MORGAN STANLEY & CO. LLC, as Senior Underwriter

____
[John Sheldon
Managing Director]

Accepted: [SALE DATE]

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By:________________________________
Russell Mills
Treasurer

[Signature page to Contract of Purchase]

Exhibit A

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Electric Revenue Refunding Bonds, 2022 Series J

Maturity (August 15)	Principal Amount	Interest Rate	Yield	Price

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit B to the Contract of Purchase
(Official Statement)

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit C to the Contract of Purchase
(Opinion of General Counsel to the
Sacramento Municipal Utility District)

[CLOSING DATE]

Morgan Stanley & Co. LLC
555 California St., Fl. 21,
San Francisco, CA 94104

Re: Sacramento Municipal Utility District
<u>$[PAR] Electric Revenue Refunding Bonds, 2022 Series J</u>

Ladies and Gentlemen:

This opinion is being delivered pursuant to Paragraph 3(d)(6) of the Contract of Purchase (the "Contract of Purchase"), dated [SALE DATE], between Morgan Stanley & Co. LLC, as Senior Managing Underwriter named therein (the "Senior Underwriter"), and the Sacramento Municipal Utility District (the "District") relating to the above-captioned bonds (the "Bonds").

As counsel to the District, I have reviewed (i) Resolution No. 6649 of the District, adopted on January 7, 1971, as amended and supplemented to date, including as amended and supplemented by Resolution No. [RESO NO.], adopted on [RESO DATE] (as so amended and supplemented, the "Resolution"); (ii) the Continuing Disclosure Agreement, dated the date hereof (the "Undertaking"), between the District and U.S. Bank Trust Company, National Association, as trustee (in such capacity, the "Trustee"); (iii) the Official Statement of the District, dated [SALE DATE] (the "Official Statement") (iv) the escrow agreement, dated the date hereof (the "Escrow Agreement"), between the District and U.S. Bank Trust Company, National Association, as escrow agent (in such capacity, the "Escrow Agent"), and (v) such other documents, opinions and matters to the extent I deemed necessary to provide the opinions set forth herein.

The opinions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. I have assumed the genuineness of all documents and signatures presented to me (whether as originals or as copies) and the due and legal execution and delivery by, and validity against, any parties other than the District. I have not undertaken to verify independently, and have assumed, the accuracy of the factual matters represented, warranted or certified in the documents referred to in the second paragraph hereof. I have further assumed compliance with all covenants and agreements contained in such documents.

I call attention to the fact that the rights and obligations under the Resolution, the Escrow Agreement, the Undertaking, and the Contract of Purchase may be subject to bankruptcy, insolvency, reorganization, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, and to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. I express no opinion with respect to any indemnification, contribution, choice of law, choice of forum or waiver provisions contained therein.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, I am of the opinion that:

1. The District is a political subdivision of the State of California duly organized and validly existing under the Act, as amended, and has full legal right, power and authority to execute and deliver (or adopt, as the case may be), and to perform its obligations under, the Resolution, the Escrow Agreement, the Undertaking and the Contract of Purchase.

2. The Contract of Purchase, the Escrow Agreement, and the Undertaking have been duly authorized, executed and delivered by the District, and, assuming due authorization, execution and delivery by each of the parties thereto other than the District, constitute the legal, valid and binding obligations of the District, enforceable against the District in accordance with their respective terms.

3. The District is not in breach of or default under any existing constitutional provision, applicable law or administrative regulation of the State of California or the United States or any applicable judgment or decree or any loan agreement, indenture, bond, note, resolution, agreement or other instrument known to me after reasonable inquiry to which the District is a party or to which the District or any of its property or assets is otherwise subject which would have a material adverse effect on the financial condition or operations of the District, and no event has occurred and is continuing which with the passage of time or the giving of notice, or both, would constitute a default or event of default under any such instrument which would have a material adverse effect on the financial condition or operations of the District; and the execution and delivery of the Bonds, the Escrow Agreement, the Undertaking and the Contract of Purchase and the adoption of the Resolution, and compliance with any existing constitutional provision, law, administrative regulation, judgment, decree, loan agreement, indenture, bond, note, resolution, agreement or other instrument known to me after reasonable inquiry to which the District is a party or to which the District or any of its property or assets is otherwise subject will not, as of the date hereof, conflict with or constitute a breach of or default under any such instrument which would have a material adverse effect on the financial condition or operations of the District, nor will any such execution, delivery, adoption or compliance result in the creation or imposition of any lien, charge or other security interest or encumbrance of any nature whatsoever upon any of the property or assets of the District or under the terms of any such law, regulation or instrument, except as expressly provided by the Bonds and the Resolution.

4. The statements contained in the Official Statement which purport to describe certain provisions of the Bonds, the Escrow Agreement, the Undertaking, and the Resolution present a fair and accurate summary of such provisions for the purpose of use in the Official Statement.

5. Except as described or referred to in the Preliminary Official Statement and the Official Statement, as of the date hereof, there is no action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, public board or body, pending or, to the best of my knowledge, threatened against the District affecting the corporate existence of the District or the titles of its officers to their respective offices, or affecting or seeking to prohibit, restrain or enjoin the sale, issuance or delivery of the Bonds or the collection of the Revenues (as defined in the Resolution) or the Net Revenues (as defined in the Resolution) pledged or to be pledged to pay the principal of and interest on the Bonds or contesting or affecting as to the District the validity or enforceability of the Act, the Bonds, the Resolution, the Escrow Agreement, the Contract of Purchase or the Undertaking, or contesting the tax exempt status of interest on the Bonds, or which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution facilities, or contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or any supplement or amendment thereto, or contesting the powers of the District or any authority for the issuance of the Bonds, the adoption of the Resolution, or the execution and delivery by the District of the Contract of Purchase, the Escrow Agreement, or the Undertaking, nor, to the best of my knowledge, is there any basis for any such action, suit, proceeding, inquiry or investigation wherein an unfavorable decision, ruling or finding would materially adversely affect the validity or enforceability of the Act or the authorization, execution, delivery or performance by the District of the Bonds, the Resolution, the Escrow Agreement, the Undertaking, or the Contract of Purchase.

6. Based upon my review of the Preliminary Official Statement and the Official Statement as General Counsel to the District and without having undertaken to determine independently the accuracy, completeness or fairness of the statements contained in the Preliminary Official Statement and the Official Statement (except as specifically set forth in paragraph 4 hereof), I have no reason to believe that the statements contained in the Preliminary Official Statement (except for information relating Cede & Co., DTC or the operation of the book-entry system, the Appendices (except Appendix A) to the Preliminary Official Statement, and other financial and statistical data included therein, as to all of which I express no view) as of its date and as of the date of the Contract of Purchase contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading and the Official Statement (except for information relating Cede & Co., DTC or the operation of the book-entry system, the Appendices (except Appendix A) to the Official Statement, and other financial and statistical data included therein, as to all of which I express no view) (A) as of the date of the Official Statement contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading or (B) as of the date hereof contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading.

For purposes of the opinions expressed herein, I have assumed that an agreement or other document is "material" to the District if it involves amounts in excess of $10,000,000 and that a matter would result in a "material adverse change" to the District if the financial consequences involved would exceed $10,000,000.

I understand that you are relying upon the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel, with respect to the validity of the Bonds and the exclusion of interest on the Bonds from gross income for federal income tax purposes and the Bonds for purposes of State of California income taxation and, accordingly, render no opinion with respect thereto.

Very truly yours,

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit D to the Contract of Purchase

CERTIFICATE

The Sacramento Municipal Utility District (the "District"), hereby certifies that:

(1) The representations and warranties of the District (excluding those representations and warranties contained in Section 2(e) and Section 2(k) of the hereinafter defined Contract of Purchase) contained in the Contract of Purchase, dated [SALE DATE], between the District and the Underwriters named therein (the "Contract of Purchase") with respect to the sale by the District of $[PAR] aggregate principal amount of its Electric Revenue Refunding Bonds, 2022 Series J (the "Bonds"), are true and correct on and as of the Closing Date as if made on the Closing Date.

(2) All approvals, consents, authorizations, licenses and permits, elections and orders of or filings or registrations with any governmental authority, legislative body, board, agency or commission having jurisdiction which would constitute a condition precedent to, or the absence of which would materially adversely affect, the due performance by the District of its obligations in connection with the issuance of the Bonds under the Resolution, the Escrow Agreement, the Undertaking, and the Contract of Purchase have been duly obtained or made and are in full force and effect, except for such approvals, consents and orders as may be required under the "Blue Sky" or other securities laws of any state in connection with the offering and sale of the Bonds; and, except as disclosed in the Preliminary Official Statement and the Official Statement, all authorizations, approvals, licenses, permits, consents and orders of any governmental authority, board, agency or commission having jurisdiction in the matters which are required for the due authorization of, which would constitute a condition precedent to, or the absence of which would materially adversely affect the due performance by the District of its respective obligations under, the Contract of Purchase, the Escrow Agreement, the Undertaking, the Bonds or the Resolution, or which are necessary to permit the District to carry out the transactions contemplated by the Preliminary Official Statement and the Official Statement to acquire, construct, operate, maintain, improve and finance the Electric System have been duly obtained or, where required for future performance, are expected to be obtained.

(3) Except as disclosed in the Preliminary Official Statement and the Official Statement, no litigation, action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, regulatory agency, public board or body, is pending or, to the best of knowledge of the officer of the District executing this Contract of Purchase after due investigation, threatened against the District, in any way affecting the corporate existence of the District or the titles of its officers to their respective offices, or affecting or seeking to prohibit, restrain or enjoin the sale, issuance or delivery of any of the Bonds or the collection of the Revenues (as defined in the Resolution) or the Net Revenues (as defined in the Resolution) pledged or to be pledged to pay the principal of and interest on the Bonds, or in any way contesting or affecting as to the District the validity or enforceability of the Act, the Bonds, the Resolution, the

Contract of Purchase, the Escrow Agreement, the Undertaking, or any action of the District contemplated by any of said documents, or contesting the tax exempt status of interest on the Bonds, or which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution system, or contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or any supplement or amendment thereto, or contesting the powers of the District or any authority for the issuance of the Bonds, the adoption of the Resolution, or the execution and delivery by the District of the Contract of Purchase, or the Undertaking, nor, to the best of my knowledge, is there any basis for any such action, suit, proceeding, inquiry or investigation wherein an unfavorable decision, ruling or finding would materially adversely affect the validity or enforceability of the Act of the authorization, execution, delivery or performance by the District of the Bonds, the Resolution, the Escrow Agreement, the Undertaking, or the Contract of Purchase, or any action of the District contemplated by any of said documents, or which would adversely affect the exclusion from gross income for federal income tax purposes of interest paid on the Bonds, nor to the knowledge of the officer of the District executing this Contract of Purchase is there any basis therefor.

(4) No event affecting the District has occurred since the date of the Official Statement which should be disclosed in the Official Statement so that the Official Statement will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, and which has not been disclosed in a supplement or amendment to the Official Statement.

(5) The District has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to the date hereof pursuant to the Contract of Purchase with respect to the issuance of the Bonds.

(6) All capitalized terms employed herein which are not otherwise defined shall have the same meanings as in the Contract of Purchase.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By: ______________________________
Name:
Title:

Dated: [CLOSING DATE]

Exhibit E to the Contract of Purchase
(Supplemental Opinion of Bond Counsel)

[CLOSING DATE]

Morgan Stanley & Co. LLC
555 California St., Fl. 21,
San Francisco, CA 94104

Sacramento Municipal Utility District
Electric Revenue Refunding Bonds, 2022 Series J
(Supplemental Opinion)

Ladies and Gentlemen:

This letter is addressed to you, as Senior Underwriter, pursuant to Section 3(d)(5) of the Contract of Purchase, dated [SALE DATE] (the "Purchase Contract"), between you and the other underwriters named therein and the Sacramento Municipal Utility District ("SMUD"), providing for the purchase of $[PAR] principal amount of Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2022 Series J (the "Bonds"). The Bonds are being issued pursuant to Resolution No. 6649 of the Board of Directors of SMUD, adopted January 7, 1971, as supplemented and amended by later resolutions of said Board of Directors (as so supplemented and amended, the "Resolution"), including Resolution No. [RESO NO.], adopted on [RESO DATE]. Capitalized terms not otherwise defined herein shall have the meanings ascribed thereto in the Resolution or, if not defined in the Resolution, in the Purchase Contract.

In connection with our role as Bond Counsel to SMUD, we have reviewed the Purchase Contract; the Resolution; the Tax Certificate, dated the date hereof (the "Tax Certificate"), executed by SMUD; certain portions of the posted preliminary official statement of SMUD, dated [POS DATE], with respect to the Bonds (the "Preliminary Official Statement") and of the posted official statement of SMUD, dated [SALE DATE], with respect to the Bonds (the "Official Statement"); opinions of counsel to SMUD and the Trustee; certificates of SMUD, the Trustee and others; and such other documents, opinions and matters to the extent we deemed necessary to provide the opinions or conclusions set forth herein.

The opinions and conclusions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. Such opinions or conclusions may be affected by actions taken or omitted or events occurring after the original delivery of the Bonds on the date hereof. We have not undertaken to determine, or to inform any person, whether any such actions are taken or omitted or events do occur or any other matters come to our attention after the original delivery of the Bonds on the date hereof. We have assumed the genuineness of all documents and signatures provided to us and the due and legal execution and delivery thereof by, and validity against, any parties other than SMUD. We have assumed, without undertaking to verify, the accuracy of the factual matters represented, warranted or certified in the documents, and of the legal conclusions contained in the opinions, referred to in the second paragraph hereof. We have further assumed compliance with all covenants and agreements contained in such documents. In addition, we call attention to the fact that the rights and obligations under the Bonds, the Resolution, the Tax Certificate and the Purchase Contract and their enforceability may be subject to bankruptcy, insolvency, reorganization, receivership, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. We express no opinion with respect to any indemnification, contribution, liquidated damages, penalty (including any remedy deemed to constitute or having the effect of a penalty), right of set-off, arbitration, judicial reference, choice of law, choice of forum, choice of venue, non-exclusivity of remedies, waiver or severability provisions contained in the foregoing documents, nor do we express any opinions with respect to the state or quality of title to or interest in any of the assets described in or as subject to the lien of the Resolution or the accuracy or sufficiency of the description contained therein of, or the remedies available to enforce liens on, any such assets.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, we are of the following opinions or conclusions:

1. The Bonds are not subject to the registration requirements of the Securities Act of 1933, as amended, and the Resolution is exempt from qualification pursuant to the Trust Indenture Act of 1939, as amended.

2. The Purchase Contract has been duly executed and delivered by, and is a valid and binding agreement of, SMUD.

3. The statements contained in the Official Statement under the captions "THE 2022 SERIES J BONDS" (excluding information relating to book-entry or The Depository Trust Company), "SECURITY FOR THE BONDS" and "TAX MATTERS" and in APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE RESOLUTION" and APPENDIX E – "PROPOSED FORM OF LEGAL OPINION FOR 2022 SERIES J BONDS," excluding any material that may be treated as included under such captions by cross-reference or reference to other documents or sources, insofar as such statements expressly summarize certain provisions of the Resolution or set out the form and content of our final legal opinion as Bond Counsel to SMUD concerning the validity of the Bonds and certain other matters, dated the date hereof and addressed to SMUD, are accurate in all material respects.

4. We are not passing upon and do not assume any responsibility for the accuracy, completeness or fairness of any of the statements contained in the Preliminary Official Statement or (except as explicitly stated in paragraph 3 above) in the Official Statement and make no representation that we have independently verified the accuracy, completeness or fairness of any such statements. In our capacity as Bond Counsel to SMUD in connection with issuance of the Bonds, we participated in conferences with your representatives, your counsel, representatives of SMUD, its counsel, accountants, and others, during which the contents of the Preliminary Official Statement or the Official Statement and related matters were discussed. Based on our participation in the above-mentioned conferences (which, with respect to the Preliminary Official

Statement, did not extend beyond the date of the Purchase Contract, and with respect to the Official Statement, did not extend beyond its date), and in reliance thereon, on oral and written statements and representations of SMUD and others and on the records, documents, certificates, opinions and matters herein mentioned, subject to the limitations on our role as Bond Counsel to SMUD, we advise you as a matter of fact and not opinion that (a) no facts had come to the attention of the attorneys in our firm rendering legal services with respect to the Preliminary Official Statement which caused us to believe as of the date of the Purchase Contract, based on the documents, drafts and facts in existence and reviewed as of that date, that the Preliminary Official Statement contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading (except any information marked as preliminary or subject to change, any information permitted to be omitted by Securities and Exchange Commission Rule 15c2-12 or otherwise left blank and any other differences with the information in the Official Statement), and (b) no facts had come to the attention of the attorneys in our firm rendering legal services with respect to the Official Statement which caused us to believe as of the date of the Official Statement and as of the date hereof that the Official Statement contained or contains any untrue statement of a material fact or omitted or omits to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that, we expressly exclude from the scope of this paragraph and express no view or opinion, with respect to both the Preliminary Official Statement and the Official Statement, about any CUSIP numbers, financial, accounting, statistical or economic, engineering or demographic data or forecasts, numbers, charts, tables, graphs, estimates, projections, assumptions or expressions of opinion, any statements about compliance with prior continuing disclosure undertakings, any management discussion and analysis, any information about Cede & Co., The Depository Trust Company or book-entry, ratings, rating agencies, financial advisors, swap advisors, underwriters, underwriting and the information contained in Appendices B and C included or referred to therein or omitted therefrom. No responsibility is undertaken or view expressed with respect to any other disclosure document, materials or activity, or as to any information from another document or source referred to by or incorporated by reference in the Preliminary Official Statement or the Official Statement.

This letter is furnished by us as Bond Counsel to SMUD. No attorney-client relationship has existed or exists between our firm and you in connection with the Bonds or by virtue of this letter. We disclaim any obligation to update this letter. This letter is delivered to you as Senior Underwriter of the Bonds, is solely for your benefit as such Senior Underwriter in connection with the original issuance of the Bonds on the date hereof, and is not to be used, circulated, quoted or otherwise referred to or relied upon for any other purpose or by any other person. This letter is not intended to, and may not, be relied upon by owners of Bonds or by any other party to whom it is not specifically addressed.

Very truly yours,

Exhibit F to the Contract of Purchase

(Form of Issue Price Certificate Of The Senior Underwriter Regarding Offering Prices)

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Electric Revenue Refunding Bonds, 2022 Series J

The undersigned, on behalf of Morgan Stanley & Co. LLC, as representative (the "Representative") of itself, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC (together, the "Underwriting Group"), hereby certifies, on its own behalf and on behalf of the other members of the Underwriting Group on the basis of representations and warranties set forth in the agreement among underwriters, as set forth below with respect to the sale and issuance of the above-captioned obligations (the "Bonds).

1. ***Sale of the [General Rule Maturities][Bonds]***. As of the date of this Certificate, for each Maturity of the [General Rule Maturities][Bonds], the first price at which at least 10% of such Maturity was sold to the Public is the respective price listed in Schedule A.

2. [***Initial Offering Price of the Hold-the-Offering-Price-Maturities***.

(a) The Underwriting Group offered the Hold-the-Offering-Price Maturities to the Public for purchase at the respective initial offering prices listed in Schedule A (the "Initial Offering Prices") on or before the Sale Date. A copy of the pricing wire or equivalent communication for the Bonds is attached to this Certificate as Schedule B.

(b) As set forth in the Bond Purchase Agreement for the Bonds, the Representative has agreed in writing that, (i) for each Maturity of the Hold-the-Offering-Price Maturities, it would neither offer nor sell any of the unsold Bonds of such Maturity to any person at a price that is higher than the Initial Offering Price for such Maturity during the Holding Period for such Maturity (the "hold-the-offering-price rule"), and (ii) unsold Bonds of the Hold-the-Offering-Price Maturities shall be retained by the Representative and not allocated to any of the other Underwriters. Pursuant to such agreement, the Representative has not offered or sold any unsold Bonds of any Maturity of the Hold-the-Offering-Price Maturities at a price that is higher than the respective Initial Offering Price for that Maturity of the Bonds during the Holding Period.]

3. ***Defined Terms***.

(a) [*General Rule Maturities* means those Maturities of the Bonds listed in Schedule A hereto as the "General Rule Maturities."]

(b) [*Hold-the-Offering-Price Maturities* means those Maturities of the Bonds listed in Schedule A hereto as the "Hold-the-Offering-Price Maturities."]

(c) [*Holding Period* means, with respect to a Hold-the-Offering-Price Maturity, the period starting on the Sale Date and ending on the earlier of (i) the close of the fifth business day after the Sale Date, or (ii) the date on which the Underwriters have sold at least 10% of such Hold-the-Offering-Price Maturity to the Public at prices that are no higher than the Initial Offering Price for such Hold-the-Offering-Price Maturity.]

(d) *Issuer* means Sacramento Municipal Utility District.

(e) *Maturity* means Bonds with the same credit and payment terms. Bonds with different maturity dates, or Bonds with the same maturity date but different stated interest rates, are treated as separate maturities.

(f) *Public* means any person (including an individual, trust, estate, partnership, association, company, or corporation) other than an Underwriter or a Related Party (as such terms are defined below) to an Underwriter.

(g) A purchaser of any of the Bonds is a *Related Party* to any Underwriter if the Underwriter and the purchaser are subject, directly or indirectly, to (i) at least 50% common ownership of the voting power or the total value of their stock, if both entities are corporations (including direct ownership by one corporation of another), (ii) more than 50% common ownership of their capital interests or profits interests, if both entities are partnerships (including direct ownership by one partnership of another), or (iii) more than 50% common ownership of the value of the outstanding stock of the corporation or the capital interests or profit interests of the partnership, as applicable, if one entity is a corporation and the other entity is a partnership (including direct ownership of the applicable stock or interests by one entity of the other).

(h) *Sale Date* means the first day on which there is a binding contract in writing for the sale of a Maturity of the Bonds. The Sale Date of the Bonds is [SALE DATE].

(i) *Underwriter* means (i) any person that agrees pursuant to a written contract with the Issuer (or with the lead underwriter to form an underwriting syndicate) to participate in the initial sale of the Bonds to the Public, and (ii) any person that agrees pursuant to a written contract directly or indirectly with a person described in clause (i) of this paragraph to participate in the initial sale of the Bonds to the Public (including a member of a selling group or a party to a retail distribution agreement participating in the initial sale of the Bonds to the Public).

The representations set forth in this certificate are limited to factual matters only, and as it relates to the actions of the other Underwriters, such representations are made to the best of the Representative's knowledge based on the Representative's records. Nothing in this certificate represents the Representative's interpretation of any laws, including specifically Sections 103 and 148 of the Internal Revenue Code of 1986, as amended, and the Treasury Regulations thereunder. The undersigned understands that the foregoing information will be relied upon by the Issuer with respect to certain of the representations set forth in the Tax Certificate and with respect to compliance with the federal income tax rules affecting the Bonds, and by Orrick, Herrington & Sutcliffe LLP, Bond Counsel to the Issuer, in connection with rendering its opinion that the interest on the Bonds is excluded from gross income for federal income tax purposes, the preparation of the Internal Revenue Service Form 8038-G, and other federal income tax advice that it may give to the Issuer from time to time relating to the Bonds.

Dated: [CLOSING DATE

Morgan Stanley & Co. LLC,
as representative of the Underwriting Group

By:____
Name:______________________________________

Schedule A

Sale Prices

$[PAR] Electric Revenue Refunding Bonds, 2022 Series J

Maturity (August 15)	Principal Amount	Interest Rate	Yield	Price	Hold-the-Price Maturities	General Rule Maturities

Attachment F
to Resolution No. 22-05-11

PRELIMINARY OFFICIAL STATEMENT DATED _________, 2022

NEW ISSUE - FULL BOOK-ENTRY **Ratings: See "RATINGS" herein**

In the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD, based upon an analysis of existing laws, regulations, rulings and court decisions and, assuming, among other matters, the accuracy of certain representations and compliance with certain covenants, interest on the 2022 Series J Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 and is exempt from State of California personal income taxes. In the further opinion of Bond Counsel, interest on the 2022 Series J Bonds is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel expresses no opinion regarding any other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Series J Bonds. See "TAX MATTERS."

$[PRINCIPAL AMOUNT]*
ELECTRIC REVENUE REFUNDING BONDS, 2022 SERIES J

Dated: Date of Delivery **Due: August 15, as shown on the inside cover**

The Electric Revenue Refunding Bonds, 2022 Series J (the "2022 Series J Bonds") will be issued pursuant to the provisions of Resolution No. 6649 of the Sacramento Municipal Utility District ("SMUD"), as amended and supplemented, and will be payable from the Net Revenues of the Electric System of SMUD, as described herein. The 2022 Series J Bonds are being issued to (i) refund certain of SMUD's outstanding Bonds (as defined herein) and (ii) pay certain costs associated with the issuance of the 2022 Series J Bonds. See "PLAN OF FINANCE."

The 2022 Series J Bonds will mature in the years and amounts as shown on the inside cover. Interest on the 2022 Series J Bonds will accrue at the rates set forth on the inside cover and be payable on February 15, 2023, and semiannually thereafter on each February 15 and August 15.

The 2022 Series J Bonds are not subject to redemption prior to maturity.

The 2022 Series J Bonds will be issued in fully registered form and, when issued, will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("DTC"). DTC will act as securities depository (the "Securities Depository") for the 2022 Series J Bonds. Individual purchases of interests in the 2022 Series J Bonds may be made in book-entry form only, in the principal amount of $5,000 or any integral multiple thereof. Purchasers of such interests will not receive certificates representing their interests in the 2022 Series J Bonds. Principal and interest are payable directly to the Securities Depository by U.S. Bank Trust Company, National Association, Trustee and Paying Agent. Upon receipt of payments of principal and interest, the Securities Depository will in turn remit such principal and interest to the Securities Depository's Direct Participants (as such term is herein defined) for subsequent disbursement to the purchasers of interests in the 2022 Series J Bonds, as described herein. See APPENDIX C – "BOOK-ENTRY SYSTEM."

The principal of and interest on the 2022 Series J Bonds, together with the debt service on other Parity Bonds (as defined herein), are payable exclusively from and secured by a pledge of the Net Revenues of the Electric System of SMUD. Neither the credit nor the taxing power of SMUD or the State of California is pledged to the payment of the 2022 Series J Bonds.

The information presented on this cover page is for general reference only and is qualified in its entirety by reference to the entire Official Statement and the documents summarized and described herein.

The 2022 Series J Bonds are offered when, as and if issued and received by the Underwriters, subject to the approval of the validity of the 2022 Series J Bonds and certain other legal matters by Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD. Certain legal matters will be passed on for the Underwriters by their counsel, Nixon Peabody LLP, San Francisco, California. It is expected that the 2022 Series J Bonds will be available for delivery through the facilities of DTC on or about _______, 2022.

Morgan Stanley

BofA Securities	**Barclays**	**Citigroup**
Goldman Sachs & Co. LLC		**J.P. Morgan**

_________, 2022

* Preliminary, subject to change.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
Sacramento, California

$[PRINCIPAL AMOUNT]*
ELECTRIC REVENUE REFUNDING BONDS, 2022 SERIES J

MATURITY SCHEDULE*

Due (August 15)	Amount	Interest Rate	Yield	CUSIP†
	$	%	%	

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* Preliminary, subject to change.
† CUSIP® is a registered trademark of the American Bankers Association. CUSIP® data herein is provided by CUSIP Global Services (CGS), which is managed on behalf of the American Bankers Association by FactSet Research Systems Inc. This data is not intended to create a database and does not serve in any way as a substitute for the CGS database. CUSIP® numbers have been assigned by an independent company not affiliated with SMUD or the Underwriters and are included solely for the convenience of the registered owners of the applicable 2022 Series J Bonds. Neither SMUD nor the Underwriters are responsible for the selection or uses of these CUSIP® numbers, and no representation is made as to their correctness on the applicable 2022 Series J Bonds or as included herein. The CUSIP® number for a specific maturity is subject to being changed after the execution and delivery of the 2022 Series J Bonds as a result of various subsequent actions including, but not limited to, a refunding in whole or in part or as a result of the procurement of secondary market portfolio insurance or other similar enhancement by investors that is applicable to all or a portion of certain maturities of the 2022 Series J Bonds.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
Sacramento, California

BOARD OF DIRECTORS

Brandon Rose, President
Heidi Sanborn, Vice President
Nancy Bui-Thompson
Gregg Fishman
Rosanna Herber
Rob Kerth
Dave Tamayo

OFFICERS AND EXECUTIVES

Paul Lau, Chief Executive Officer and General Manager
Brandy Bolden, Chief Customer Officer
Suresh Kotha, Chief Information Officer
Jose Bodipo-Memba, Interim Chief Diversity Officer[1]
Scott Martin, Chief Strategy Officer
Laura Lewis, Chief Legal and Government Affairs Officer and General Counsel
Frankie McDermott, Chief Operating Officer
Lora Anguay, Chief Zero Carbon Officer
Jennifer Davidson, Chief Financial Officer
Farres Everly, Director, Communications, Marketing and Community Relations
Russell Mills, Treasurer
Lisa Limcaco, Controller

SPECIAL SERVICES

ORRICK, HERRINGTON & SUTCLIFFE LLP
Bond Counsel

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION
Trustee and Paying Agent

BAKER TILLY VIRCHOW KRAUSE, LLP, Madison, Wisconsin
Independent Accountants

PFM FINANCIAL ADVISORS LLC, Philadelphia, Pennsylvania
Municipal Advisor

SWAP FINANCIAL GROUP, LLC
Swap Advisor

[________]
Verification Agent

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[1] The previous Chief Diversity Officer, Gary King, retired as of March 31, 2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – INTRODUCTION – Independent Governance – *Chief Diversity Officer*."

No dealer, broker, salesperson or other person has been authorized by SMUD or the Underwriters to give any information or to make any representations with respect to the 2022 Series J Bonds other than those contained in this Official Statement and, if given or made, such information or representations must not be relied upon as having been authorized by any of the foregoing. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of the 2022 Series J Bonds by any person in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale. The information set forth herein has been obtained from SMUD and other sources which are believed to be reliable, but it is not guaranteed as to accuracy or completeness by, and is not to be construed as a representation of, the Underwriters. The information and expressions of opinion stated herein are subject to change without notice. The delivery of this Official Statement shall not, under any circumstances, create any implication that there has been no change in the affairs of SMUD since the date hereof. The Underwriters have provided the following sentence for inclusion in this Official Statement: The Underwriters have reviewed the information in this Official Statement in accordance with and as part of their responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but the Underwriters do not guarantee the accuracy or completeness of such information.

The 2022 Series J Bonds have not been registered under the Securities Act of 1933, as amended, in reliance upon an exemption from the registration requirements contained in such Act. The 2022 Series J Bonds have not been registered or qualified under the securities laws of any state.

IN CONNECTION WITH THE OFFERING OF THE 2022 SERIES J BONDS THE UNDERWRITERS MAY OVERALLOT OR EFFECT TRANSACTIONS WHICH STABILIZE OR MAINTAIN THE MARKET PRICES OF SUCH BONDS AT LEVELS ABOVE THOSE THAT MIGHT OTHERWISE PREVAIL ON THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME. THE UNDERWRITERS MAY OFFER AND SELL THE 2022 SERIES J BONDS TO CERTAIN DEALERS AND OTHERS AT PRICES LOWER THAN THE PUBLIC OFFERING PRICES SET FORTH ON THE INSIDE COVER PAGE HEREOF AND SAID PUBLIC OFFERING PRICES MAY BE CHANGED FROM TIME TO TIME BY THE UNDERWRITERS.

CAUTIONARY STATEMENTS REGARDING FORWARD-LOOKING STATEMENTS IN THIS OFFICIAL STATEMENT

Certain statements included or incorporated by reference in this Official Statement constitute "forward-looking statements." Such statements generally are identifiable by the terminology used, such as "plan," "expect," "estimate," "budget" or other similar words.

The achievement of certain results or other expectations contained in such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results, performance or achievements described to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. SMUD does not plan to issue any updates or revisions to those forward-looking statements if or when its expectations or events, conditions or circumstances on which such statements are based occur.

This Official Statement, including any supplement or amendment hereto, is intended to be deposited with the Municipal Securities Rulemaking Board through the Electronic Municipal Market Access website. SMUD maintains a website. However, the information presented therein is not part of this Official Statement and should not be relied upon in making investment decisions with respect to the 2022 Series J Bonds. The references to internet websites in this Official Statement are shown for reference and convenience only; unless explicitly stated to the contrary, the information contained within the websites is not incorporated herein by reference and does not constitute part of this Official Statement.

TABLE OF CONTENTS

OFFICIAL STATEMENT

RELATING TO

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PRINCIPAL AMOUNT]*
ELECTRIC REVENUE REFUNDING BONDS, 2022 SERIES J

INTRODUCTION

This Official Statement, including the cover page and Appendices attached hereto, describes the Sacramento Municipal Utility District ("SMUD"), a political subdivision of the State of California (the "State"), and its $[PRINCIPAL AMOUNT]* Electric Revenue Refunding Bonds, 2022 Series J (the "2022 Series J Bonds"), in connection with the sale by SMUD of the 2022 Series J Bonds. The 2022 Series J Bonds are being issued to (i) refund certain of SMUD's outstanding Bonds (as defined herein) (the "Refunded Bonds") and (ii) pay certain costs associated with the issuance of the 2022 Series J Bonds. See "PLAN OF FINANCE."

The 2022 Series J Bonds are part of an Electric Revenue Bond authorization of SMUD and are issued pursuant to Resolution No. 6649 (the "Master Resolution") adopted in 1971, as amended and supplemented, and applicable California law, including Article 6a of Chapter 6 of the Municipal Utility District Act (Public Utilities Code Sections 12850 to 12860) (the "Act"), the Revenue Bond Law of 1941 (Government Code Section 54300 *et seq.*) and Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (Government Code Section 53580 *et seq.*). The issuance of the 2022 Series J Bonds was authorized on May 19, 2022, by the Board of Directors of SMUD by a Sixty-Fifth Supplemental Resolution (the "Sixty-Fifth Supplemental Resolution") supplemental to the Master Resolution. The Master Resolution and all supplemental resolutions, including the Sixty-Fifth Supplemental Resolution, are collectively referred to herein as the "Resolution." See APPENDIX D — "SUMMARY OF CERTAIN PROVISIONS OF THE RESOLUTION."

The purchasers of the 2022 Series J Bonds, by virtue of their purchase of the 2022 Series J Bonds, will consent to certain amendments to the Resolution. See "SECURITY FOR THE BONDS – Consent to Amendments to the Resolution."

The 2022 Series J Bonds and other bonds issued on a parity therewith pursuant to the Resolution are collectively referred to herein as the "Bonds." The Bonds, together with other Parity Bonds, are payable solely from the Net Revenues of the Electric System. See "SECURITY FOR THE BONDS." As of May 1, 2022, Bonds in the aggregate principal amount of $1,966,925,000 were outstanding under the Resolution. Immediately following the issuance of the 2022 Series J Bonds and the refunding of the Refunded Bonds, Bonds in the aggregate principal amount of $[_________]* will be outstanding under the Resolution.

Although the Resolution establishes an "Electric Revenue Bond Reserve Fund" (the "Reserve Fund"), the Reserve Fund does *not* secure and will *not* be available to pay debt service on the 2022 Series J Bonds. The Reserve Fund secures all Bonds issued prior to January 1, 2004 that are currently outstanding (and not otherwise deemed to be paid and discharged under the Resolution) and may secure additional Bonds issued in the future.

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* Preliminary, subject to change.

U.S. Bank Trust Company, National Association serves as trustee and paying agent under the Resolution (the "Trustee").

From time to time, SMUD issues Subordinated Electric Revenue Bonds (the "Subordinated Bonds") pursuant to Resolution No. 85-11-1 of SMUD, adopted on November 7, 1985, as amended and supplemented (the "Subordinate Resolution"). As of May 1, 2022, Subordinated Bonds in the aggregate principal amount of $200,000,000 were outstanding. The Subordinated Bonds are payable solely from the Net Subordinated Revenues of the Electric System and are subordinate in right of payment to the prior payment of principal of and interest on the Bonds (including the 2022 Series J Bonds).

SMUD also issues commercial paper notes (the "Notes") from time to time. As of May 1, 2022, no Notes were outstanding. Currently, Notes in the aggregate principal amount of $300,000,000 may be outstanding at any one time, but SMUD reserves the right to increase or decrease the aggregate principal amount of the Notes that may be outstanding at any one time in the future. The Notes are secured by letters of credit issued by commercial banks. The Notes (and SMUD's obligations to repay drawings under the letters of credit) are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Bonds (including the 2022 Series J Bonds) and the Subordinated Bonds. Drawings under the letters of credit, to the extent not repaid immediately from the proceeds of commercial paper or other available SMUD funds, are repayable with interest over a period of five years. The letters of credit currently expire in February and August of 2025.

SMUD also entered into a revolving credit agreement with a commercial bank and issued its taxable and tax-exempt revolving notes thereunder (collectively, the "Revolving Credit Facility") in February 2022. As of May 1, 2022, no principal was outstanding under the Revolving Credit Facility. Currently, the aggregate principal amount that can be outstanding under the Revolving Credit Facility at any one time is limited to $100,000,000. However, SMUD reserves the right to increase or decrease the aggregate principal amount that can be outstanding at any one time under the Revolving Credit Facility in the future. SMUD's payment obligations under the Revolving Credit Facility are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Bonds (including the 2022 Series J Bonds) and the Subordinated Bonds. The current term of the Revolving Credit Facility expires in February 2026.

SMUD is responsible for the acquisition, generation, transmission and distribution of electric power to its service area, which includes most of Sacramento County and small portions of Placer and Yolo counties. For the year ended December 31, 2021, SMUD served a population of approximately 1.5 million with a total annual retail load of approximately 10,453 million kilowatt hours ("kWh"). SMUD owns and operates an electric system which, as of March 31, 2022, included generating facilities owned and operated by SMUD with an aggregate generating capacity of approximately 809 megawatts ("MW"), local gas-fired plants owned and operated by a joint powers authority and managed by SMUD with an aggregate generating capacity of approximately 1,081 MW, over which SMUD has exclusive control of dispatch, and purchased power with an aggregate generating capacity of approximately 1,366 MW and transmission and distribution facilities. SMUD's power requirements exceed its generating capacity and thus SMUD has agreements with others (including the Local Gas-Fired Plants as defined in APPENDIX A) for the purchase of a portion of its power requirements. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – POWER SUPPLY AND TRANSMISSION – Power Supply Resources." Continuing development of SMUD's business strategy in response to changing environmental and regulatory requirements has had, and is expected to continue to have, a major effect on SMUD's power supply planning. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – BUSINESS STRATEGY."

Pursuant to a Continuing Disclosure Agreement, dated the date of issuance of the 2022 Series J Bonds (the "Continuing Disclosure Agreement") between SMUD and the Trustee, SMUD will covenant for the benefit of the holders of the 2022 Series J Bonds and owners of beneficial interest in the 2022 Series J Bonds to provide certain financial information and operating data and to provide certain notices. See "CONTINUING DISCLOSURE UNDERTAKING" and APPENDIX F – "FORM OF CONTINUING DISCLOSURE AGREEMENT."

The information presented in this Introduction is qualified in its entirety by reference to this entire Official Statement and the documents summarized or described herein. This Official Statement, including the Appendices, summarizes the terms of the 2022 Series J Bonds, the Resolution and certain agreements, contracts and other arrangements, some of which currently exist and others of which may exist in the future. The summaries of and references to all documents, statutes, regulations and other instruments referred to herein do not purport to be complete, comprehensive or definitive, and each such summary and reference is qualified in its entirety by reference to each such document, statute, regulation or instrument.

Capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed thereto in APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE RESOLUTION – Certain Definitions" or in the Resolution.

PLAN OF FINANCE

The proceeds of the 2022 Series J Bonds will be used to (i) refund the $157,785,000 outstanding principal amount of the Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2012 Series Y maturing after August 15, 2022 (the "Refunded Bonds") and (ii) pay certain costs associated with the issuance of the 2022 Series J Bonds. In connection with the refunding of the Refunded Bonds, SMUD expects to terminate an interest rate swap agreement that was executed in December of 2019 to hedge potential interest rate exposure relating to the future refunding of the Refunded Bonds. SMUD expects that it will receive a termination payment for the termination of the interest rate swap agreement.

A portion of the proceeds of the 2022 Series J Bonds, together with other available funds, will be deposited in trust in an escrow fund (the "Escrow Fund") established under an escrow agreement between SMUD and the Trustee. The moneys so deposited will be invested in direct obligations of the United States of America (the "Federal Securities"), the interest on and principal of which will be sufficient to pay the interest on the Refunded Bonds due on August 15, 2022 (the "Redemption Date") and to redeem the Refunded Bonds on the Redemption Date. Upon deposit, all liability of SMUD with respect to the Refunded Bonds (except for the obligation of SMUD to pay the interest on and redemption price of the Refunded Bonds from moneys on deposit in the Escrow Fund) will cease. The holders of the Refunded Bonds will be entitled to payment from SMUD solely from moneys or Federal Securities on deposit in the Escrow Fund, and the Refunded Bonds will no longer be outstanding under the Resolution. The Federal Securities and moneys in the Escrow Fund will not secure the 2022 Series J Bonds and will not be available to pay the principal of or interest on the 2022 Series J Bonds.

ESTIMATED SOURCES AND USES OF FUNDS

The estimated sources and uses of funds with respect to the 2022 Series J Bonds are as follows:

Sources of Funds:	
Principal Amount	$
[Net] Original Issue [Premium/Discount]	
Interest Fund Release	
Interest Rate Swap Termination Payment	
SMUD Contribution	
Total Sources of Funds	$
Uses of Funds:	
Refunding of Refunded Bonds	$
Costs of Issuance (including Underwriters' Discount)	
Total Uses of Funds	$

THE 2022 SERIES J BONDS

The 2022 Series J Bonds will mature in the years and amounts and bear interest at the rates set forth on the inside cover page hereof. Interest on the 2022 Series J Bonds will accrue from the date of delivery of the 2022 Series J Bonds, and will be payable on February 15, 2023, and semiannually thereafter on each February 15 and August 15 (each, an "Interest Payment Date") to the owners thereof as of the first day of the month (whether or not such day is a Business Day) in which an Interest Payment Date occurs (each, a "Record Date").

The 2022 Series J Bonds will be issued in fully registered form and, when issued, will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("DTC"). DTC will act as securities depository (the "Securities Depository") for the 2022 Series J Bonds. Individual purchases of interests in the 2022 Series J Bonds will be made in book-entry form only, in the principal amount of $5,000 or any integral multiple thereof. Purchasers of such interests will not receive certificates representing their interests in the 2022 Series J Bonds. Principal and interest are payable directly to the Securities Depository by the Trustee. Upon receipt of payments of principal and interest, the Securities Depository will in turn remit such principal and interest to the Securities Depository's Direct Participants (as such term is hereinafter defined) for subsequent disbursement to the purchasers of interests in the 2022 Series J Bonds. See APPENDIX C – "BOOK-ENTRY SYSTEM."

The 2022 Series J Bonds are not subject to redemption prior to maturity.

DEBT SERVICE SCHEDULE

The following table sets forth the debt service requirements with respect to the 2022 Series J Bonds. See also APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Debt Service Requirements*."

Calendar Year	Principal	Interest	Total
	$	$	$
	$	$	$

SECURITY FOR THE BONDS

General

The principal of and premium, if any, and interest on the Bonds, together with other Parity Bonds, are payable exclusively from, and are secured by a pledge (effected in the manner and to the extent provided in the Resolution) of, the Net Revenues of the Electric System of SMUD.

Neither the credit nor the taxing power of SMUD is pledged to the payment of the Bonds and the general fund of SMUD is not liable for the payment thereof. The owners of the Bonds cannot compel the exercise of any taxing power of SMUD or the forfeiture of any of its property. The Bonds are not a legal or equitable pledge, charge, lien or encumbrance upon any of SMUD's property (including the Electric System) or upon any of its income, receipts or revenues except the Net Revenues of the Electric System to the extent of the pledge thereof contained in the Resolution.

Consent to Amendments to the Resolution

The purchasers of the 2022 Series J Bonds, by virtue of their purchase of the 2022 Series J Bonds, will consent to certain amendments to the Resolution (the "Proposed Amendments"). Such amendments are described in ***bold italic*** font herein under "SECURITY FOR THE BONDS – Rates and Charges" and " – Limitations on Additional Obligations Payable from Revenues" and in APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE RESOLUTION – Certain Definitions" and " – Reserve Fund for Certain Bonds." The written consents to the Proposed Amendments of the holders and registered owners of at least 60% of the Bonds outstanding have been filed with SMUD or the Trustee, as required by the Resolution. However, while certain Bonds remain outstanding, SMUD must also obtain the written consents of certain bond insurers to implement the Proposed Amendments. SMUD expects to implement the Proposed Amendments when the written consents of such bond insurers are obtained or when the Bonds insured by such bond insurers are no longer outstanding. The final maturity date of the insured Bonds is July 1, 2024.

Allocation of Revenues

After making an allocation of Revenues to Maintenance and Operation Costs and to Energy Payments not included in Maintenance and Operation Costs, the Treasurer of SMUD is required (subject to the last paragraph of this section) to set aside, on an equal priority with sums set aside for all other Parity Bonds, Net Revenues as follows:

First: To the Electric Revenue Bond Interest Fund, in approximately equal monthly installments on or before the first day of each month, an amount equal to at least one-fifth (1/5) of the aggregate amount of interest becoming due on the Bonds on the next succeeding semiannual interest payment date, until an amount sufficient to meet said interest payment is accumulated.

Second: To the Electric Revenue Bond Redemption Fund, to be set aside in the Principal Account and Sinking Fund, respectively, in approximately equal monthly installments on or before the first day of each month, an amount equal to at least one-tenth (1/10) of the aggregate amount of principal becoming due on serial Bonds and the aggregate minimum sinking fund payments required to be made with respect to term Bonds during the next ensuing 12 months, until an amount sufficient to meet the principal and sinking fund requirements on all Bonds outstanding is accumulated in said accounts, respectively.

Third: To the Electric Revenue Bond Reserve Fund, such amounts as any supplemental resolution authorizing the issuance of a series of Bonds may require to build up and maintain said fund.

If interest on Bonds of a series or maturity is payable more frequently than semiannually, the Treasurer of SMUD shall set aside out of Net Revenues in the Interest Fund such amounts as may be required to pay interest on the Bonds of such series or maturity on each interest payment date at least one month prior to such interest payment date. Allocation to the Electric Revenue Bond Redemption Fund and Electric Revenue Bond Reserve Fund shall be made as set forth above.

All remaining Revenues, after making the foregoing allocations, will be available to SMUD for all lawful SMUD purposes.

From time to time SMUD may deposit in the Rate Stabilization Fund from such remaining Revenues such amounts as SMUD shall determine, provided that deposits in the Rate Stabilization Fund from remaining Revenues in any fiscal year may be made until (but not after) the date 120 days after the end of such fiscal year. SMUD may withdraw amounts from the Rate Stabilization Fund only for inclusion in Revenues for any fiscal year, such withdrawals to be made until (but not after) 120 days after the end of such fiscal year. All interest or other earnings upon deposits in the Rate Stabilization Fund shall be withdrawn therefrom and accounted for as Revenues. No deposit of Revenues to the Rate Stabilization Fund may be made to the extent such Revenues were included in any certificate submitted in connection with the issuance of additional bonds and withdrawal of the Revenues from the Revenues employed in rendering said certificate would have caused noncompliance with the additional bond provisions or to the extent withdrawals of the Revenues for any fiscal year would have reduced the debt service ratio for such fiscal year to or below 1.40:1.00. See APPENDIX A – "RATES AND CUSTOMER BASE – Rates and Charges" for a description of the balance in the Rate Stabilization Fund.

With respect to Bonds of a series issued on or after October 1, 2003 (including the 2022 Series J Bonds), notwithstanding the foregoing, so long as the Bonds of such series or maturity are outstanding, the supplemental resolution authorizing the issuance of such series shall require the Treasurer, out of Net Revenues received by SMUD, to set aside in the Interest Fund and the Principal Account, respectively, such amounts as may be required so that an amount equal to the amount of principal and/or interest becoming due and payable on the Bonds of such series or maturity on each interest payment date and principal payment date is on deposit in the Interest Fund and the Principal Account, respectively, at such time on or prior to such interest payment date or principal payment date as shall be specified in the supplemental resolution authorizing such Bonds.

Rates and Charges

SMUD has covenanted in the Resolution to establish and at all times maintain and collect rates and charges for the sale or use of electric energy generated, transmitted, distributed or furnished by SMUD which, together with certain items of other income permitted under the Resolution, will yield Revenues at least sufficient, with respect to the ensuing 12 months, to pay and provide for all sums required for Maintenance and Operation Costs and Energy Payments not included in Maintenance and Operation Costs and, in addition, to provide an aggregate sum equal to at least 1.20 times the total amount required for the payment of principal and interest, together with any sinking fund or reserve fund payments, on the Bonds and all Parity Bonds, in each case during such 12 months.

For purposes of the calculations of payments to be made pursuant to the Resolution, the interest rates on Parity Bonds which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Parity Bonds bear a rate or rates of interest for a known period or periods of time, such rate or rates of interest for such period or periods and thereafter, for the portion of the calculation period not covered by such known period or periods, the Assumed Interest Rate.

For purposes of the above calculations of principal of and interest on Parity Bonds, if a Financial Products Agreement has been entered into by SMUD with respect to any Parity Bonds, interest on such Parity Bonds shall be included in the calculation of such principal and interest by including for each fiscal year or period an amount equal to the amount of interest payable on such Parity Bonds in such fiscal year or period at the rate or rates stated in such Parity Bonds plus any Financial Product Payments payable in such fiscal year or period minus any Financial Product Receipts receivable in such fiscal year or period; provided that in no event shall any calculation made pursuant to this clause result in a number less than zero being included in the calculation of such principal and interest.

For purposes of the above calculations of principal of and interest on Parity Bonds, Excluded Principal Payments shall be disregarded (but interest on the Parity Bonds to which such Excluded Principal Payments relate shall be included until but not after the stated due date when principal payments on such Parity Bonds are scheduled by their terms to commence) and Assumed Principal Payments and Assumed Interest Payments shall be included; and for purposes of the above calculations of interest on Parity Bonds, the interest rates on Parity Bonds which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Parity Bonds bear a rate or rates of interest for a known period or periods of time, such rate or rates of interest for such period or periods and thereafter, for the portion of the calculation period not covered by such known period or periods, the Assumed Interest Rate.

SMUD has full power to establish rates and charges for all SMUD services, and the levels of such rates are not subject to review or regulation by any other governmental agency, either federal or state.

For purposes of the calculations specified in this section: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that SMUD receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by SMUD with respect to or in connection with such Parity Bonds during such period of time.

See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Build America Bonds Subsidy Payments*" for a description of the current Subsidy that SMUD receives with respect to certain Bonds.

See APPENDIX D hereto for the definitions of certain capitalized terms used in this section.

Limitations on Additional Obligations Payable from Revenues

The Resolution provides that SMUD will not, so long as any Bonds are outstanding, issue any obligations payable in whole or in part from Revenues except the following:

1. Refunding bonds issued solely to refund all or part of the Bonds or Parity Bonds;

2. General obligation bonds or other securities secured by the full faith and credit of SMUD;

3. Additional revenue bonds (including additional Bonds under the Resolution and additional Parity Bonds), payable on a parity with the Bonds, with an equal lien and charge upon the Revenues, but only subject to the following conditions:

(a) Such additional revenue bonds shall have been authorized for and the proceeds therefrom required to be applied to additions, betterments, extensions or improvements to the Electric System (and necessary costs of issuance, interest during construction and reserve funds);

(b) The proceedings for the issuance of such additional revenue bonds shall require SMUD to fix and collect rates and charges in an amount not less, with respect to such bonds, than the amounts required with respect to Bonds issued under the Resolution;

(c) SMUD shall not then be in default under the Resolution or other resolutions authorizing the issuance of Parity Bonds; and

(d) The Trustee shall receive a certificate of SMUD to the effect (i) that Net Revenues, after completion of the improvements proposed to be financed by such additional revenue bonds, will be sufficient to pay the principal of and interest (and bond reserve fund requirements) on all Bonds and Parity Bonds then outstanding and on such additional revenue bonds; and (ii) that for a period of 12 consecutive months during the 24 months immediately preceding the issuance of the additional revenue bonds the Net Revenues have been at least equal to 1.25 times maximum annual debt service on all Bonds and Parity Bonds then outstanding and on such additional revenue bonds (after adjusting Net Revenues to include 75 percent of the estimated additional Net Revenues to be derived from an increase in rates and charges or from the acquisition of an existing revenue producing electric system); and

4. Revenue bonds junior and subordinate to the Bonds and Parity Bonds.

For purposes of the above calculations, Excluded Principal Payments shall be disregarded (but interest on the Parity Bonds to which such Excluded Principal Payments relate shall be included until but not after the stated due date when principal payments on such Parity Bonds are scheduled by their terms to commence) and Assumed Principal Payments and Assumed Interest Payments shall be included; and for purposes of the above calculations of interest on Parity Bonds, the interest rates on Parity Bonds which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Parity Bonds bear a rate or rates of interest for a known period or periods of time, such rate or rates of interest for such period or periods and thereafter, for the portion of the calculation period not covered by such known period or periods, the Assumed Interest Rate.

For purposes of the above calculations of principal of and interest on Parity Bonds, if a Financial Products Agreement has been entered into by SMUD with respect to any Parity Bonds, interest on such Parity Bonds shall be included in the calculation of such principal and interest by including for each fiscal year or period an amount equal to the amount of interest payable on such Parity Bonds in such fiscal year or period at the rate or rates stated in such Parity Bonds plus any Financial Product Payments payable in such fiscal year or period minus any Financial Product Receipts receivable in such fiscal year or period; provided that in no event shall any calculation made pursuant to this clause result in a number less than zero being included in the calculation of such principal and interest.

For purposes of the calculations specified in this section: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that SMUD receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Net Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by SMUD with respect to or in connection with such Parity Bonds during such period of time.

See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Estimated Capital Requirements" for a description of SMUD's projected capital requirements. Such capital requirements may be satisfied through the issuance of additional Bonds or Parity Bonds.

See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Build America Bonds Subsidy Payments*" for a description of the current Subsidy that SMUD receives with respect to certain Bonds.

See APPENDIX D hereto for the definitions of certain capitalized terms used in this section.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

SMUD owns and operates an electric system that has provided retail electric service since 1946. SMUD's current service area is approximately 900 square miles, and includes the principal parts of Sacramento County and small portions of Placer and Yolo counties. For a full description of SMUD, its history, organization, operations, and financial performance, certain developments in the energy markets, certain factors affecting the electric utility industry and certain regulatory and other matters, see APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT."

ABSENCE OF LITIGATION REGARDING THE 2022 SERIES J BONDS

SMUD is not aware of any action, suit or proceeding, threatened or pending, to restrain or enjoin the issuance, sale or delivery of the 2022 Series J Bonds, or in any way contesting or affecting the validity of the 2022 Series J Bonds or any of the proceedings of SMUD taken with respect to the 2022 Series J Bonds. SMUD is not aware of any action, suit or proceeding, threatened or pending, questioning the corporate existence of SMUD, or the title of the officers of SMUD to their respective offices, or the power and authority of SMUD to execute and deliver the 2022 Series J Bonds. For a description of certain litigation in which SMUD is involved, see APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – LEGAL PROCEEDINGS."

UNDERWRITING

Morgan Stanley & Co. LLC, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets, Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC ("JPMS") (each an "Underwriter" and, collectively, the "Underwriters") have jointly and severally agreed, subject to certain customary conditions to closing, to purchase the 2022 Series J Bonds from SMUD at an aggregate purchase price of $_________ (being the aggregate principal amount of the 2022 Series J Bonds, plus [net] original issue [premium/discount] of $_______, and less Underwriters' discount of $______). The Underwriters will be obligated to purchase all 2022 Series J Bonds if any 2022 Series J Bonds are purchased. The Underwriters have agreed to make a public offering of the 2022 Series J Bonds at the initial offering prices set forth on the inside cover page hereof. The 2022 Series J Bonds may be offered and sold to certain dealers (including underwriters and other dealers depositing such bonds into investment trusts) at prices lower than such public offering prices, and such public offering prices may be changed, from time to time, by the Underwriters.

Morgan Stanley & Co. LLC., an Underwriter of the 2022 Series J Bonds, has entered into a retail distribution arrangement with its affiliate Morgan Stanley Smith Barney LLC. As part of the distribution arrangement, Morgan Stanley & Co. LLC may distribute municipal securities to retail investors through the financial advisor network of Morgan Stanley Smith Barney LLC. As part of this arrangement, Morgan Stanley & Co. LLC may compensate Morgan Stanley Smith Barney LLC for its selling efforts with respect to the 2022 Series J Bonds.

[BofA Securities, Inc., an Underwriter of the 2022 Series J Bonds, has entered into a distribution agreement with its affiliate Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S"). As part of this arrangement, BofA Securities, Inc. may distribute securities to MLPF&S, which may in turn distribute such securities to investors through the financial advisor network of MLPF&S. As part of this arrangement, BofA Securities, Inc. may compensate MLPF&S as a dealer for their selling efforts with respect to the 2022 Series J Bonds.]

[Citigroup Global Markets Inc., an Underwriter of the 2022 Series J Bonds, has entered into a retail distribution agreement with Fidelity Capital Markets, a division of National Financial Services LLC (together with its affiliates, "Fidelity"). Under this distribution agreement, Citigroup Global Markets Inc. may distribute municipal securities to retail investors at the original issue price through Fidelity. As part of this arrangement, Citigroup Global Markets Inc. will compensate Fidelity for its selling efforts.]

[JPMS, one of the Underwriters of the Bonds, has entered into negotiated dealer agreements (each, a "Dealer Agreement") with each of Charles Schwab & Co., Inc. ("CS&Co.") and LPL Financial LLC ("LPL") for the retail distribution of certain securities offerings at the original issue prices. Pursuant to each Dealer Agreement, each of CS&Co. and LPL may purchase 2022 Series J Bonds from JPMS at the original issue price less a negotiated portion of the selling concession applicable to any 2022 Series J Bonds that such firm sells.]

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, principal investment, hedging, financing and brokerage activities. Certain of the Underwriters and their respective affiliates have, from time to time, performed, and may in the future perform, various investment banking services for SMUD for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the Underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (which may include bank loans and/or credit default swaps) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve securities and instruments of, or issued for the benefit of, SMUD.

MUNICIPAL ADVISOR

SMUD has retained PFM Financial Advisors LLC, as Municipal Advisor in connection with various matters relating to the delivery of the 2022 Series J Bonds. The Municipal Advisor assumes no responsibility for the accuracy, completeness or fairness of the information contained in this Official Statement. The Municipal Advisor is an independent advisory firm and is not engaged in underwriting or distribution of securities. The Municipal Advisor will receive compensation that is contingent upon the sale, issuance and delivery of the 2022 Series J Bonds.

SWAP ADVISOR

SMUD has retained Swap Financial Group, LLC, as Swap Advisor in connection with various matters relating to the termination of the interest rate swap entered into in anticipation of the issuance of the 2022 Series J Bonds. The Swap Advisor assumes no responsibility for the accuracy, completeness or fairness of the information contained in this Official Statement. The Swap Advisor is an independent advisory firm and is not engaged in underwriting or distribution of securities or the trading of interest rate swaps. The Swap Advisor will receive compensation that is contingent upon the sale, issuance and delivery of the 2022 Series J Bonds.

APPROVAL OF LEGAL PROCEEDINGS

The validity of the 2022 Series J Bonds and certain other legal matters are subject to the approval of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD. The approving opinion of Bond Counsel will be delivered with the 2022 Series J Bonds in substantially the form appearing in APPENDIX E. Bond Counsel undertakes no responsibility for the accuracy, completeness or fairness of this Official Statement. Certain legal matters will be passed on for the Underwriters by Nixon Peabody LLP, San Francisco, California, counsel to the Underwriters.

FINANCIAL STATEMENTS

SMUD's audited, consolidated financial statements for the years ended December 31, 2021 and December 31, 2020 are included in APPENDIX B attached to this Official Statement. These financial statements have been audited by Baker Tilly Virchow Krause, LLP, Madison, Wisconsin (the "Auditor"), for the periods indicated and to the extent set forth in their report thereon and should be read in their entirety. SMUD has not requested nor did it obtain permission from the Auditor to include the audited, consolidated financial statements as an appendix to this Official Statement. Accordingly, the Auditor has not performed any procedures to review the financial condition or operations of SMUD subsequent to the date of its report included therein, nor has it reviewed any information contained in this Official Statement.

TAX MATTERS

In the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD ("Bond Counsel"), based upon an analysis of existing laws, regulations, rulings and court decisions, and assuming, among other matters, the accuracy of certain representations and compliance with certain covenants, interest on the 2022 Series J Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 (the "Code") and is exempt from State of California personal income taxes. Bond Counsel is of the further opinion that interest on the 2022 Series J Bonds is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel expresses no opinion regarding any other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Series J Bonds. A complete copy of the proposed form of opinion of Bond Counsel is set forth in APPENDIX E hereto.

To the extent the issue price of any maturity of the 2022 Series J Bonds is less than the amount to be paid at maturity of such 2022 Series J Bonds (excluding amounts stated to be interest and payable at least annually over the term of such 2022 Series J Bonds), the difference constitutes "original issue discount," the accrual of which, to the extent properly allocable to each Beneficial Owner thereof, is treated as interest on the 2022 Series J Bonds which is excluded from gross income for federal income tax purposes and exempt from State of California personal income taxes. For this purpose, the issue price of a particular maturity of the 2022 Series J Bonds is the first price at which a substantial amount of such maturity of the 2022 Series J Bonds is sold to the public (excluding bond houses, brokers, or similar persons or organizations acting in the capacity of underwriters, placement agents or wholesalers). The original issue discount with respect to any maturity of the 2022 Series J Bonds accrues daily over the term to maturity of such 2022 Series J Bonds on the basis of a constant interest rate compounded semiannually (with straight-line interpolations between compounding dates). The accruing original issue discount is added to the adjusted basis of such 2022 Series J Bonds to determine taxable gain or loss upon disposition (including sale, redemption, or payment on maturity) of such 2022 Series J Bonds. Beneficial Owners of the 2022 Series J Bonds should consult their own tax advisors with respect to the tax consequences of ownership of 2022 Series J Bonds with original issue discount, including the treatment of Beneficial Owners who do not purchase such 2022 Series J Bonds in the original offering to the public at the first price at which a substantial amount of such 2022 Series J Bonds is sold to the public.

2022 Series J Bonds purchased, whether at original issuance or otherwise, for an amount higher than their principal amount payable at maturity (or, in some cases, at their earlier call date) ("Premium Bonds") will be treated as having amortizable bond premium. No deduction is allowable for the amortizable bond premium in the case of bonds, like the Premium Bonds, the interest on which is excluded from gross income for federal income tax purposes. However, the amount of tax-exempt interest received, and a Beneficial Owner's basis in a Premium Bond, will be reduced by the amount of amortizable bond premium properly allocable to such Beneficial Owner. Beneficial Owners of Premium Bonds should consult their own tax advisors with respect to the proper treatment of amortizable bond premium in their particular circumstances.

The Code imposes various restrictions, conditions and requirements relating to the exclusion from gross income for federal income tax purposes of interest on obligations such as the 2022 Series J Bonds. SMUD has made certain representations and covenanted to comply with certain restrictions, conditions and requirements designed to ensure that interest on the 2022 Series J Bonds will not be included in federal gross income. Inaccuracy of these representations or failure to comply with these covenants may result in interest on the 2022 Series J Bonds being included in gross income for federal income tax purposes, possibly from the date of original issuance of the 2022 Series J Bonds. The opinion of Bond Counsel assumes the accuracy of these representations and compliance with these covenants. Bond Counsel has not undertaken to determine (or to inform any person) whether any actions taken (or not taken), or events occurring (or not occurring), or any other matters coming to Bond Counsel's attention after the date of issuance of the 2022 Series J Bonds may adversely affect the value of, or the tax status of interest on, the 2022 Series J Bonds. Accordingly, the opinion of Bond Counsel is not intended to, and may not, be relied upon in connection with any such actions, events or matters.

Although Bond Counsel is of the opinion that interest on the 2022 Series J Bonds is excluded from gross income for federal income tax purposes and is exempt from State of California personal income taxes, the ownership or disposition of, or the accrual or receipt of amounts treated as interest on, the 2022 Series J Bonds may otherwise affect a Beneficial Owner's federal, state or local tax liability. The nature and extent of these other tax consequences depends upon the particular tax status of the Beneficial Owner or the Beneficial Owner's other items of income or deduction. Bond Counsel expresses no opinion regarding any such other tax consequences.

Current and future legislative proposals, if enacted into law, clarification of the Code or court decisions may cause interest on the 2022 Series J Bonds to be subject, directly or indirectly, in whole or in part, to federal income taxation or to be subject to or exempted from state income taxation, or otherwise prevent Beneficial Owners from realizing the full current benefit of the tax status of such interest. The introduction or enactment of any such legislative proposals or clarification of the Code or court decisions may also affect, perhaps significantly, the market price for, or marketability of, the 2022 Series J Bonds. Prospective purchasers of the 2022 Series J Bonds should consult their own tax advisors regarding the potential impact of any pending or proposed federal or state tax legislation, regulations or litigation, as to which Bond Counsel expresses no opinion.

The opinion of Bond Counsel is based on current legal authority, covers certain matters not directly addressed by such authorities, and represents Bond Counsel's judgment as to the proper treatment of the 2022 Series J Bonds for federal income tax purposes. It is not binding on the Internal Revenue Service ("IRS") or the courts. Furthermore, Bond Counsel cannot give and has not given any opinion or assurance about the future activities of SMUD, or about the effect of future changes in the Code, the applicable regulations, the interpretation thereof or the enforcement thereof by the IRS. SMUD has covenanted, however, to comply with the requirements of the Code.

Bond Counsel's engagement with respect to the 2022 Series J Bonds ends with the issuance of the 2022 Series J Bonds, and, unless separately engaged, Bond Counsel is not obligated to defend SMUD or the Beneficial Owners regarding the tax-exempt status of the 2022 Series J Bonds in the event of an audit examination by the IRS. Under current procedures, Beneficial Owners would have little, if any, right to participate in the audit examination process. Moreover, because achieving judicial review in connection with an audit examination of tax-exempt bonds is difficult, obtaining an independent review of IRS positions with which SMUD legitimately disagrees may not be practicable. Any action of the IRS, including but not limited to selection of the 2022 Series J Bonds for audit, or the course or result of such audit, or an audit of bonds presenting similar tax issues may affect the market price for, or the marketability of, the 2022 Series J Bonds, and may cause SMUD or the Beneficial Owners to incur significant expense.

Payments on the 2022 Series J Bonds generally will be subject to U.S. information reporting and possibly to "backup withholding." Under Section 3406 of the Code and applicable U.S. Treasury Regulations issued thereunder, a non-corporate Beneficial Owner of 2022 Series J Bonds may be subject to backup withholding with respect to "reportable payments," which include interest paid on the 2022 Series J Bonds and the gross proceeds of a sale, exchange, redemption, retirement or other disposition of the 2022 Series J Bonds. The payor will be required to deduct and withhold the prescribed amounts if (i) the payee fails to furnish a U.S. taxpayer identification number ("TIN") to the payor in the manner required, (ii) the IRS notifies the payor that the TIN furnished by the payee is incorrect, (iii) there has been a "notified payee underreporting" described in Section 3406(c) of the Code or (iv) the payee fails to certify under penalty of perjury that the payee is not subject to withholding under Section 3406(a)(1)(C) of the Code. Amounts withheld under the backup withholding rules may be refunded or credited against a Beneficial Owner's federal income tax liability, if any, provided that the required information is timely furnished to the IRS. Certain Beneficial Owners (including among others, corporations and certain tax-exempt organizations) are not subject to backup withholding. The failure to comply with the backup withholding rules may result in the imposition of penalties by the IRS.

CONTINUING DISCLOSURE UNDERTAKING

Pursuant to the Continuing Disclosure Agreement, SMUD will covenant for the benefit of the holders and the "Beneficial Owners" (as defined in the Continuing Disclosure Agreement) of the 2022 Series J Bonds to provide certain financial information and operating data relating to SMUD by not later than 180 days after the end of each of SMUD's fiscal years (presently, each December 31), commencing with the report for the year ending December 31, 2022 (the "Annual Report"), and to provide notices of the occurrence of certain listed events with respect to the 2022 Series J Bonds. The Annual Report will be filed by or on behalf of SMUD with the Municipal Securities Rulemaking Board (the "MSRB") through its Electronic Municipal Market Access system ("EMMA") and any notices of such listed events will be filed by or on behalf of SMUD with the MSRB through EMMA. The specific nature of the information to be contained in the Annual Report and the notices of listed events are set forth in the form of the Continuing Disclosure Agreement which is included in its entirety in APPENDIX F hereto. SMUD's covenant will be made in order to assist the Underwriters in complying with Securities and Exchange Commission Rule 15c2-12.

[In a limited number of circumstances, certain of the annual reports, audited financial statements or listed event filings required to be made by SMUD during the last five years under its continuing disclosure undertakings were not connected to all of the CUSIP numbers of the bonds subject to the continuing disclosure undertakings. In addition, SMUD entered into two subordinated forward starting interest rate swaps in December 2019 and filed a notice of the interest rate swaps with the MSRB through EMMA in April 2020. A notice of rating upgrade on October 6, 2020, by Moody's Investors Service of the Northern California Gas Authority No. 1 Gas Project Revenue Bonds, Series 2007B, was also not filed until October 28, 2020.]

RATINGS

Fitch Ratings, Inc. ("Fitch") and S&P Global Ratings ("S&P") have assigned ratings of "[AA (stable outlook)]" and "[AA (stable outlook)]," respectively, to the 2022 Series J Bonds. Such ratings reflect only the views of such organizations and are not a recommendation to buy, sell or hold the 2022 Series J Bonds. Explanations of the significance of such ratings may be obtained only from the respective rating agencies. SMUD has furnished to Fitch and S&P certain information and materials concerning the 2022 Series J Bonds and itself. Generally, a rating agency bases its rating on the information and materials furnished to it and on investigations, studies and assumptions of its own. There is no assurance that such ratings will continue for any given period or that they will not be revised downward, suspended or withdrawn entirely by the respective rating agencies, if in the judgment of such rating agency, circumstances so warrant. SMUD has not, other than as described under "CONTINUING DISCLOSURE UNDERTAKING" above, and the Underwriters have not undertaken any responsibility either to bring to the attention of the holders or beneficial owners of the 2022 Series J Bonds any proposed revision, suspension or withdrawal of any rating on the 2022 Series J Bonds or to oppose any such proposed revision, suspension or withdrawal. Any such downward revision, suspension or withdrawal of such ratings may have an adverse effect on the market price or marketability of the 2022 Series J Bonds.

VERIFICATION

Upon delivery of the 2022 Series J Bonds, [________] (the "Verification Agent") will verify, from the information provided to it, the mathematical accuracy as of the date of the closing of the 2022 Series J Bonds of the computations contained in the provided schedules to determine that the anticipated receipts from the securities and cash deposits listed in the Underwriters' schedules, to be held in escrow, will be sufficient to pay, when due, the interest on and redemption requirements of the Refunded Bonds. The Verification Agent will express no opinion on the assumptions provided to them.

MISCELLANEOUS

This Official Statement includes descriptions of the terms of the 2022 Series J Bonds, power purchase agreements with certain other parties, pooling and other agreements, the Resolution and certain provisions of the Act. Such descriptions do not purport to be complete, and all such descriptions and references thereto are qualified in their entirety by reference to each such document.

Copies of the Resolution, which forms a contract with the holders of the 2022 Series J Bonds, will be made available upon request.

This Official Statement has been duly authorized by the Board of Directors of SMUD.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By: ____
Chief Executive Officer and General Manager

APPENDIX A

INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT

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APPENDIX A

INFORMATION REGARDING
SACRAMENTO MUNICIPAL UTILITY DISTRICT

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Sacramento, California

BOARD OF DIRECTORS

Brandon Rose, President
Heidi Sanborn, Vice President
Nancy Bui-Thompson
Gregg Fishman
Rosanna Herber
Rob Kerth
Dave Tamayo

OFFICERS AND EXECUTIVES

Paul Lau, Chief Executive Officer and General Manager
Brandy Bolden, Chief Customer Officer
Suresh Kotha, Chief Information Officer
Jose Bodipo-Memba, Interim Chief Diversity Officer[1]
Scott Martin, Chief Strategy Officer
Laura Lewis, Chief Legal and Government Affairs Officer and General Counsel
Frankie McDermott, Chief Operating Officer
Lora Anguay, Chief Zero Carbon Officer
Jennifer Davidson, Chief Financial Officer
Farres Everly, Director, Communications, Marketing & Community Relations
Russell Mills, Treasurer
Lisa Limcaco, Controller

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[1] The previous Chief Diversity Officer, Gary King, retired as of March 31, 2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. See "INTRODUCTION – Independent Governance – *Chief Diversity Officer*."

INTRODUCTION

General

The Sacramento Municipal Utility District ("SMUD") owns and operates an electric system that has provided retail electric service since 1946. SMUD's current service area is approximately 900 square miles, and includes the principal parts of Sacramento County and small portions of Placer and Yolo counties. See "THE SERVICE AREA AND ELECTRIC SYSTEM – The Service Area."

Independent Governance

SMUD is an independently run community-owned organization. SMUD is not required by law to transfer any portion of its collections from customers to any local government.

SMUD is governed by a Board of Directors (the "Board"), which consists of seven directors elected by ward for staggered four-year terms. The Board determines policy and appoints the Chief Executive Officer and General Manager, who is responsible for SMUD's overall management and day-to-day operations. The Chief Executive Officer and General Manager is responsible for the hiring and removal of all employees, other than the Chief Legal Officer and General Counsel, the Internal Auditor and the Special Assistant to the Board, who are hired and may be removed only by the Board. The employment status of nearly all SMUD employees is governed by a civil service system administered by the Chief Executive Officer and General Manager.

The Board elects its President and Vice President annually to take office in January. The current members of the Board are as follows:

Name	Occupation	Term Expires
Brandon Rose, President	Air Pollution Specialist, California Environmental Protection Agency	December 31, 2024
Heidi Sanborn, Vice President	Executive Director, National Stewardship Action Council	December 31, 2022
Nancy Bui-Thompson.........................	Chief Information Officer, Wellspace Health	December 31, 2024
Gregg Fishman	Communications Specialist	December 31, 2022
Rosanna Herber	Retired Utility Director	December 31, 2022
Rob Kerth	Business Owner	December 31, 2024
Dave Tamayo.....................................	Environmental Specialist IV, County of Sacramento	December 31, 2022

SMUD's senior management consists of the following executives:

Chief Executive Officer & General Manager. Paul Lau was named chief executive officer and general manager ("CEO & GM") of SMUD in October 2020. He reports to the SMUD Board of Directors. As CEO & GM, he leads the sixth largest community-owned electric utility in the nation, serving a population of approximately 1.5 million residents and managing a $1.7 billion budget. Mr. Lau previously served as SMUD's Chief Grid Strategy & Operations Officer and has held several other executive leadership positions during his 40-year career at SMUD. He serves on several national and local boards, including the Large Public Power Council, California Municipal Utilities Association, American Public Power Association, and Smart Electric Power Alliance, and as a Commissioner of the Balancing Authority of Northern California ("BANC"). A registered professional electrical engineer in the State of California (the "State"), Mr. Lau received his bachelor's degree in electrical power engineering from California State University, Sacramento.

Chief Customer Officer. Brandy Bolden reports to the CEO & GM and oversees SMUD's Customer and Community Services business unit. She is responsible customer experience delivery across our residential and commercial customer segments. She provides leadership and oversight of customer operations including customer care and revenue management, business intelligence, strategic account management, customer experience and segmentation strategy, channel management, customer program and service delivery, and special assistance. She is also responsible for commercial development and business attraction and oversees Community Energy Services, which provides services and support for community choice aggregators. Since joining SMUD in 2003, Brandy has demonstrated strong leadership and held a variety of senior leadership roles, including leading the Customer & Community Services project management office and the dual role of director of Customer Care and Revenue Operations. Ms. Bolden led the team responsible for implementing time-of-day rates, streamlining the meter-to-cash processes, delivering key billing and payment experience enhancements and recognizing operational efficiencies that resulted in sustained annual savings for SMUD. Ms. Bolden holds a bachelor's degree in Sociology from University of California, Davis.

Chief Information Officer. Suresh Kotha reports to the CEO & GM and is responsible for SMUD's information technology strategy, operations, infrastructure, IT Project Management Office, enterprise innovation process, and cybersecurity. More recently, Mr. Kotha has been leading many technology efforts that are integral to developing a grid of the future that will help us achieve our zero carbon goal, including our Advanced Distribution Management System, the software platform that supports the full suite of distribution management and optimization, and next-generation network upgrades. Mr. Kotha joined SMUD in 2002 as a principal technical developer, with responsibility for designing and leading implementation and upgrades of multiple technology systems, including the SAP software platform and our meter-to-cash systems. He holds a Master's of Technology in Computer Science from Jawaharlal Nehru Technology University and a Bachelor of Engineering in Electronics & Communications Engineering from Gulbarga University.

Chief Diversity Officer. The Chief Diversity Officer reports to the CEO & GM and is responsible for human resources, workforce diversity and inclusion and SMUD's Sustainable Communities program. The previous Chief Diversity Officer, Gary King, retired as of March 31,2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. The three current Workforce, Diversity & Inclusion Directors will each serve in the role for a 3-month period, starting with Jose Bodipo-Memba. Jose started in this new role on April 2, 2022. He will be followed by Laurie Rodriguez beginning on July 2, 2022, and Markisha Webster beginning on Oct. 1, 2022, following which the position will be filled from among the three directors.

Chief Strategy Officer. Scott Martin reports to the CEO & GM and is responsible for looking holistically at all strategies across the company and driving prioritization including zero carbon, rates and pricing, enterprise strategic planning and enterprise prioritization. Mr. Martin is a seasoned executive with more than 30 years of experience. Prior to assuming this role, Mr. Martin was a director for resource planning and new business strategy. Previous experience also includes customer strategy planning supervisor. Mr. Martin joined SMUD in 1999 and holds a bachelor of arts degree in economics from the University of California, Berkeley and a master of arts degree in economics from the University of Nevada, Las Vegas.

Chief Legal & Government Affairs Officer and General Counsel. Laura Lewis was named general counsel for SMUD in April 2014. In this position she serves as chief lawyer and manages SMUD's legal office and its staff of eight attorneys. She also serves as the secretary to SMUD's elected board of directors. She reports to the Board and to the CEO & GM and has responsibility for all legal matters in which SMUD is a party to, or has an interest in. Ms. Lewis also oversees SMUD's government affairs and reliability compliance department. In this capacity, she is responsible for management and coordination of all legislative matters and regulatory requirements affecting SMUD at the state and federal level, including the FERC-NERC electric reliability standards. Ms. Lewis joined SMUD in 1997 as a staff attorney, serving in that capacity through 1999, after which she moved to the San Francisco law firm Davis Wright Tremaine. In 2002, she returned to SMUD as a senior attorney. In 2010, she became assistant general counsel and in 2013 was appointed chief assistant general counsel. She holds a juris doctorate from McGeorge School of Law, where she won membership in the Order of the Coif honor society. She holds a bachelor's degree in political science from the University of California, San Diego and is a member of the American Bar Association, the Energy Bar Association, and the State Bar of California.

Chief Operating Officer. Frankie McDermott reports to the CEO & GM and is responsible for providing strategic leadership and tactical oversight related to the safe and reliable transmission and delivery of energy to customers, ensuring efficient planning, construction, operation and maintenance of transmission, and distribution facilities requirements in order to safely and efficiently meet customer demands. This position has primary responsibility for the processes and functions related to system reliability and operations across SMUD. The Chief Operating Officer is also the safety leader for the enterprise, leader of operational efficiency and responsible for all non-IT capital investments. Prior to this role, Mr. McDermott served as Chief Energy Delivery Officer and Chief Customer Officer, responsible for SMUD's overall retail strategy. From 2010 to 2014, he served as customer services director, which included managing relationships with customer segments as SMUD moved forward with smart-grid technologies. Prior to that, he served as manager of enterprise performance and held positions in supply chain and in general services. Before joining SMUD in 2003, Mr. McDermott served in management roles in the semiconductor industry at NEC Electronics in Roseville, California and in Ireland. After engineering school in Ireland, he earned an MBA from Golden Gate University and completed the Advanced Management Program at the Haas School of Business at the University of California Berkeley.

Chief Zero Carbon Officer. Lora Anguay reports to the CEO & GM and is responsible for leadership oversight of SMUD's Energy Supply which includes Energy Trading and Contracts and SMUD's Power Generation Assets. This role is also responsible for the delivery of SMUD's plan to provide 100% carbon free energy resources by 2030. This includes obtaining new grants and partnerships, overseeing research and development, designing distributed energy resource programs, enabling processes to settle distributed energy transactions with SMUD's customers and transitioning SMUD's power generation assets and energy contracts to zero carbon resources. Prior to assuming this role, Ms. Anguay was the director of Distribution Operations & Maintenance and was responsible for the day to day operations of SMUD's electric distribution grid. Before that she was an engineering designer, process control supervisor, project manager for smart meter deployment, a senior project manager for smart grid distribution automation and supervisor in Grid Assets. Before SMUD, she worked for Oracle Corporation as a finance manager and is a veteran who served in the United States Coast Guard. Ms. Anguay joined SMUD in 2004 and holds a Bachelor of Science degree in business administration from California State University, Sacramento.

Chief Financial Officer. Jennifer Davidson was named chief financial officer ("CFO") in 2017. Reporting to the CEO & GM, she oversees corporate accounting, treasury operations and risk management, and planning and budget functions and is also responsible for key corporate services, including facilities, security, image production and postal service, purchasing, warehouse and fleet. Ms. Davidson joined SMUD in 2006 and previously served as director of budget, enterprise performance and risk management. Before joining SMUD, Ms. Davidson held management positions with investor-owned utility Southern

California Edison and software and services provider Amdocs. She holds a bachelor's degree in geography from the University of California, Los Angeles.

Director, Communications, Marketing & Community Relations. Farres Everly reports to the CEO & GM and since 2009 has been responsible for oversight of the SMUD brand, all external and internal strategic marketing and communications activities and campaigns and SMUD's outreach efforts to the community and the State's capital region, including volunteerism, events and sponsorships. He previously served as SMUD's Manager of Advertising and Promotions. Prior to joining SMUD, Mr. Everly held marketing leadership positions at VSP Vision Care, The Money Store and the Sacramento Metropolitan Chamber of Commerce. He holds a bachelor's degree in Journalism from California State University, Chico.

Treasurer. Russell Mills reports to the CFO. He oversees all treasury operations, including debt and cash management, banking, financial planning and forecasting, enterprise and commodity risk management, property and casualty insurance, and is responsible for developing and implementing capital borrowing strategies. Mr. Mills also serves as treasurer for the Transmission Agency of Northern California ("TANC"), the Central Valley Financing Authority ("CVFA"), the Sacramento Cogeneration Authority ("SCA"), the Sacramento Municipal Utility District Financing Authority ("SFA"), the Sacramento Power Authority ("SPA"), the Northern California Gas Authority No. 1 ("NCGA"), the Northern California Energy Authority ("NCEA") and BANC. Before joining SMUD in 2018 as Treasurer, Mr. Mills served as Chief Financial Officer of Southern California Public Power Authority. He also served as the Chief Financial Officer of the Power Supply Program at the California Department of Water Resources. He holds an MBA from Loyola Marymount University, and a bachelor's degree in economics from Towson University in Baltimore, Maryland. Mr. Mills also holds the Energy Risk Professional (ERP) designation and is a CFA level II candidate.

Controller. Lisa Limcaco reports to the CFO and is responsible for accounting and financial reporting at SMUD. Prior to her appointment as controller in 2020, Ms. Limcaco served as an assistant controller, manager of customer value, performance and projects, senior energy commodity specialist and as principal accountant for SMUD's joint powers authorities. Ms. Limcaco also serves as controller for TANC, CVFA, SCA, SFA, SPA, NCGA, NCEA and BANC. Before joining SMUD in 2010 as a senior accountant, Ms. Limcaco had 12-years' experience as the Director of Accounting and controller for a food service provider in Sacramento and over 13-years' experience in public accounting including audit manager at Price Waterhouse LLP. Ms. Limcaco holds a bachelor's degree in accounting from the University of Hawaii, a Master of Business Administration from Sacramento State University and is a Certified Public Accountant in the State.

THE SERVICE AREA AND ELECTRIC SYSTEM

The Service Area

SMUD is the primary distributor of electric power within an area of approximately 900 square miles in central California. The service area includes the State Capital, Sacramento, the populous areas principally to the northeast and south of the City of Sacramento (the "City" or "Sacramento") and the agricultural areas to the north and south. The City is located 85 miles northeast of San Francisco.

SMUD's electric system supplies power to a population of approximately 1.5 million with a total annual retail load of approximately 10,453 million kilowatt-hours ("kWh") for the year ended December 31, 2021. As the capital of the nation's most populous state, Sacramento benefits from the historically stabilizing influence of a large government sector. Sacramento is home to the State government headquarters, the Sacramento County seat, the City government and various special districts that combine to make government the largest single employment sector in the Sacramento area. Information technology, transportation, education and health services, leisure and hospitality, and construction round out the other major sectors of employment and industry in the area.

SMUD's annual peak load has averaged 3,001 Megawatts ("MW") over the last three years, with SMUD's record peak load of 3,299 MW occurring on July 24, 2006. In 2017, SMUD recorded its second highest peak load of 3,157 MW. In 2021, SMUD's peak load was 3,019 MW. SMUD reviews its load forecast, at a minimum, on an annual basis.

The Electric System

SMUD owns and operates an integrated electric system that includes generation, transmission and distribution facilities.

SMUD supplies power to its bulk power substations through a 230 kilovolt ("kV") and 115 kV transmission system. This system transmits power from SMUD's generation plants and interconnects with Pacific Gas & Electric ("PG&E") and the Western Area Power Administration ("WAPA"). Power is distributed throughout Sacramento County via a 69 kV sub-transmission system with the exception of the City's downtown area, which is served from the 115 kV transmission system. The downtown area is served from 115/12 kV and 115/21 kV substations. The distribution system serving the remainder of SMUD's service territory is comprised of 69/12 kV substations with overhead and underground 12 kV distribution circuits.

BUSINESS STRATEGY

General

SMUD's Board of Directors has established the following purpose and vision statements: "SMUD's purpose is to enhance the quality of life for our customers and community by providing reliable and affordable electricity, and leading the transition to a clean energy future. SMUD's vision is to be a trusted and powerful partner in achieving an inclusive, zero carbon economy. SMUD will leverage its relationships to accelerate innovation, ensure energy affordability and reliability, protect the environment, eliminate greenhouse gas emissions, catalyze economic and workforce development, promote environmental justice, and enhance community vitality for all." The Board has adopted a set of Strategic Directions with related metrics, which it considers essential for the success of SMUD and for serving SMUD's customers. These include competitive rates, access to credit markets, reliability, customer relations, environmental leadership, resource planning, enterprise risk management and safety. Some of the general elements in SMUD's business strategy are:

- developing and maintaining a sustainable and reliable power supply to meet demand growth consistent with State mandates and the Board's directions for renewable energy and the reduction of carbon emissions to zero by 2030. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan*";
- working closely with customers to provide the information, tools and incentives to assist them to more efficiently manage energy use, which will contribute to meeting greenhouse gas ("GHG") emission targets and managing needle peak demand requirements (those 40 or so hours of the year with extreme temperatures when customer demand surges by up to 400 additional MW);
- managing price, volumetric and credit risks associated with energy and natural gas procurement;

- attracting, developing and retaining a diverse, skilled and engaged workforce that reflects SMUD's values and is committed to achieving SMUD's mission;
- retaining local decision making authority and operational independence; and
- collaborating regionally to attract new businesses and grow existing business to diversify and strengthen the Sacramento economy.

SMUD's long-range business strategy focuses in part on ensuring financial stability by establishing rates that provide an acceptable fixed charge coverage ratio on a consolidated basis, taking into consideration the impact of capital expenditures and other factors on cash flow. SMUD's Board policy sets a minimum fixed charge coverage ratio of 1.50 times for annual budgets, though it generally plans to meet a minimum fixed charge coverage ratio of 1.70 times. Over the past ten years, the actual fixed charge coverage ratio has averaged 2.14 times on a consolidated basis. SMUD also manages its liquidity position by planning for a minimum of 150 days cash on hand and planning to maintain at least $150 million of available capacity under its commercial paper and line of credit program. As of June 1, 2022, SMUD had all $400 million of the authorized principal amount of its commercial paper and line of credit program available for use. SMUD uses cash on hand and commercial paper and a line of credit to fund capital expenditures, then issues debt to reimburse itself for cash expended for qualified capital expenditures or to pay down the outstanding principal amount of its commercial paper program and line of credit. Over the past ten years, the days cash on hand has averaged 218. The resolutions securing SMUD's Senior Bonds and Subordinated Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below) do not require SMUD to maintain a minimum fixed charge coverage ratio, minimum days cash on hand or minimum available capacity under its commercial paper program and line of credit.

In addition, SMUD's business strategy focuses on servicing its customers in a progressive, forward-looking manner, addressing current regulatory and legislative issues and potential competitive forces.

Serving SMUD's Customers

SMUD continually looks for ways to better serve and partner with its customers to further strengthen customer loyalty, while providing reasonable product pricing. SMUD also has a focused effort to assist and incentivize customers to more efficiently manage energy use, which will contribute to meeting GHG emission targets and managing peak demand requirements as noted below.

Digital Enhancements. Customers are increasingly turning to digital channels such as the new SMUD application, SMUD website, e-mail and social media to interact and do business with SMUD. SMUD has delivered many digital enhancements, including bill pay functionality; online payment arrangements; start/stop/transfer move service; view of energy usage, chat, an enhanced outage map; and the SMUD Energy Store, which is an online marketplace for energy-related products. SMUD plans to continue efforts to provide more personalized digital customer experiences.

Advanced Metering, Infrastructure and Rate Design. As a community-owned organization, SMUD is dedicated to providing the tools and transparency in customer energy usage to enable customers to easily and positively affect energy usage, energy cost, and climate change. In 2012 SMUD installed smart technology, including 617,000 digital communicating smart meters, distribution automation systems and equipment to facilitate load management. The advanced technology has allowed SMUD to deliver tools such as text and e-mail bill alerts and online energy usage comparison charts to help customers manage energy use. SMUD has leveraged smart grid investments to improve reliability, reduce losses, reduce power quality issues and improve customer service through better, more timely information, particularly related to outages.

Time-of-Day Rates. On June 15, 2017, the Board approved time-of-day ("TOD") rates as the standard rate for residential customers. The residential rate transition began in the fourth quarter of 2018 and was completed in the fourth quarter of 2019. Currently, about 98% of residential customers are on TOD rates.

All of SMUD's business customers are also on time-based rates. On June 24, 2019, the Board approved an update to the commercial TOD rates to improve consistency and better align commercial rates with current energy market prices. Due to the impacts of the COVID-19 pandemic on SMUD's operations and priorities, on August 20, 2020, the Board postponed the implementation of the commercial rate restructure for one year. The transition was completed in the first quarter of 2022. See "RATES AND CUSTOMER BASE – Rates and Charges."

Renewable Options. SMUD's customers have been increasingly interested in distributed energy resources, mainly through the installation of solar systems. In 2007, SMUD received 39 applications for customer-owned solar connections. As of January, 2022, approximately 40,400 of SMUD's residential and commercial customers, approximately 6% of retail customers, had installed solar systems, representing approximately 280 MW of solar installations.

As the cost of energy storage continues to decline, SMUD anticipates an increase in behind-the-meter energy storage, mainly through the installation of battery storage systems. As of January 2022, approximately 611 of SMUD's residential and commercial customers, approximately 0.01% of retail customers, had installed storage systems, representing approximately 4.4 MW of storage.

As another option for solar, SMUD's SolarShares® ("SolarShares") pilot program is a cost-effective and convenient way for commercial customers to meet their energy needs from solar power. The SolarShares program offers SMUD commercial customers the opportunity to receive solar power without upfront costs or equipment installation through 5, 10 or 20 year purchase contracts. These customers can receive up to half of their power from a utility-scale solar system. SMUD supplies solar power for the SolarShares program either by building and maintaining utility-scale solar systems or by procuring solar power from third parties through power purchase agreements. The SolarShares generation was approximately 3.0% of retail sales in 2021. As of April 30, 2021, SMUD had completed the SolarShares pilot program and is not entering into new SolarShares contracts.

Since January 2020, the California Building Code has required all newly constructed residential buildings under three stories to be powered by photovoltaic solar systems. A new home satisfies this requirement if it installs on-site solar or participates in an approved community solar or energy storage program. In February 2020, SMUD obtained approval from the California Energy Commission ("CEC") to administer its own community solar program, called Neighborhood SolarShares® ("Neighborhood SolarShares"). SMUD's Neighborhood SolarShares program can be used by developers of new low-rise residential buildings to satisfy the mandatory solar requirement. See also "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Rooftop Solar Mandate*." Starting in 2023, the California Building Code's mandatory solar requirement will extend beyond low-rise residential properties, and other changes to the California Building Code's community solar regulations will take effect. SMUD will revise its program to align with the new regulations and seek approval from the CEC to continue offering its Neighborhood SolarShares compliance option to newly constructed low rise residential homes in its service territory.

In addition to SolarShares and Neighborhood SolarShares, SMUD maintains a voluntary green energy pricing program called Greenergy® ("Greenergy"). The Greenergy program allows customers the opportunity to pay an additional amount per month to ensure that either all or part of their electricity comes from green energy sources. In 2021, the program allocated Renewable Energy Credits ("RECs") equivalent to approximately 6% of retail sales to its participating customers.

Energy Efficiency. To further assist customers in managing energy usage and reducing regional carbon emissions and air pollution, SMUD offers an extensive array of energy efficiency and building electrification programs and services including financial incentives, loans, energy audits and education. In addition, SMUD has partnered with local developers to incorporate energy efficiency and all-electric construction measures into new residential and commercial construction, which helps developers plan and design efficient, cost-effective and low or zero-emission buildings. As part of SMUD's 2019 Integrated Resource Plan ("IRP"), SMUD set a goal for regional carbon emissions through transport and building electrification that aims to reduce carbon emissions in buildings and transport by 64% over the next 20 years. SMUD's focus on electrification is continued in the Zero Carbon Plan (defined and discussed below). SMUD was the first electric utility in the country to set its efficiency goals based on carbon reductions, allowing building electrification and energy efficiency to both count toward meeting SMUD's efficiency goals. This is a significant opportunity, as converting a typical home today to all-electric saves more than three times the carbon emissions compared to doing a major energy efficiency upgrade alone to the same building. See "POWER SUPPLY AND TRANSMISSION – Projected Resources."

Sustainable Power Supply and Transmission

Maintaining a sustainable power supply entails focusing efforts on researching, promoting and implementing new renewable energy technologies and sources to meet SMUD's long-term commitment to reducing carbon emissions and providing a reliable energy supply. SMUD defines a sustainable power supply as one that reduces SMUD's GHG emissions to serve retail customer load to zero by 2030. See "– *2030 Zero Carbon Plan*" below. SMUD is planning to achieve zero GHG emissions to serve retail customer load through investments in energy efficiency, clean distributed energy resources, renewables portfolio standard ("RPS") eligible renewables, energy storage, large hydroelectric generation, clean and emissions free fuels, and new technologies and business models. Additionally, SMUD plans to continue pursuing GHG emissions reductions through vehicle, building and equipment electrification. At the same time, SMUD's plans for maintaining a sustainable power supply include assuring the reliability of SMUD's electric system, minimizing environmental impacts on land, habitat, water and air quality, and maintaining competitive rates relative to other electricity providers in the State.

A number of bills affecting the electric utility industry have been enacted by the State Legislature. In general, these bills regulate GHG emissions and encourage greater investment in energy efficiency and sustainable generation alternatives, principally through more stringent RPS. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings" herein.

2030 Zero Carbon Plan. In July 2020, the Board declared a climate emergency and adopted a resolution calling for SMUD to take significant and consequential actions to reduce its carbon footprint by 2030. On April 28, 2021, the Board approved SMUD's 2030 Zero Carbon Plan (the "Zero Carbon Plan"). The Zero Carbon Plan is intended to be a flexible roadmap for SMUD to eliminate carbon emissions from its electricity production by 2030 while maintaining reliable and affordable service. To achieve these goals the Zero Carbon Plan is focused on four main areas: natural gas generation repurposing, proven clean technologies, new technologies and business models and financial impacts and options. SMUD plans to revisit the Zero Carbon Plan annually.

The natural gas generation repurposing focus of the Zero Carbon Plan calls for exploring the retirement of two of SMUD's five Local Gas-Fired Plants (as defined herein) and the retooling of the other three Local Gas-Fired Plants. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*." Based on SMUD's studies to date, SMUD estimates that SPA

McClellan (as defined herein) can be retired by 2024 and that the SPA Project (as defined herein) can be retired by 2025. Final decisions about the retirement of these two Local Gas-Fired Plants will be based on additional reliability studies and engagement with the community. As part of the Zero Carbon Plan, SMUD is also exploring converting the CVFA Project (as defined herein) and the SCA Project (as defined herein) to standby operations only and investigating the use of alternative fuels like Renewable Natural Gas-biomethane (RNG-biomethane), hydrogen and other biofuels for the CVFA Project, SCA Project, and SFA Project (as defined herein). In addition, SMUD is investigating long duration energy storage strategies for the SFA Project. All final generator configurations are subject to reliability assessments.

The proven clean technologies focus of the Zero Carbon Plan calls for SMUD to procure approximately 1,100 to 1,500 MW of local utility-scale solar photovoltaic ("PV") generating capacity, 700 to 1,100 MW of local utility-scale battery storage, 300 to 500 MW of wind generating capacity, 100 to 220 MW of geothermal generating capacity, and 100 MW of regional utility-scale solar PV generating capacity. The Zero Carbon Plan also estimates that customer installation of approximately 500 to 750 MW of behind-the-meter solar PV generating capacity and approximately 50 to 250 MW of behind-the-meter battery storage will assist SMUD with achieving the Zero Carbon Plan goals.

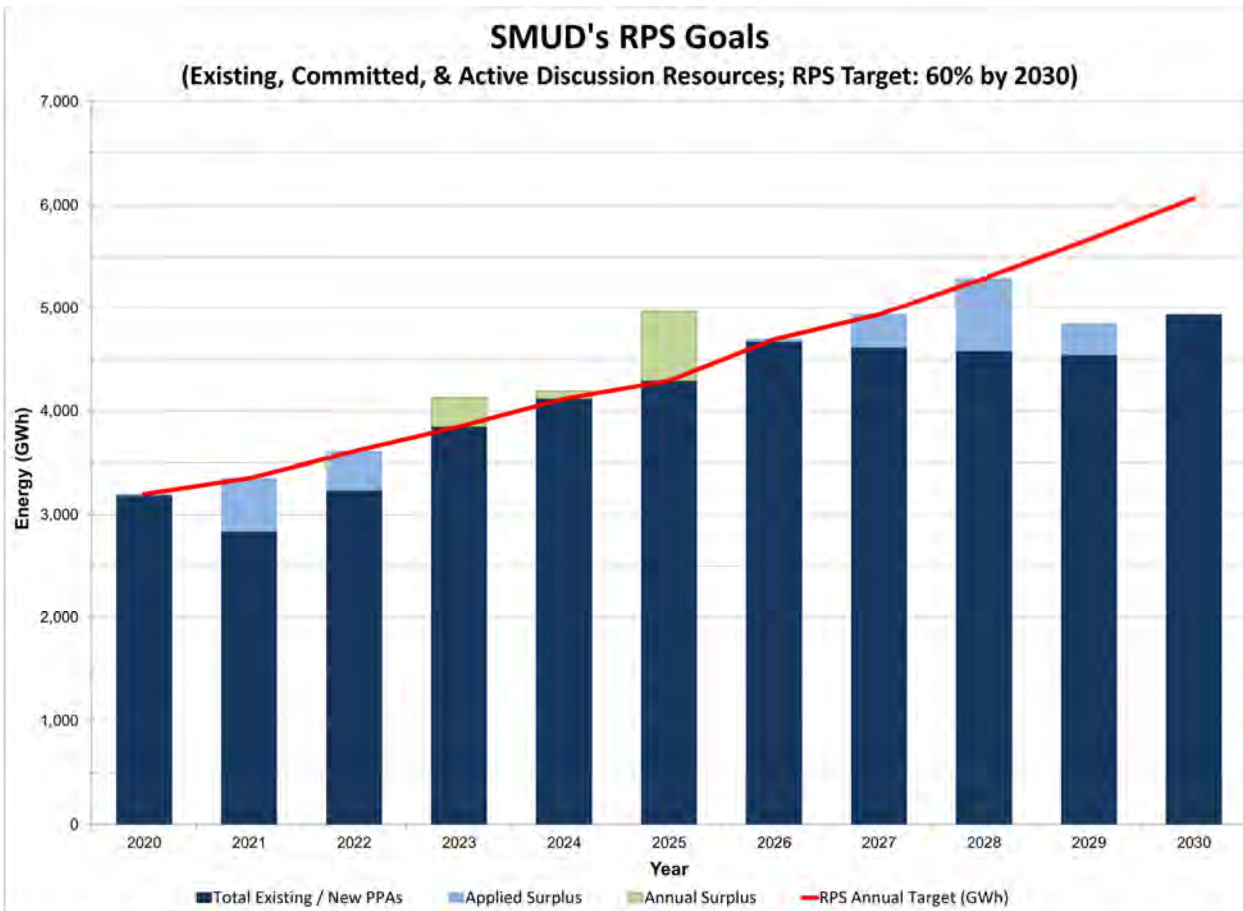
With respect to new technologies and business models, the Zero Carbon Plan focuses on evaluating, prioritizing and scaling the emerging technologies that SMUD expects will have the largest impact on reducing carbon in SMUD's 2030 resource mix. SMUD is currently focused on four main areas of technology: electrification, education and demand flexibility, virtual power plants and vehicle-to-grid technology, and new grid-scale technologies. The Zero Carbon Plan forecasts that customer-owned resources and SMUD customer-focused programs will contribute between 360 and 1,300 MW of capacity to SMUD's grid by 2030.

The financial impacts and options focus of the Zero Carbon Plan aims to keep SMUD rate increases at or below the rate of inflation while achieving SMUD's goal of eliminating carbon emissions from its power supply by 2030. To pay for the expected costs of the Zero Carbon Plan and keep rate increases at or below the rate of inflation, the Zero Carbon Plan estimates the need for SMUD to realize between $50 million and $150 million of sustained annual savings. SMUD currently plans to achieve these sustained annual savings by exploring the implementation of operational savings strategies and pursuing partnership and grant opportunities.

While the ultimate impacts of the Zero Carbon Plan on SMUD's financial results and operations are difficult to predict and are dependent on a variety of factors, such as the relative cost of procuring energy from clean technologies, the availability and relative cost of new technologies, and the adoption and implementation of energy efficiency and other measures by SMUD's customers, such impacts could be material.

Renewable Energy and Climate Change. The California Renewable Energy Resources Act, established by Senate Bill X1-2 ("SBX1-2") and the Clean Energy and Pollution Reduction Act of 2015, enacted by Senate Bill 350 ("SB 350") require that SMUD meets 33% of its retail sales from RPS-eligible renewable resources by 2020 and 50% of its retail sales from RPS-eligible renewable resources by 2030. Senate Bill 100 ("SB 100"), passed by the legislature and approved by then-Governor Brown on September 10, 2018, accelerates the RPS targets and establishes a new 60% target by 2030. The bill also creates a planning goal to meet all of the State's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Renewables Portfolio Standards*" for a discussion of the State RPS requirements.

SMUD's compliance with State RPS requirements is evaluated over 3 or 4-year compliance periods. SMUD met the State RPS requirements for the first compliance period (2011-2013) and second compliance period (2014-2016). The third compliance period (2017-2020) required SMUD to source one-third of its energy from renewable resources, and SMUD had sufficient RECs to meet the third compliance period requirements. SMUD filed its 2020 and third compliance period RPS compliance report with the CEC in the second quarter of 2021 and is awaiting verification of its submission from the CEC which is expected to occur by the end of 2022. As of the end of the third compliance period (2020), SMUD had approximately 1.0 million surplus RECs available to help meet future RPS targets. SMUD expects to file its 2021 RPS compliance report by July 1, 2022, and has sufficient resources purchased in 2021 and surplus RECs to meet the 2021 RPS target (35.75%). In addition to meeting RPS standards, SMUD serves an additional 9% of its customer load with renewable energy through its voluntary SolarShares and Greenergy pricing programs. SMUD estimates that it has sufficient renewable energy deliveries, new power supply contract commitments, new power supply commitments under active discussion, and RPS-eligible surplus carryover to meet its RPS requirements through 2025. Additional solicitations currently under way are expected to provide sufficient RPS-eligible resources to cover SMUD's RPS requirements through 2028. The resources needed to meet SMUD's 2030 Zero Carbon Plan goals are expected to cover SMUD's RPS obligations through at least 2030. The following chart illustrates SMUD's current RPS requirements through 2030 and its existing and committed resources, and its resources under active discussion that are expected to be utilized to meet those requirements.



In addition to procuring new sources, meeting the RPS requirements will require replacement of certain existing renewable contracts which expire in future years. While SMUD anticipates it will meet much of its renewable resource requirements through purchase contracts with third parties, it continues to explore additional options, including wind, solar, biomass, and geothermal developments, partnering with other utilities on future projects, and local development options. SMUD's resource forecast (see "POWER SUPPLY AND TRANSMISSION – Projected Resources") accounts for future renewable resources as a component of "Uncommitted Purchases." To meet SMUD's Zero Carbon Plan goals, SMUD anticipates meeting loads in 2030 with approximately 70-80% renewable resources, in addition to hydro and other new zero carbon technologies. See "*– 2030 Zero Carbon Plan*" above.

Given the intermittent nature of power from renewable resources such as wind and solar, SMUD is exploring and investing in options that provide the flexibility to manage the intermittency of such renewable resources. Potential options include energy storage resources, which SMUD has committed to as part of the 2030 Zero Carbon Plan, and expanding load management resources. Additionally, on April 3, 2019, SMUD, through its membership in BANC, a joint exercise of powers agency formed in 2009, and currently comprised of SMUD, the Modesto Irrigation District ("MID"), the City of Roseville ("Roseville"), the City of Redding ("Redding"), the City of Shasta Lake and the Trinity Public Utilities District has commenced its participation in the California Independent System Operator Corporation ("CAISO") energy imbalance market ("EIM"). Participation in the EIM benefits SMUD by providing it with broader access to balancing resources within the region to help manage its expanding renewable portfolio. In addition, other entities within the BANC Balancing Authority Area began participation in the EIM on March 25, 2021. See "BUSINESS STRATEGY – Serving SMUD's Customers – *Operational Independence and Local Control*" and "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements."

In 2018, SMUD's Board adopted a new IRP through a comprehensive public process and filed the approved IRP with the CEC on April 29, 2019 pursuant to the CEC's IRP guidelines. The approved IRP calls for a reduction in GHG emissions from SMUD's energy supply by more than 60% by 2030 relative to 1990 levels and a goal of net zero emissions by 2040 due, in part, to a significant investment in electrification of the local building and transportation sectors. The IRP was expected to reduce Sacramento's economy-wide GHG emissions by 70% relative to current levels. SMUD's Zero Carbon Plan, adopted in 2021, built upon the 2018 IRP and set a goal of zero carbon emissions by 2030. SMUD is currently working to update its IRP filing with the CEC to incorporate the updated goals set in the 2030 Zero Carbon Plan pursuant to the CEC's IRP guidelines. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission *– 2030 Zero Carbon Plan."*

The State's carbon cap-and-trade market established pursuant to Assembly Bill 32 ("AB 32") began in 2013. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Greenhouse Gas Emissions*" for a discussion of AB 32 and the State's cap-and-trade program. SMUD anticipates that allowances allocated to SMUD will nearly equal SMUD's compliance obligations under normal water year conditions. Under low water year conditions, SMUD may need to purchase additional allowances to cover its compliance obligations, including carbon obligations related to wholesale energy sales from SMUD's natural gas power plants. As SMUD implements its clean power goals, SMUD expects its need for these allowances to decline.

There is scientific consensus that increasing concentrations of GHG have caused and will continue to cause a rise in temperatures in the State and around the world. The change in the earth's average atmospheric temperature, generally referred to as "climate change," is, among other things, expected to result in a wide range of changes in climate patterns, including increases in the frequency and severity of extreme weather events, including droughts and heat waves, more frequent incidences of wildfires, changes in wind patterns, sea level rise and flooding, any of which alone or in combination could materially adversely affect SMUD's financial results or operations. See also "FACTORS AFFECTING THE REGION" and "OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY – Other Factors." As described above, SMUD is actively working to meet its sustainable power supply goals, reduce its own GHG emissions, and assist the local governments in the territory it serves with their desired GHG reductions. In 2016, SMUD introduced the Pilot Natural Refrigerant Incentive Program, its first customer program providing incentives for GHG reduction in addition to kWh savings. SMUD is a founding member and active participant in the Capital Region Climate Readiness Collaborative, a public private partnership formed to better understand and plan for climate impacts expected in the region. SMUD is also an active member of the United States Department of Energy (the "DOE") Partnership for Energy Sector Climate Resilience. SMUD regularly reviews scientific findings related to climate change and in 2016 published its Climate Readiness Assessment and Action Plan.

Energy Storage Systems. Assembly Bill 2514 ("AB 2514") requires the Board to re-evaluate energy storage goals every three years. In compliance with AB 2514, the Board established a target of 9 MW of energy storage procurement by December 31, 2020, which SMUD has procured. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Energy Storage Systems*" for further discussion of AB 2514. In September 2020, the Board directed that energy storage forecasts be implemented through SMUD's IRP process going forward. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*" above for a discussion of SMUD's IRP. SMUD is also evaluating how to couple utility-scale solar with utility-scale storage to support future system reliability needs and renewable energy goals.

Meeting Peak Load. A significant consideration for SMUD will be how it addresses its system peak load. SMUD has implemented programs and tools, such as advanced metering, energy efficiency options, and TOD rates for residential customers, to help customers manage their costs while helping SMUD reduce its peak load. Analysis of 2021 data showed a reduction of approximately 125 MW, not weather adjusted, for residential customers during the TOD peak period (5-8 p.m. local time). SMUD staff will continue to monitor the progress and results of the implementation of TOD rates and will use this information to inform future rate actions and load forecasts. See "BUSINESS STRATEGY – Serving SMUD's Customers – *Time-of-Day Rates*."

On September 16, 2021, the Board approved an optional residential Critical Peak Pricing rate (the "Peak Pricing Rate"), which will go into effect June 1, 2022. The Peak Pricing Rate is designed to reduce load by increasing the price of energy when the grid is most impacted, up to 50 hours per summer. In exchange, customers on the rate will receive a per kWh discount on summer Off-Peak and Mid-Peak rates. SMUD is also exploring the use of more distributed energy resources and demand response programs that could further reduce SMUD's system peak.

Operational Independence and Local Control. A key component of SMUD's business strategy is focused on maintaining its independence in operating and maintaining its resources. As such, SMUD has taken a number of actions to mitigate the potential impacts of various federal and state regulatory actions. For example, in 2002 SMUD established itself as an independent control area (now termed "Balancing Authority") within the Western Electricity Coordinating Council ("WECC") region. By removing itself from CAISO's Balancing Authority area, SMUD became responsible for balancing electric supply and demand within its own service territory. This move substantially reduced fees paid to CAISO, preserved operational flexibility and helped to insulate SMUD from the uncertain regulatory environment and tariff structure of CAISO. In addition to decreased financial risks, this independence also reduced SMUD's exposure to the impacts of capacity and energy shortages in the CAISO Balancing Authority area. Further, as an independent Balancing Authority, SMUD continued to support the statewide electric grid in events of electrical emergencies requiring rotating outages, such as loss of major transmission lines or equipment, as provided in the statewide emergency plan. By 2006, the SMUD Balancing Authority footprint expanded north to the California-Oregon border and south to Modesto, to include the service areas of the WAPA, MID, Redding and Roseville, and TANC -owned 340-mile 500-kV California-Oregon Transmission Project ("COTP"). In October 2009, SMUD, with the coordination and cooperation of WAPA, joined the

Northwest Power Pool Reserve Sharing Group, which supports reliability and reduces operating costs. In May 2011, BANC assumed the role of the Balancing Authority, though SMUD continues to oversee operation of the grid on behalf of BANC. BANC members share cost responsibility for balancing authority-related compliance obligations, liabilities, and operations. BANC also serves as an important venue for SMUD and other BANC members to collaborate with respect to operational and market improvements inside the BANC footprint and to preserve their operational independence. See "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements." On April 3, 2019, SMUD, through its participation in BANC, began operating in the CAISO EIM, which will help SMUD better manage the integration of renewable energy resources. The CAISO EIM is a voluntary market, which allows SMUD to maintain its operational independence from the CAISO, while providing SMUD greater access to balancing resources throughout the western region. See "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements."

FERC Order 1000. In 2011, the Federal Energy Regulatory Commission ("FERC") issued Order 1000, which mandates regional transmission planning and imposes a regional cost allocation methodology for transmission facilities. FERC states that it has the authority to allocate costs to beneficiaries of transmission services even in the absence of a contractual relationship between the owner of the transmission facilities and the beneficiary. Despite appeals challenging FERC's authority on a number of grounds, the D.C. Circuit Court of Appeals upheld Order 1000. See "DEVELOPMENTS IN THE ENERGY MARKETS – Federal Legislation and Regulatory Proceedings – *Federal Regulation of Transmission Access*." Nevertheless, there remains flexibility with respect to SMUD's participation in regional transmission planning. Specifically, SMUD is voluntarily participating as a Coordinating Transmission Owner ("CTO") in the WestConnect transmission planning organization, and will rely on its WestConnect membership to keep it Order 1000 compliant. While SMUD opposes any cost allocation methodology that would obligate SMUD to pay for facilities that it does not use or need to maintain reliable operations or serve its load, the FERC-approved WestConnect planning process does provide a CTO the option to not accept an allocation of costs. WestConnect is composed of utility companies providing transmission of electricity in a portion of the western United States, working collaboratively to assess stakeholder and market needs and develop cost-effective enhancements to the western wholesale electricity market. SMUD is unable to predict at this time the full impact that Order 1000 will have on the operations and finances of SMUD's electric system or the electric industry generally.

Electricity, Natural Gas, and Related Hedging

SMUD continues to utilize a comprehensive and integrated power and fuel supply strategy to acquire a reliable and diversified portfolio of resources to meet existing and future needs. This strategy includes a combination of both physical supply and financial hedging transactions to reduce price risk exposure over a five-year horizon. SMUD's physical supply arrangements include ownership of power generating resources, as well as a diversified portfolio of power and fuel supply purchase contracts that range in duration, with a mixture of fixed and variable pricing terms.

With regard to the power purchase contracts, SMUD has entered into a series of contracts for the purchase of electricity to supply the portion of its resource needs not already provided by owned resources. SMUD also actively manages its exposure on variable rate electricity purchases, and at times may enter into financial contracts to fix prices by using options to reduce price risk, in each case when warranted by economic conditions. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements."

With regard to fuel supply contracts, SMUD utilizes a similar strategy of employing financial contracts of various durations to hedge its variable rate fuel supply contracts. As of March 31, 2022, these contracts are forecasted to have hedged the price exposure on approximately 68%, 70% and 65% of SMUD's anticipated natural gas requirements for 2022, 2023 and 2024, respectively. While the financial effects resulting from the unhedged portions of SMUD's natural gas requirements are difficult to predict, SMUD's financial results could be materially impacted. See "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Supply*."

As provided in SMUD's natural gas contracts, SMUD may be required to post collateral to various counterparties. As of April 15, 2022, SMUD did not have any collateral posting obligations. A decrease in natural gas prices could result in a collateral posting by SMUD. While the posting of collateral is not an expense for SMUD, it does temporarily encumber unrestricted cash balances.

To hedge against hydroelectric production volatility of SMUD-owned hydroelectric facilities, SMUD implemented a pass-through rate component called the Hydro Generation Adjustment (the "HGA"). The HGA and the associated Hydro Rate Stabilization Fund (the "HRSF") help to offset increased power supply or fuel supply costs in years where precipitation levels at SMUD-owned hydroelectric facilities are low. To hedge against variations in the volume of energy received from non-SMUD-owned hydroelectric resources, SMUD uses a rate stabilization fund to help offset increased power supply or fuel supply costs. See "RATES AND CUSTOMER BASE – Rate Stabilization Funds."

Managing Risks

SMUD maintains an Enterprise Risk Management ("ERM") program, a strategic approach to managing enterprise-wide risks as a portfolio, to help reduce the chance of loss, create greater financial stability and protect SMUD resources. It is designed to maintain an early warning system to monitor changes in, and the emergence of, risks that affect the organization's business objectives. Under the purview of the Enterprise Risk Oversight Committee, composed of executive members and chaired by the Chief Financial Officer, ERM conducts ongoing risk identification, assessments, monitoring, mitigation, risk-based budgeting and reporting. To ensure accountability and oversight, each identified risk is assigned to an executive-level risk owner. Risk status and mitigation efforts are reported monthly to the Board.

Competitive Challenges

In the coming decade, utilities like SMUD may face competition from companies in other industries looking to diversify into the energy sector. Examples of developing competitive areas include retail sale of electricity, distributed electric storage resources, renewable distributed generation (mostly solar in Sacramento), customer installation of fuel cells, third-party electric vehicle charging, home or business automation that enables greater customer participation in energy markets, and third-party provision of energy management software and solutions.

SMUD has a wide range of initiatives to monitor and adapt to changing market conditions and new industry participants. Key areas of focus include:

- Enhancing customer experience. Recognizing the importance of meeting customer expectations, SMUD introduced the Customer Experience Strategy in 2016 to provide customers "value for what they pay" and further strengthen customer loyalty. The initiative is focused on ensuring SMUD has the people, systems, technology, programs and services to consistently meet or exceed customers' changing expectations. The customer experience is measured via surveys with the goal of achieving and maintaining at least 70% of customers agreeing that SMUD provides them with value for what they pay by 2024.

- Restructuring electric rates. In 2017, the Board approved TOD rates as the standard rate for residential customers. The residential rate transition began in the fourth quarter of 2018, and the full transition was completed in the fourth quarter of 2019. All of SMUD's business customers are also on time-based rates. In 2019, the Board approved a restructuring of commercial rates to collect a greater portion of fixed costs through fixed charges and to better align time periods and prices with energy markets. The commercial rate restructuring was delayed by one year due to the impacts of the COVID-19 pandemic. The transition was completed in the first quarter of 2022. See “RATES AND CUSTOMER BASE – Rates and Charges” and “FACTORS AFFECTING THE REGION – Impacts from COVID-19 Pandemic.”

- Ongoing integrated resource planning. SMUD monitors and updates its integrated resource planning to ensure future sources of energy balance cost, reliability and environmental requirements with the flexibility to meet challenges of changing market and regulatory conditions, customer energy resources, and emerging technologies.

Leveraging Core Competencies

In addition to these initiatives, SMUD is leveraging core competencies to improve industry safety and help communities serve their customers’ energy needs.

Sacramento Power Academy. SMUD is leveraging its significant experience in training skilled line-workers with the opening of the SMUD Power Academy regional training center in 2016. The academy currently emphasizes training for public power, customer-owned utility employees. There are currently approximately 2,000 customer-owned utilities in the United States that are similar to SMUD, many of which may not have the resources to adequately train their employees. In addition to line-workers, the center will also train substation and network electricians. Other future plans include training electrical, telecom and meter technicians; engineers and designers; construction management inspectors; equipment operators; cable splicers and locators; and support staff.

Community Choice Aggregation. In 2002, Assembly Bill 117 was passed to establish Community Choice Aggregation in the State. SMUD sees the growth of Community Choice Aggregators (“CCAs”) as an opportunity to support organizations with values closely aligned with SMUD’s values, while also generating additional revenue for SMUD. CCA programs are proliferating in the State thanks to support for expanding renewable energy use and desire for local control particularly for electricity procurement. There are numerous CCAs operating in the State, and more are anticipated to launch in the future. CCAs are responsible for procuring wholesale power, setting the generation rate, and staffing a call center to handle opt-outs and questions about the power portfolio. The local investor-owned utility (“IOU”) continues to deliver electricity from the electric grid, maintain its electric infrastructure, bill customers and collect payments.

In October 2017, SMUD was selected by the governing board of Valley Clean Energy (“VCE”) to provide technical, energy and support services, including data management and call center services, wholesale energy services, and business operations support, to VCE for a five-year term. VCE is a joint powers agency formed in 2016 by the City of Woodland, the City of Davis and Yolo County to implement a local CCA program. The service territory expanded to include the City of Winters in 2021. The mission of VCE is to deliver cost-competitive clean electricity, product choice, price stability, energy efficiency, and greenhouse gas emissions reductions to its customers in Yolo County. VCE began electric services to its customers in the summer of 2018, giving Yolo County residents a choice between two electricity providers, VCE and PG&E.

In November 2017, SMUD was selected by the governing board of East Bay Community Energy (“EBCE”) to provide call center and data management services for a three-year term beginning in January 2018. EBCE is a joint powers agency formed in 2016 by the cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Oakland, Piedmont, San Leandro and Union City in Alameda County to implement a local CCA program. EBCE expanded its territory to the cities of Pleasanton, Newark, and Tracy in April 2021. SMUD signed a new contract with EBCE in January 2022 for another three years for call center and data management services.

In June 2019, SMUD was selected by the governing board of Silicon Valley Clean Energy ("SVCE") to provide program services to help local SVCE communities reduce carbon pollution while delivering engaging customer experiences. SVCE programs are focused on grid integration, as well as electrifying transportation, buildings and homes. SVCE is a joint powers agency formed in 2016 by the cities of Campbell, Cupertino, Gilroy, Lost Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and Unincorporated Santa Clara County to implement a local CCA program.

While CCAs have had success in the State, they are susceptible to business, regulatory and other risks that could lead to a financial loss and/or result in a cessation of operations for the CCA. These risks could extend to a CCA's counterparties, including SMUD. SMUD has made an effort to identify and mitigate potential counterparty risks to the extent possible in service agreements with the CCA's described above. SMUD may pursue opportunities to provide similar services to additional CCAs in the future. SMUD management does not expect its current arrangements with VCE, EBCE, and SVCE to have a material adverse impact on SMUD's financial position, liquidity or results of operations.

FACTORS AFFECTING THE REGION

Precipitation Variability

SMUD uses a National Weather Service precipitation station located at Pacific House, California to approximate available water supply to SMUD's Upper American River Project (the "UARP") hydropower reservoirs. As of March 31, 2022, precipitation at Pacific House, California totaled 37.14 inches for the October-September hydropower water supply period. This is 89% of the 50-year rolling median of 41.86 inches. Total reservoir storage in the UARP hydropower reservoirs was about 83% of capacity as of April 12, 2022, approximately 15% above historical average for this date. SMUD manages its reservoirs to maximize water storage going into the summer season, which preserves generating capacity during SMUD's high load months and ensures that SMUD meets its UARP FERC license requirements, including requirements for recreational and environmental flows.

Although reservoir levels in the UARP are above historical averages, there remains the potential for wide swings in precipitation from year to year. In years with below average rainfall, SMUD may have to generate or purchase replacement energy at additional cost. To hedge against variations in the volume of energy received from SMUD-owned UARP hydroelectric resources, SMUD uses the HRSF to help offset increased power supply or fuel supply costs. See "RATES AND CUSTOMER BASE – Rate Stabilization Funds."

SMUD is also exposed to precipitation variability through its contract with the WAPA. In an average water year this contract provides roughly 661 gigawatt hours ("GWh") of power, but the actual amount will vary depending on precipitation. Unlike the UARP, SMUD does not monitor precipitation stations to approximate power deliveries under the WAPA contract, and instead relies on a forecast of power deliveries from WAPA. As of March 31, 2022, WAPA has forecasted power deliveries of 348 GWh for 2022. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Western Area Power Administration*."

Wildfires

General. Wildfires in the State have become increasingly common and destructive. Frequent drought conditions and unseasonably warm temperatures have increased, and could further increase, the possibility of wildfires occurring in areas where SMUD maintains generation, transmission and distribution facilities. The number of diseased and dead trees has increased, and could further increase, this possibility. As a result, SMUD faces an increased risk that it may be required to pay for wildfire related property damage or personal injuries, fines and penalties, some of which may not be covered by insurance (including costs in excess of applicable policy limits), or may be disputed by insurers, and could be material. In addition, a significant fire or fires in SMUD's generation, transmission or service area could result in damage or destruction to SMUD's facilities, result in a temporary or permanent loss of customers or otherwise materially increase SMUD's costs or materially adversely affect SMUD's ability to operate its Electric System or generate revenues.

SMUD's service territory is located within Sacramento County, which is located outside the California Public Utilities Commission (the "CPUC") high fire threat areas, established in 2018. However, as described below, SMUD's UARP facilities and certain of SMUD's and TANC's transmission facilities are within CPUC high fire threat areas. In addition, as described below, certain portions of SMUD's service territory are located within the California Department of Forestry and Fire Protection ("Cal Fire") Fire Protection and Resource Assessment Program ("FRAP") Moderate, High and Very High Fire Hazard Severity Zones. SMUD's exposure to liability for damages related to its UARP facilities, which are located within high fire threat areas in El Dorado County, is reduced due to risk mitigation measures adopted by SMUD and the low number of inhabitants and structures near the UARP facilities (See "Wildfire Mitigation" below). SMUD continues to take responsible action to minimize its exposure to liability from wildfires; however, under current State law, utilities can be held liable for damages caused by wildfires sparked by their equipment or other facilities regardless of whether the utility was negligent or otherwise at fault. Therefore, at this time the full extent of SMUD's potential exposure to wildfire risk is unknown.

Distribution (SMUD Service Territory). Portions of SMUD's service territory are located within Cal Fire's FRAP Moderate, High and Very High Fire Hazard Severity Zones. State law requires Cal Fire to classify areas in the State based on the severity of the fire hazard that is expected to prevail there. These areas or "Fire Hazard Severity Zones" are based on factors such as fuel (material that can burn), slope and the expected chance of burning. There are three Fire Hazard Severity Zones (Moderate, High and Very High) based on increasing fire hazard. SMUD has assessed its service territory based on Cal Fire's FRAP map, adopted in 2007; the following table illustrates SMUD's assessment of the approximate extent of its service territory and retail customer base located within the three Fire Hazard Severity Zones.

Fire Hazard Severity Zone	Moderate	High	Very High
Acres of SMUD Service Area	231,816	2,337	1,061
% of Total SMUD Service Area	40.6%	0.4%	0.2%
Number of Retail Customers	40,114	3,688	136
% of Total Retail Customers	6.0%	0.6%	0.0%

Transmission (Outside of SMUD Service Territory). In 2018, the CPUC approved a new statewide fire map that identifies areas of elevated and extreme wildfire risk from utility-associated assets located throughout the State. SMUD directly participated in the development of the CPUC's statewide fire map. In connection with the development of the CPUC's statewide fire map, a peer review and a team of independent nationwide experts led by Cal Fire affirmed that SMUD's electric service area is properly located outside of these elevated ("Tier 2") and extreme ("Tier 3") high fire threat areas; however, SMUD's UARP facilities are located within both Tier 2 and Tier 3 areas. According to the CPUC, Tier 2 fire-threat areas are areas where there is an elevated wildfire risk from utility assets and Tier 3 fire-threat areas are areas where there is an extreme risk from utility assets. As of June 8 2021, approximately 37 right-of-way mile of SMUD's transmission lines are in Tier 2 fire-threat areas and approximately 19 right-of-way miles of SMUD's transmission lines are in Tier 3 fire-threat areas. SMUD is also a member of TANC. As of July, 2021, approximately 116.3 right-of-way miles of TANC's transmission lines are in Tier 2 fire-threat areas and approximately 4.5 right-of-way miles of TANC's transmission lines are in Tier 3 fire-threat areas. In accordance with its FERC license, SMUD adheres to a FERC-approved Fire Prevention and Response Plan for its UARP facilities. On May 17, 2018, in accordance with State law, SMUD's Board of Directors determined that the UARP area may have a "significant risk of catastrophic wildfire" resulting from overhead electric facilities and that SMUD's FERC-approved UARP Fire Prevention and Response Plan meets requirements for presenting wildfire mitigation measures to the Board for its approval.

Wildfire Mitigation. In response to potential wildfire risk, SMUD is implementing a series of measures intended to prevent wildfires from occurring, minimize the spread of any fire that does occur and improve the resiliency of its system. These measures include an increase in the degree of sophistication of fuel reduction inside and adjacent to rights-of-ways; installation of Cal Fire-approved exempt material to reduce the risk of sparking; enhanced inspection and maintenance programs; increased use of ignition-resistant construction, including covered conductors and undergrounding of conductors; increased monitoring of and identified responses to fire conditions, including operational procedures for the de-energization of lines during high fire conditions; and elimination of the use of automatic circuit reclosers on SMUD's transmission lines and on SMUD's distribution lines in certain areas during fire season.

SMUD's proactive approach to vegetation management recently has been expanded to include the use of advanced technologies such as Light Detection and Ranging surveys, ortho and oblique that is used to pinpoint tree health and/or condition that may not yet be visible to the naked eye. In addition, SMUD has installed additional weather stations in transmission corridors and substations for increased situational awareness, and has continued coordination and collaboration with local agencies and first responders as well as vulnerable populations.

State legislation enacted in 2018 and 2019 requires publicly owned utilities ("POUs") to prepare and present Wildfire Mitigation Plans to their governing boards by January 1, 2020, and annually thereafter. SMUD assembled an enterprise-wide team of subject-matter experts to prepare its plan in compliance with this legislation, released a draft of the plan for public comment, contracted for and obtained an independent evaluation of the comprehensiveness of the plan, and presented the plan and the evaluator's report to the Board in the fourth quarter of 2019. The plan was adopted by the Board and submitted to the State Wildfire Safety Advisory Board (the "WSAB") in 2020.

SMUD reviewed and updated its wildfire mitigation plan, released a draft of the updated wildfire mitigation plan for 2021 (the "2021 Wildfire Mitigation Plan") for public comment, contracted for and obtained an independent evaluation of the comprehensiveness of the 2021 Wildfire Mitigation Plan, and presented the 2021 Wildfire Mitigation Plan and the evaluator's report to the Board in the fourth quarter of 2020. Subsequent to this approval the WSAB issued a general set of recommendations for publicly owned electric utility wildfire mitigation plans. SMUD prepared a Supplement to its 2021 Wildfire Mitigation Plan (the "Supplement") to respond to those recommendations and presented the Supplement to the Board in the second quarter 2021. The Supplement was adopted by the Board and SMUD submitted the 2021 Wildfire Mitigation Plan together with the Supplement to the WSAB in June 2021. The WSAB adopted its 2022 Guidance Advisory Opinion for POUs in February 2022 and SMUD has responded to all recommendations regarding SMUD's Wildfire Mitigation Plan in the development of its draft Wildfire Mitigation Plan ("2022 Wildfire Mitigation Plan"). After completion of a noticed public comment process and qualified independent evaluator review, the draft 2022 Wildfire Mitigation Plan will be presented to the Board and once adopted by the Board will be submitted to the WSAB by July 1, 2022. SMUD will continue to annually review and update its wildfire mitigation plan, conducting a comprehensive review at least every third year.

Wildfire Insurance. Wildfires in the State have not only increased potential liability for utilities, but have also adversely impacted the insurance markets, leading to higher costs for coverage; coverages becoming prohibitively expensive; limited or restricted coverage to certain types of risks; or coverage at insufficient levels. SMUD most recently renewed its general and wildfire liability insurance coverage on June 15, 2021. SMUD increased the commercially-insured portion of its $250 million wildfire coverage program from $173 million to $176 million and stayed within budgeted premium amounts. SMUD self-insures certain layers and quota share portions of the insurance tower up to $74 million.

In addition, it is expected that SMUD will have a portion of the $400 million aggregate principal amount of its commercial paper and line of credit program to provide operational flexibility in the event of the occurrence of a wildfire or other operational event. However, SMUD has not covenanted to maintain the availability of the commercial paper program and line of credit program for these purposes and no assurances can be given that the commercial paper and line of credit program will be available at the time of, or during, such an event.

August 2020 Heat Wave

The State experienced a prolonged above average temperature from August 14, 2020 through August 18, 2020. The CAISO was forced to institute rotating electricity outages in the State during this extreme heat wave. SMUD, as a member of BANC, did not have to implement any planned power disruptions. Additionally, SMUD was able to support the CAISO during some hours of the heat wave with both requested emergency assistance and wholesale market sales. SMUD's peak demand between August 14, 2020 and August 18, 2020, varied between 2,874 MW and 3,057 MW, well below SMUD's record peak of 3,299 MW.

Impacts from COVID-19 Pandemic

The COVID-19 pandemic has dramatically altered the behavior of businesses and people in a manner that has had, and continues to have, negative effects on global and local economies. SMUD is still experiencing the impact from COVID-19, but the impact on SMUD has lessened since the height of the pandemic in 2020. Compared to weather adjusted, pre-pandemic load levels, SMUD is currently experiencing an approximately 2%-3% increase in residential customer load and an approximately 3% decrease in commercial customer load, resulting in almost no change in net load. The commercial customers currently experiencing the largest impacts of the pandemic appear to be medium sized commercial customers while the smallest and largest commercial customers appear to have returned to pre-pandemic load levels or are exceeding them. SMUD anticipates that load recovery will continue over the next couple of years resulting in continued movement towards pre-pandemic levels, but not a complete recovery as people continue to work from home long-term.

In addition, as a result of the pandemic, many businesses have closed or reduced operations, unemployment has dramatically increased, many employees have been furloughed and/or shifted to reduced working hours and an increased number of SMUD's customers have been, and could continue to be, unable to pay their electric bills. Part of the governmental response to the economic consequences of the pandemic required utility providers (including SMUD) to provide additional grace periods and flexible payment plans for the payment of utility bills or to refrain from pursuing collection remedies for unpaid bills for a period of time. SMUD had also implemented a no-shutoff policy through January 2022 under which SMUD would not disconnect power to a customer for non-payment of its electric bill. Beginning in February 2022, SMUD resumed its normal payment, late fee, and disconnection process and began disconnections of unpaid accounts in late April 2022. As a result, SMUD has experienced an increase in delinquencies for customer electric accounts versus pre-pandemic levels. In January 2022, SMUD received $41 million from the California Arrearage Payment Program ("CAPP") and the funds were applied to delinquent balances. As of April 9, 2022, the total delinquencies for customer electric accounts were $74.3 million, after the CAPP credit, which is an increase from the February 2020 balance of total delinquencies for customer electric accounts of $16.9 million. SMUD has also paused the recertification process for existing customers in SMUD's low-income discount program. The number of customers participating in the low-income assistance program increased by 14,700, or approximately 14% from February 2020 to March 2022. Although low-income assistance customers increased, program costs decreased by $0.7 million in 2021 compared to 2019 due to a previously approved program restructuring.

SMUD's actual 2021 revenue exceeded the 2021 revenue forecast. Revenue in 2022 and 2023 is expected to increase as customers shift back to pre-pandemic energy usage patterns. On September 16, 2021, the Board also approved a 1.5% rate increase effective March 1, 2022 and a 2.0% rate increase effective January 1, 2023 for all customer classes. See "RATES AND CUSTOMER BASE – Rates and Charges – *2021 Rate Action*."

While the full effects of the pandemic and its related consequences on SMUD's financial results and operations are difficult to predict, SMUD's financial results or operations could be materially adversely affected. If the pandemic and its consequences are prolonged, again become more severe or another similar event occurs, the likelihood of adverse impacts could be increased.

RATES AND CUSTOMER BASE

Rates and Charges

SMUD's Board of Directors has autonomous authority to establish the rates charged for all SMUD services. Unlike IOUs and some other municipal utility systems, retail rate and revenue levels are not subject to review or regulation by any other federal, State or local governmental agencies. Changes to SMUD rates only require formal action by the Board of Directors after two public workshops and a public hearing. SMUD is not required by law to transfer any portion of its collections from customers to any local government. SMUD typically reviews and sets rates on a two-year cycle.

2019 Rate Action.

On June 24, 2019, the Board approved a 3.75% rate increase effective January 1, 2020, a 3.00% rate increase effective October 1, 2020, a 2.50% rate increase effective January 1, 2021, and a 2.00% rate increase effective October 1, 2021, for all customer classes. Additionally, the Board approved a restructuring of the commercial rates, including new time periods and an overall increase in the fixed bill components, such as the System Infrastructure Fixed Charge and demand charges, and a corresponding decrease in energy charges, making the restructuring revenue neutral by rate category. To minimize bill impacts, rate categories will be restructured over an 8-year period. Customers were transitioned to the new rates in the first quarter of 2022. There is currently pending litigation concerning the adoption of the 2020 and 2021 rates. See "LEGAL PROCEEDINGS – Proposition 26 Lawsuit."

Due to the impacts of the COVID-19 pandemic on SMUD's operations and priorities, on August 20, 2020, the Board approved postponing the implementation of the commercial rate restructure for one year.

2021 Rate Action.

On September 16, 2021, the Board approved a 1.5% rate increase effective March 1, 2022 and a 2.0% rate increase effective January 1, 2023 for all customer classes. Additionally, the Board approved the Solar and Storage Rate, the optional residential CPP rate, and updates to certain schedules of SMUD's Open Access Transmission Tariff ("OATT"). The Board also approved a new timeline for the commercial rate restructure transition, and all impacted commercial customers were transitioned to the new rates by the end of the first quarter of 2022.

SMUD also implemented a solar interconnection fee based on the size of solar interconnection and supporting programs such as battery incentives, incentives to enroll in SMUD's Critical Peak Pricing rate, battery incentives for Virtual Power Plants, and a program to bring the benefits of solar to under-resourced multi-family communities. These programs and fees are not subject to Board approval.

Rate Stabilization Funds

The Rate Stabilization Fund (the "RSF") is maintained by SMUD to reduce the need for future rate increases when costs exceed existing rates. At the direction of the Board, amounts may be either transferred into the RSF (which reduces revenues) or transferred out of the RSF (which increases revenues). The Board authorizes RSF transfers on an event driven basis. The RSF includes funds to hedge variations in the volume of energy received from non-SMUD hydroelectric generation, variation in AB 32 revenue and variations in Low Carbon Fuel Credit ("LCFS") revenue. As of March 31, 2022, the balance in the RSF was $137.5 million, approximately 8.8% of retail revenue.

Effective July 2008, SMUD implemented the HGA, which is a pass-through rate component to deal with variations in hydroelectric generation from the UARP (see "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Hydroelectric*"). The HGA is designed to increase revenues in dry years when SMUD must buy power to replace hydroelectric generation and return money to the HRSF in wet years when SMUD has more hydroelectric generation than expected. Each year SMUD determines the impact of precipitation variances on projected hydroelectric generation from the UARP. When the precipitation variance results in a deficiency of hydroelectric generation from the UARP, transfers from the HRSF, which was created as a component of the RSF, to SMUD's available cash, will be made in an amount approximating the cost to SMUD of replacement power (up to 4% of revenues) until the balance in the HRSF is zero. When the precipitation variance results in a projected surplus of hydroelectric generation from the UARP, deposits will be made into the HRSF in an amount approximating the positive impact to SMUD from the surplus hydroelectric generation (up to 4% of revenues) until the balance in the HRSF is equal to 6% of budgeted retail revenue (currently approximately $56 million). If the balance in the HRSF is not sufficient to cover transfers that would otherwise be made in the event of a projected deficiency in UARP hydroelectric generation, a 12-month HGA surcharge will automatically be included on customers' electric bills at a level that generates up to 4% of retail revenue. If the balance in the HRSF is equal to 6% of budgeted retail revenue on any precipitation variance calculation date and the precipitation variance results in a projected UARP hydroelectric generation surplus, the positive impact of the surplus may be used for other purposes at staff's recommendation, with the approval of the Board, including returned to customers through an electric bill discount up to 4% of retail revenue. SMUD calculates HRSF transfers based on an April-March (water year) precipitation period at Pacific House, California. This National Weather Service precipitation station is used to approximate available water supply to SMUD's UARP hydropower reservoirs. As of March 31, 2022, precipitation at Pacific House, California totaled 38.34 inches which is below the 50-year rolling median of 50.52 inches.

As of March 31, 2022, the combined balance in the RSF and HRSF was $193.6 million. SMUD is forecasting a transfer of approximately $25.1 million out of the HRSF to SMUD's available cash in April

2022 due to below average precipitation, which will decrease the balance in the HRSF from $56.1 million to approximately $31.0 million. Although the HRSF and the subaccount of the RSF that hedge variations in the volume of energy received from non-SMUD hydroelectric generation currently have positive balances, continued below average precipitation could deplete the HRSF and RSF balances to zero.

Low Income Discount

As of March 2022, approximately 90,102 customers received the low-income discount offered by SMUD, which represents approximately 16% of all residential customers. SMUD monitors the program to ensure participants continue to be eligible for the discount. In 2021, the total discount was approximately $29.5 million. As a result of the effects of the COVID-19 pandemic and related economic downturn, SMUD experienced an increase in low-income discount applicants. See “FACTORS AFFECTING THE REGION – Impacts from COVID-19 Pandemic.”

SMUD expanded its programs and services starting in 2016 to help customers with energy assistance, home improvement packages and education. SMUD is creating tailored solutions to best meet the needs of low-income customers. These solutions include free solar panels and inspecting homes to identify energy saving opportunities. As of March 2022, SMUD has performed 27,000 energy retrofits and, in partnership with Grid Alternatives (a non-profit organization that focuses on implementing solar power and energy efficiency for low-income families), 196 customers have benefited from free solar installations. Forty additional homes received solar and energy efficiency through a partnership with Habitat for Humanity of Greater Sacramento. As part of SMUD’s Zero Carbon Plan and the focus on building electrification, SMUD has also been ramping up electrification investments for low-income customers. Since 2019, SMUD has assisted more than 675 households with electrification upgrades.

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Rate Comparisons

SMUD's rates remain significantly below those of PG&E and other large utilities throughout the State. The following table sets forth the average charges per kWh by customer class for both SMUD and PG&E. PG&E's rates reflect their recently approved rate effective March 1, 2022.

AVERAGE CLASS RATES

	SMUD Rates (cents/kWh)[(1)]	**PG&E Rates (cents/kWh)[(2)]**	**Percent SMUD is Below PG&E[(3)]**
Residential – Standard	17.57¢	33.57¢	47.6%
Residential – Low Income	12.18¢	20.91¢	41.7%
All Residential	**16.73¢**	**29.16¢**	**42.6%**
Small Commercial (Less than 20 kW)	17.01¢	32.24¢	47.3%
Small Commercial (21 to 299 kW)	15.76¢	30.69¢	48.6%
Medium Commercial (300 to 499 kW)	14.59¢	29.75¢	50.9%
Medium Commercial (500 to 999 kW)	13.65¢	25.73¢	47.0%
Large Commercial (Greater than 1,000 kW)	11.45¢	20.08¢	43.0%
Lighting – Traffic Signals	13.46¢	31.39¢	57.1%
Lighting – Street Lighting	15.17¢	35.57¢	57.3%
Agriculture	15.10¢	29.19¢	48.3%
System Average	15.26¢	27.76¢	45.0%

(1) Projected 2022 average prices for SMUD with rates effective October 1, 2021 and March 1, 2022.
(2) PG&E average prices in 2022 reflect rates effective March 1, 2022, per Advice Letter 6509-E- dated February 18, 2022.
(3) The rates in the Average Class Rates table are calculated by dividing the total revenue of each class by the total usage of that class in kWh. The actual savings per customer will vary based on their electricity consumption.

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The following table shows a comparison of SMUD's charges for the average residential usage of 750 kWh per month (based on an average of summer and non-summer) and charges of seven similar neighboring or largest utilities in the State.

STATEWIDE COMPARISON–RESIDENTIAL SERVICE

	Monthly Billing Charge 750 kWh[2]	**Percent SMUD is (Below)/Above Utility**
Sacramento Municipal Utility District[1]	$128.54	
Pacific Gas & Electric Company	$258.62	(50.3%)
Roseville Electric Utility	$116.20	10.6%
Turlock Irrigation District	$120.40	6.8%
Modesto Irrigation District	$134.53	(4.5%)
Southern California Edison Company	$172.74	(25.6%)
Los Angeles Dept. of Water & Power	$217.72	(41.0%)
San Diego Gas and Electric Company	$306.45	(58.1%)

(1) Includes approved March 1, 2022 rates.
(2) Per individual utility's published schedules as of March 1, 2022.

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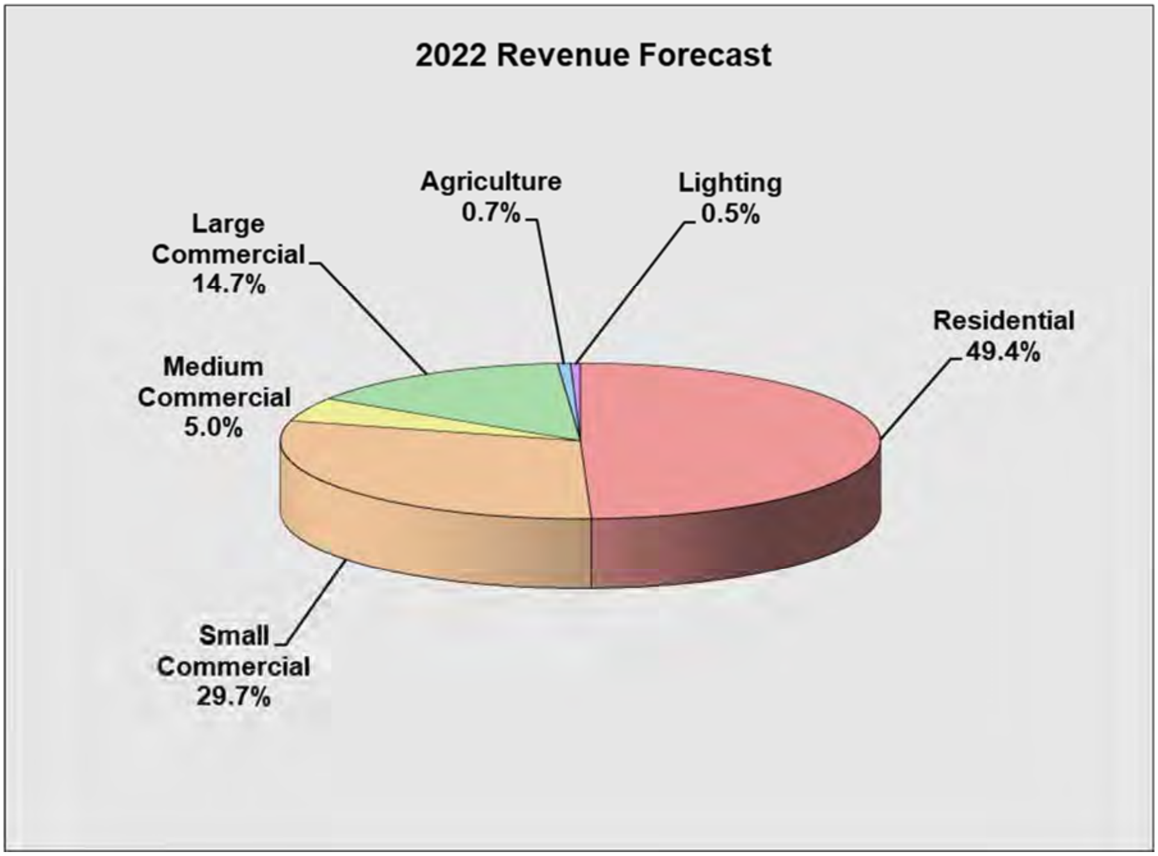
Allocation of Revenue by Customer Class

The following chart sets forth the forecast percentage of SMUD revenues from billed sales associated with each customer class.



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Customer Base; Largest Customers

A stabilizing influence on SMUD's revenues is that a substantial proportion is derived from residential customers (49.6% in 2021). Historically, revenue from commercial and industrial consumption has been more sensitive to economic fluctuation. Furthermore, SMUD has no dominant customers that account for a significant percentage of annual revenues. In 2021, no single customer contributed more than 3% of revenues. The top ten customers generated approximately 11% of revenues and the top 30 generated approximately 17%. The following table presents information on SMUD's top ten customers as of December 31, 2021.

SMUD'S LARGEST CUSTOMERS
(As of December 31, 2021)

Customer Type	Annual Revenue ($ millions)	% of Total Revenue
Technology	$37.46	2.43%
Government	$32.42	2.10%
Government	$30.43	1.98%
Technology	$13.57	0.88%
Government	$13.20	0.86%
Communications	$9.89	0.64%
Industrial Gases	$9.07	0.59%
Grocery	$7.31	0.47%
Government	$7.22	0.47%
Government	$6.73	0.44%
Top 10 Total	**$167.28**	**10.86%**

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POWER SUPPLY AND TRANSMISSION

Power Supply Resources

The following table sets forth information concerning SMUD's power supply resources as of March 31, 2022. Capacity availability reflects expected capacities at SMUD's load center, as well as entitlement, firm allocations and contract amounts in the month of July, which is generally SMUD's peak month.

POWER SUPPLY RESOURCES
(As of March 31, 2022)

Source:	Capacity Available (MW)[1]
Generating Facilities:	
Upper American River Project – Hydroelectric	685
Solano Wind Project – Wind[2]	120
Hedge Battery[2]	4
Sub-total:	**809**
Local Gas-Fired Plants:	
SFA (Cosumnes)	570
CVFA (Carson-Ice)	103
SCA (Procter & Gamble)	166
SPA (McClellan)	72
SPA (Campbell Soup)	170
Sub-total:	**1,081**
Purchased Power:	
Western Area Power Administration (WAPA) [3] [4]	272
Grady – Wind[2]	67
Iberdrola (PPM) – Wind[2]	32
Feed-in-Tariff Photovoltaic – Solar[2]	27
Rancho Seco Solar[2]	73
NTUA Navajo Drew Solar[2]	56
Recurrent – Solar[2]	39
Wildflower Solar[2]	11
CalGeo – Geothermal	26
Patua (Gradient/Vulcan) – Geothermal	12
Other Long-Term Contracts	18
ELCC Portfolio Adjustment[2]	(53)
Firm Contract Reserves[4]	14
Committed Short-Term Purchases [5]	708
Uncommitted Short-Term Purchases	88
Sub-total:	**1,366**
Total	**3,255**

(1) Available capacity is the net capacity available to serve SMUD's system peak load during the month of July.
(2) Capacity values shown are based on resource effective load carrying capability modeling.
(3) Total includes SMUD's Base Resource share and WAPA Customer allocations.
(4) Assumes firm reserves of 5% are included.
(5) Committed Short-Term Purchases are primarily purchased on a year-ahead to season-ahead basis from various sources.

Note: Totals may not add due to rounding.

Power Generation Facilities

Hydroelectric. The UARP consists of three relatively large storage reservoirs (Union Valley, Loon Lake and Ice House) with an aggregate water storage capacity of approximately 400,000 acre-feet and eight small reservoirs. Project facilities also include eight tunnels with a combined length of over 26 miles and eight powerhouses containing 11 turbines. In addition to providing clean hydroelectric power and operating flexibility for SMUD, the UARP area provides habitat for fish and wildlife and a variety of recreational opportunities, including camping, fishing, boating, hiking, horseback riding, mountain biking and cross-country skiing.

The combined capacity of the UARP is approximately 673 MW at SMUD's load center in Sacramento. Under current licensing and mean water conditions, these facilities are expected to generate approximately 1,600 GWh of electric energy annually, which represents approximately 15% of SMUD's current average annual retail energy requirements. In 1957, the Federal Power Commission (predecessor agency to FERC) issued a license to SMUD for the UARP. This 50-year license was subsequently amended to add and upgrade facilities and now includes all segments of SMUD's hydroelectric facilities located on the South Fork of the American River and its tributaries upstream from the Chili Bar Project (described below). Before the original FERC license expired in 2007, SMUD reached a settlement agreement with federal and state regulatory land management agencies, nongovernmental organizations, and other interested stakeholders on proposed terms and conditions to be included in a new FERC license for the UARP. The settlement agreement was filed with the FERC on February 1, 2007.

On October 4, 2013 the California State Water Resources Control Board (the "SWRCB") issued a 401 Water Quality Permit as required by the Clean Water Act, and on July 23, 2014 FERC issued a new 50 year license for the UARP. The new license followed the Settlement Agreement filed in 2007. The new license includes increases in environmental flow releases, and recreational flows at several locations. The estimated loss of generation is approximately 100 GWh per year and an additional $15 million of O&M and capital costs per year.

On June 16, 2021, pursuant to Board authorization, SMUD acquired the Chili Bar Hydroelectric Project which consists of a 7 MW powerhouse, reservoir, dam and spillway, north of Placerville on the South Fork of the American River for approximately $10.4 million (the "Chili Bar Project"). The Chili Bar Project is immediately downstream from the UARP and operates as the regulating reservoir for the UARP's largest powerhouse. Owning the UARP and the Chili Bar Project enables SMUD to operate the two projects with a holistic approach to license compliance and generation efficiency.

Solano Wind Project. SMUD owns and operates a 102 MW wind project, located in Solano County, known as Solano Phases 1 and 2. Solano Phases 1 and 2 consist of 23 wind turbine generators ("WTG") rated at 660 kilowatts ("kW") each, and 29 WTGs rated at 3 MW each, respectively. Energy from the project is collected at 21 kV and transmitted over a dedicated 3-mile overhead system to the SMUD-owned Russell substation. At the Russell facility, the energy is transformed to 230 kV and interconnected to PG&E's Birds Landing Switching Station. Energy deliveries are scheduled through the CAISO.

Solano 3 Project. In 2011 and 2012, SMUD constructed a 128 MW wind project adjacent to Solano Phases 1 and 2, known as Solano 3. The Solano 3 project consists of 55 WTGs rated at 1.8 MW and 3.0 MW, and interconnects at the Russell substation. The Solano 3 project was sold to Solano 3 Wind, LLC, a subsidiary of Citigroup, in December of 2011. The transaction included an option for SMUD to repurchase the Solano 3 project at year six, eight or fifteen. SMUD exercised its repurchase option at year six, and completed this transaction and transfer of ownership in April 2018.

Solano 4 Project. SMUD is developing the Solano 4 Wind Project. The Solano 4 Wind Project currently plans to utilize SMUD-owned land near the Solano 3 project, known as the Collinsville and Roberts properties, to install 10 WTGs rated at 4.5MW, and to remove the Solano Phase 1 turbines and replace them with 9 WTGs rated at 4.5 MW. In 2019, SMUD secured the wind rights on the Roberts property and removed the wind turbines on that property. SMUD received the Cluster II Phase I Study results from the CAISO in January 2019, provided the initial security posting in April 2019, and received the Phase II Study Report in November 2019, furthering the process towards a Large Generator Interconnection Agreement. SMUD has met all of the CAISO requirements and has executed a Large Generator Interconnection Agreement as of June 2021 that will allow for 90.8 MW of capacity at the point of interconnection. WAPA and PG&E identified upgrades needed to interconnect the Solano 4 Wind Project that may not be complete before 2024. The WAPA impacts have been resolved at no cost. PG&E has an approved project and expects to complete the needed upgrades by May of 2025. In April 2021, SMUD submitted an application for advisory review by the Solano County Airport Land Use Commission (the "Solano ALUC") of the Solano 4 Wind Project's consistency with the 2015 Travis Air Force Base Land Use Compatibility Plan (the "Travis Plan"). In May 2021, the Solano ALUC purported to resolve that the Solano 4 Wind Project was inconsistent with the Travis Plan. In August 2021, the Board approved the Project Environmental Impact Report, made findings overriding the Solano ALUC's finding of inconsistency, made findings there was no alternative to the project, and approved the Solano 4 Wind Project. In addition, SMUD applied for and obtained extensions of the Federal Aviation Administration Determinations of No Hazard allowing for construction of the turbines. They remain valid as long as SMUD awards a contract by the end of July 2022. SMUD released the Request for Proposals to construct the Solano 4 Wind Project in May 2021 and has received bids and is working toward a contract award mid-2022. The expected operation date for the project is May 2024. Full project capacity may be delayed into the first quarter of 2025 due to the timeframe established for the PG&E required upgrades. SMUD has developed a mitigation plan for the limited interconnection capacity for the first year of operation, in coordination with CAISO and PG&E, of using all of the existing SMUD Solano Russell substation interconnection capacity combined to dispatch all the projects under. SMUD expects to complete the administrative process to allow for this by late 2022.

Solar Photovoltaic. SMUD owns and operates approximately 2 MW of solar photovoltaic generating facilities. These facilities include installations at the Hedge Substation property, SMUD Headquarters, the East Campus Operations Center, and other smaller photovoltaic systems throughout the service area on parking lots.

Local Gas-Fired Plants. SMUD constructed five local natural gas-fired plants in its service area: the CVFA Project, the SCA Project, the SPA Project, SPA McClellan and the SFA Project (each defined below). These five plants are referred to collectively as the "Local Gas-Fired Plants." These plants are a strategic component of SMUD's resource mix. In addition to providing SMUD a total capacity of approximately 1,139 MW, the Local Gas-Fired Plants provide SMUD with needed voltage support, operational and load following capability, and the reliability inherent in having power resources located close to loads. With the exception of SPA McClellan, these plants were financed through the issuance of project revenue bonds by separate joint powers authorities (collectively, the "Authorities"). In late 2021, ownership of all of the Local Gas-Fired Plants was transferred to one of the Authorities, SFA. SMUD has entered into long-term agreements with SFA providing for the purchase by SMUD of all of the power from each of the Local Gas-Fired Plants. This consolidation created operational and administrative efficiencies without changing any of the functionality of the power plants. Although the Local Gas-Fired Plants are owned by SFA, SMUD has exclusive control of their dispatch and manages their operations as part of its overall power supply strategy.

Payments under the power purchase agreements are payable from the revenues of SMUD's Electric System prior to the payment of the principal of or interest on SMUD's Senior Bonds and Subordinated

Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below), as are other maintenance and operation costs and energy payments. For further discussion of SMUD's obligations to make these payments to SFA, see "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Joint Powers Authorities*."

The following is a brief description of the five Local Gas-Fired Plants:

The Cosumnes Power Plant (the "SFA Project"). The SFA Project is a 612 MW natural gas-fired, combined cycle plant located in the southern portion of Sacramento County adjacent to SMUD's decommissioned Rancho Seco Nuclear Power Plant. Commercial operation of the SFA Project commenced on February 24, 2006. SFA increased the net generating capacity of the facility by 81 MWs via an Advanced Gas Path ("AGP") upgrade. The additional AGP generation was realized after hardware and software upgrades were completed on both units in March of 2019. The SFA Project is owned by SFA, a joint powers authority formed by SMUD and MID. The existing take-or-pay power purchase agreement between SMUD and SFA expires no earlier than when the related bonds have been paid in full (the outstanding related bonds are scheduled to mature on July 1, 2030).

The CVFA Carson Cogeneration Project (the "CVFA Project"). The CVFA Project, a 103 MW natural-gas-fired cogeneration project consisting of separate combined cycle and peaking plants, provides steam to the Sacramento Regional County Sanitation District ("SRCSD") wastewater treatment plant adjacent to the site. The CVFA Project was originally owned by the CVFA, a joint powers authority formed by SMUD and the SRCSD. Construction of the CVFA Project was completed and the plant began commercial operation on October 11, 1995. The CVFA bonds were defeased in September 2019. In late 2021, ownership of the CVFA Project was transferred to SFA. The take-or-pay power purchase agreement between SMUD and SFA relating to the CVFA Project (the "CVFA PPA") will be in effect until terminated by SMUD.

The SCA Procter & Gamble Cogeneration Project (the "SCA Project"). The SCA Project, a 182 MW natural gas-fired cogeneration facility, is located in an established industrial area of Sacramento. The initial combined cycle portion of the plant began commercial operation on March 1, 1997. Construction of the peaking plant portion of the SCA Project commenced during 2000 and the unit achieved commercial status on April 24, 2001. The SCA Project produces steam for use in Procter & Gamble Manufacturing Company's oleochemical manufacturing processes and electricity for sale to SMUD. The SCA Project was originally owned by the SCA, a joint powers authority formed by SMUD and SFA, a separate joint powers authority. The SCA bonds were defeased in September 2019. In late 2021, ownership of the SCA Project was transferred to SFA. The take-or-pay power purchase agreement between SMUD and SFA relating to the SCA Project (the "SCA PPA") will be in effect until terminated by SMUD.

The SPA Campbell Soup Cogeneration Project (the "SPA Project"). The SPA Project, a 170 MW natural gas-fired cogeneration project, was completed and began commercial operations on December 4, 1997. Upgrades were implemented during 2000, which increased the plant's peaking capacity to 180 MW, well above its net demonstrated capacity of 159.8 MW. The plant is located in south Sacramento adjacent to the Capital Commerce Center (formerly the Campbell Soup Company food processing facility). The SPA Project was originally owned by SPA, a joint powers authority formed by SMUD and SFA. The SPA bonds were redeemed in July 2015. In late 2021, ownership of the SPA Project was transferred to SFA. The power purchase agreement between SMUD and SFA relating to the SPA Project (the "SPA PPA") covers both the SPA Project and SPA McClellan and will be in effect until terminated by SMUD. As part of the Zero Carbon Plan, SMUD is exploring retiring the SPA Project in 2025 pending a feasibility assessment. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan.*"

The SPA McClellan Gas Turbine ("SPA McClellan"). SPA McClellan is a 72 MW natural gas-fired simple cycle combustion turbine generating plant at McClellan Business Park in Sacramento. This turbine is connected to SMUD's electric system and is operated to meet SMUD's peak-load requirements. SPA McClellan is aligned for remote starting and operation with both black start and fast start capabilities. SMUD constructed the McClellan unit in 1986 as a 50 MW emergency power source for the McClellan Air Force Base. In 2001, following the Air Force Base closure, McClellan was upgraded to 72 MW and converted for SMUD use. In May 2007, SMUD transferred ownership of the McClellan Gas Turbine to SPA for more efficient operation. SPA did not issue debt related to SPA McClellan. In late 2021, ownership of SPA McClellan was transferred to SFA. SFA passes all costs of operations and maintenance through to SMUD in accordance with the terms of the SPA PPA. In exchange for paying all costs related to SPA McClellan, SMUD receives all of the power generated thereby. As part of the Zero Carbon Plan, SMUD is exploring retiring SPA McClellan in 2024 pending a feasibility assessment. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan."*

Fuel Supply

General. SMUD is obligated to arrange for the purchase and delivery of natural gas to the Local Gas-Fired Plants. Management of the natural gas procurement and delivery process is a key focus of SMUD's reliability and risk policies. Although the natural gas consumption of the power plants for SMUD's load can vary significantly depending on the season, precipitation, and the market price of power and natural gas, the plants are forecasted to need, on average in 2022, a total of approximately 96,000 Decatherms per day ("Dth/day") with a daily peak slightly more than 171,000 Dth/day of natural gas. Due to a gradual decline in natural gas consumption, SMUD is forecasting consumption of approximately 75,000 Dth/day in 2024. SMUD has implemented a comprehensive strategy to secure a reliable and diversified fuel supply through a variety of agreements for the supply, transportation, and storage of natural gas.

Supply. SMUD hedges a significant portion of its expected gas needs to meet customer power requirements. This includes gas for the Local Gas-Fired Plants and for the Sutter Energy Center. See "Power Purchase Agreements – *Sutter Energy Center*". This is accomplished through a combination of long-term supply arrangements and an exposure reduction program. The program consists of a primary rolling three-year exposure reduction component, as well as supplemental fixed calendar year components reaching out five calendar years. Long-term arrangements may consist of a combination of physical commodity supply contracts, financial hedges, or options. Natural gas is purchased from a wide variety of producers and marketers at the northern and southern California borders, at Alberta, Canada and from the San Juan and the Rocky Mountain supply basins. SMUD has a number of both fixed-price supply agreements and financial hedging contracts to fix gas costs ranging from one month to several years in duration. Including fixed price biogas contracts as of March 31, 2022, these contracts have hedged the price of approximately 68%, 70% and 65% of SMUD's forecasted natural gas requirements for 2022, 2023 and 2024, respectively. While the financial effects resulting from the unhedged portions of SMUD's natural gas requirements are difficult to predict, SMUD's financial results could be materially impacted.

SMUD has contracted with the Northern California Gas Authority No. 1 ("NCGA") to purchase an approximate average of 8,700Dth/day over the remaining life of a contract expiring May 31, 2027 (the "NCGA Contract"). Under the NCGA contract, SMUD pays a discounted variable price for the fuel and anticipates periodically fixing the effective price under separate hedging contracts. Currently the delivery point for the NCGA Contract is the AECO hub in Alberta. SMUD is using its long-term transport capacity to deliver the fuel to the local area plants. To increase delivery efficiencies, SMUD expects to exchange the gas delivered at the AECO hub under the NCGA Contract with gas delivered at the Malin receipt point beginning in 2023. SMUD has also contracted with the Northern California Energy Authority ("NCEA") to purchase an approximate average of 22,000 Dth/day or to be converted to the approximate value in

MegaWatt-hours ("MWh") of electricity over the remaining life of a contract expiring on May 31, 2049. The gas will be delivered to the SMUD system via the Malin receipt point on the PG&E backbone system. SMUD is using its long-term transport capacity to deliver the fuel to the local area plants. SMUD will pay a discounted variable price for the fuel and anticipates periodically fixing the effective price under separate hedging contracts.

Renewable Natural Gas Supply. As a component of meeting SMUD's RPS goals, SMUD procures renewable natural gas and digester gas as fuels to generate renewable electricity from the SFA Project. Descriptions of the renewable natural gas supply agreements are provided below.

In March 2009, SMUD entered into a 15-year contract (that qualifies as renewable energy) with Shell Energy North America (US), L.P. ("Shell Energy") to purchase up to 6,000 Dth/day of renewable natural gas produced from a landfill project in Texas. SMUD began taking deliveries of this supply in April 2009. In March 2012, SMUD amended the contract with Shell Energy to increase the maximum volumes to 7,300 Dth/day and extended the term by 10 years to March 31, 2034. Currently, the delivery point is PG&E Topock and SMUD is using its long-term transport capacity to deliver it to the SFA Project. In 2016, SMUD entered into a 3-year contract with Shell Energy to sell back the entire volume of renewable natural gas purchased, less 500 Dth/day, to be sold into the vehicle transportation markets. Upon expiration of the initial 3-year contract for the sale of biogas to Shell Energy, SMUD extended the sell back of the entire volume of biogas for an additional 3 years with Element Markets, starting in 2020.

SMUD contracted with Heartland Renewable Energy, LLC ("HRE") in December 2009 for a 20-year supply of up to 7,000 Dth/day of renewable natural gas from a digester facility in Colorado. Deliveries began in March of 2014. Currently, the delivery point is Opal, Wyoming and SMUD uses its long-term transport capacity to deliver it to the SFA Project. HRE has not delivered volumes from the project to SMUD since December 2016 due to current litigation with Weld County, Colorado regarding odor and permit issues. EDF Renewables, the majority owner of HRE, notified SMUD in August of 2017 that it is in discussions with a short list of bidders to sell its interests in the facility. In June of 2020, the project was purchased and SMUD's contract was assigned to the new owner, Platte River Biogas, LLC ("PRB"). SMUD and PRB terminated the contract in the third quarter of 2021.

In September 2011, SMUD and CVFA entered into a "Digester Gas Purchase and Sale Agreement" through which the CVFA Project cleans nearly all of the digester gas received from SRCSD and sells it to SMUD for delivery to the SFA Project. In return, SMUD pays all of the CVFA Project's costs in acquiring, cleaning and making the gas available to SMUD. The Digester Gas Purchase and Sale Agreement expires in September 2025. In late 2021, the Digester Gas Purchase and Sale Agreement, along with the CVFA Project was transferred to SFA. The CVFA Project is currently receiving, processing and selling up to 1,500 Dth/day with provisions for volume increases over time to 2,500 Dth/day. Digester gas, when designated for use in SMUD's power plants, is counted as renewable generation towards SMUD's RPS obligations.

In December 2011, SMUD entered into a 20-year agreement with EIF KC Landfill Gas LLC ("EIF") to purchase up to 7,050 Dth/day of renewable natural gas produced from multiple landfill projects. SMUD began taking deliveries of this supply in January 2014. Currently the delivery point is Kern River – Opal and SMUD uses its long-term transport capacity to deliver it to the SFA Project. Renewable natural gas, when designated for use in SMUD's power plants, is counted as renewable generation towards SMUD's RPS obligations. In April 2022 SMUD entered into a transaction to sell the renewable natural gas purchased into the vehicle transportation markets. The transaction expires in March 2025.

AB 2196 is a law that defines the criteria by which existing and future renewable natural gas contracts will qualify for the State RPS program. The CEC adopted a RPS Eligibility Guidebook on April

30, 2013, which includes detailed rules for implementation of AB 2196. SMUD received an updated certificate of eligibility from the CEC in July 2014 for the SFA Project that included the quantities of renewable natural gas from all four contracts. The CEC adopted a revised RPS Eligibility Guidebook (Ninth Edition) on April 27, 2017. This latest guidebook did not change the RPS eligibility of any of the above SMUD renewable natural gas and digester gas contracts, but did simplify reporting requirements for these contracts. When fully delivering, these contracts represent roughly 30% of SMUD's 2020 RPS requirement.

Gas Transmission

SMUD has satisfied its obligation to deliver natural gas to its power plants by constructing a natural gas pipeline, purchasing an equity interest in two PG&E backbone gas transmission lines, and contracting for capacity on a number of existing interstate natural gas transmission lines.

The Local Pipeline. SMUD constructed and owns a 20-inch, 50-mile natural gas pipeline in the greater Sacramento area (the "Local Pipeline") that transports gas to all of the Local Gas-Fired Plants except SPA McClellan. The Local Pipeline is interconnected with PG&E's major State gas transmission lines 300 and 401. Additionally, it may be interconnected with one or more private gas gathering pipelines located in the area, a gas storage project and/or other FERC approved pipelines that may be built in the local area. In conjunction with the construction of the SFA Project, SMUD extended the Local Pipeline to the plant site. The 26-mile extension was completed in 2004. The extension is 24 inches in diameter and was designed to serve both the SFA Project and an additional second phase, if constructed.

PG&E Backbone Gas Transmission Lines 300 and 401. In 1996, SMUD purchased an equity interest in PG&E's backbone gas transmission lines 300 and 401 (referred to as the PG&E backbone). The total capacity acquired at that time was approximately 85,000 Dth/day and consisted of approximately 43,600 Dth/day of firm gas transport from the California–Oregon border at Malin, Oregon and 44,700 Dth/day from the California–Arizona border at Topock, Arizona, to SMUD's interconnection with the PG&E backbone near Winters, California. SMUD was also entitled to a share of non-firm capacity, which was approximately 4,360 Dth/day; making the total capacity potentially available to SMUD almost 90,000 Dth/day. This purchase made SMUD a co-owner of the PG&E backbone gas transmission lines 300 and 401 and obligated SMUD to pay PG&E to operate the pipelines on its behalf subject to the terms of the purchase agreement and operating protocols. PG&E reduced operating pressures on Line 300 after PG&E suffered a natural gas explosion in San Bruno, CA in September of 2010. As a result of the reduced operating pressures on Line 300 and a related settlement between PG&E and SMUD, SMUD now holds a total capacity of approximately 88,000 Dth/day, consisting of approximately 47,620 Dth/day of firm gas transport from the California–Oregon border at Malin, and 39,233 Dth/day of firm gas transport from the California–Arizona border at Topock, Arizona, to SMUD's interconnection with the PG&E backbone near Winters, California.

SMUD also holds additional backbone capacity under tariff service for 5,000 Dth/day of northern path (Redwood) capacity. This contract expires in June 2023.

Kern River Gas Transmission Company Long Term Agreement. SMUD has an agreement with Kern River Gas Transmission Company for 20,000 Dth/day of firm capacity through April 30, 2028. This capacity gives SMUD access to the Rocky Mountain supply basin at Opal, Wyoming, and connects to PG&E Line 300 (owned in part by SMUD) at Daggett, California.

TransCanada Firm Transmission Service Agreements. SMUD has several agreements with TransCanada Corporation that give SMUD access to Canadian supply from the Alberta basin to Kingsgate, British Columbia and the California-Oregon border at Malin. SMUD has agreements for 22,101 Dth/day at the California-Oregon border at Malin via the Gas Transmission Northwest ("GTN") pipeline that expires in 2023. SMUD has agreements for approximately 12,000 Dth/day from the Alberta ANG/Foothills pipeline, also expiring in 2023. In order to match the Canadian capacity with the takeaway capacity at Malin, SMUD has an agreement with Foothills Pipeline for approximately 10,000 Dth/day that expires on October 31, 2022. Currently, SMUD is not planning to renew GTN, Alberta ANG/Foothills and Foothills Pipeline.

SMUD's diversified portfolio of gas transmission arrangements allow for the purchase of gas from a variety of suppliers and locations, and the opportunity to capitalize on regional price differentials where possible. In addition, its ownership interest in the SMUD/PG&E backbone and Local Pipeline enhances the reliability of SMUD's gas supply.

Gas Storage

SMUD also employs gas storage as part of its overall fuel supply strategy. Gas storage is useful in helping to balance gas supply, mitigate market price volatility, and provide a reliable supply to meet peak day delivery requirements.

SMUD also has a contract with Lodi Gas Storage, LLC, which began in April 2018 and expires in March 2023, for capacity in the Lodi Gas Storage project located near Acampo in northern California. The contract provides SMUD with capacity levels of 1.0 million Dth of storage inventory, 10,000 Dth/day of injection rights and 20,000 Dth/day of withdrawal capacity.

SMUD has a second contract with Lodi Gas Storage, LLC , which began in April 2022 and expires in March 2024, for additional capacity in the Lodi Gas Storage project located near Acampo in northern California. The contract provides SMUD with capacity levels of 1.0 million Dth of storage inventory, 10,000 Dth/day of injection rights and 20,000 Dth/day of withdrawal capacity.

Power Purchase Agreements

SMUD has a number of power purchase agreements to help meet its power requirements. Some of these agreements are described below.

Western Area Power Administration. Effective January 1, 2005, SMUD entered into a 20-year contract with WAPA. SMUD has entered into a replacement agreement extending the term by 30 years for the period of January 1, 2025 through December 31, 2054. Power sold under this contract is generated by the Central Valley Project ("CVP"), a series of federal hydroelectric facilities in northern California operated by the United States Bureau of Reclamation. The contract provides WAPA's CVP Base Resource customers (including SMUD) delivery of a percentage share of project generation in return for reimbursement of an equivalent share of project costs. SMUD's CVP Base Resource share is roughly 25% of project generation and costs. This is expected to be approximately 318 MW of capacity and 661 GWh of energy in an average water year but will vary depending on precipitation. Energy available under the contract is determined by water releases required for water supply and flood control and is then shaped into higher value periods within other CVP operating constraints. More capacity and energy are typically available in spring and summer months and less in fall and winter.

SMUD also has a contract with WAPA expiring December 31, 2024, by which WAPA delivers an additional 200-300 MW per hour from projects located in the Pacific Northwest based on certain contractual parameters. In 2021, SMUD received 1,100 GWh of energy under this contract.

Avangrid (formerly Iberdrola Renewables ("Iberdrola")). SMUD has a contract with Iberdrola that provide SMUD with bundled renewable energy (energy plus RECs). The contract agreement is for 126 GWh of wind power generated in Solano County, California. The SMUD Board approved an extension of the wind contract through June 30, 2025.

Patua Project LLC. In April 2010, SMUD entered into a power purchase agreement with Patua Project LLC ("Patua"), a subsidiary of Gradient Resources, for the delivery of up to 132 MW (expected to be 120 MW nominal power output) of renewable energy from geothermal generation being developed in north central Nevada, from a Gradient Resources project known as the Patua Project. The project was to have been developed in three phases. Since 2010, the agreed upon capacity has been reduced several times. In December 2013, Phase 1 of the project, which had been reduced to 30 MW, finally achieved commercial operation. In 2014, the parties concluded negotiations on the fourth amendment to the power purchase agreement with Patua, which reduced the total capacity down to 40 MW, extended the commercial operation date of Phase 2 to January 1, 2016, and allowed Patua to add up to 13 MW of solar photovoltaics to supplement geothermal production. In addition, this amendment shifted responsibility to Patua for a portion of the long-term transmission service agreements that have been underutilized due to the project not meeting its targets. In November 2015, the Patua Project was acquired by TL Power, LLC, a wholly owned subsidiary of Cyrq Energy, Inc. ("Cyrq"). In December 2015, Cyrq terminated Phase 2. Upon termination of Phase 2, the contractual right for Cyrq to add solar photovoltaics to supplement geothermal production was reduced to 10 MW. As a result of poor performance during the first year of operation, SMUD reduced its obligation to take power from 30 MW to 25 MW. Performance continued to lag in 2015 and 2016 and SMUD further reduced its obligation to take power from 25 MW to 19 MW.

Renewable Energy Feed-In Tariff. In September 2009, SMUD's Board authorized a feed-in tariff program for the purchase of renewable energy from local renewable energy projects connected to SMUD's distribution system. SMUD's Board authorized connection of up to 100 MW under the feed-in tariff which included standard payment rates and standard purchase terms for power. The feed-in tariff program became effective on January 1, 2010. Under the feed-in tariff, SMUD has executed 20-year term power purchase agreements for solar projects totaling 98.5 MW. Construction and start-up was completed on all projects between 2010 and 2012.

CalEnergy LLC. In August 2014, SMUD entered into a 22-year power purchase agreement with CalEnergy LLC for the purchase of 30 MWs per year of renewable energy from its Salton Sea geothermal facilities. As of July 1, 2017, SMUD began receiving up to 10 MWs from the CalEnergy portfolio, which escalated to the full 30 MWs on May 1, 2020.

Rancho Seco Solar. In October 2015, SMUD entered into a 20-year power purchase agreement with Rancho Seco Solar LLC for the purchase of energy from a 10.88 MW solar PV project sited on SMUD's property at the closed Rancho Seco Nuclear Generating Station. Commercial operation was achieved in August of 2016. Rancho Seco Solar LLC leased the property from SMUD under a land lease agreement. The output of this project will directly serve two large commercial customers having executed agreements with SMUD for retail supply of solar power.

In May 2019, SMUD entered into a 30-year power purchase agreement for an additional 160 MW solar PV project with Rancho Seco Solar II, LLC. The project is located on SMUD-owned property at the closed Rancho Seco Nuclear Generating Station, adjacent to the existing 10.88 MW solar PV project. Construction began in 2019, and the project became commercially operable in February 2021.

Grady Wind Energy. In October 2015, SMUD entered into a 25-year power purchase agreement with Grady Wind Energy LLC ("Grady") for the purchase of energy from a 200 MW wind project located in New Mexico (the "Grady Project"). The Grady Project began commercial operations on August 5, 2019.

Energy from the Grady Project is delivered to CAISO. SMUD purchases 100% of the Grady Project output which includes energy, renewable energy credits, and capacity attributes. SMUD and Grady have a short-term (6-month) agreement spanning the winter 2021-spring 2022 season wherein Grady has the option to pay SMUD to curtail up to 100 MW. This agreement does not affect the remaining term of the agreement.

Great Valley Solar 2, LLC. In January 2017, SMUD entered into a 20-year power purchase agreement with Great Valley Solar 2, LLC for the purchase of energy from a 60 MW solar PV project located in Fresno County, California. The project's commercial operation date was December 28, 2017.

ARP-Loyalton Cogen LLC. On September 14, 2016, Senate Bill 859 ("SB 859") was signed into law. Under SB 859, POU must procure its proportionate share of 125 MWs of renewable energy from biomass plants burning high hazard forest fuels, subject to terms of at least five years. Seven POUs (SMUD, MID, Turlock Irrigation District ("TID"), Anaheim Public Utilities, Imperial Irrigation District, Los Angeles Department of Water & Power and Riverside Public Utilities) jointly solicited proposals for up to 29 MW of contract capacity for renewable energy to meet the requirements of SB 859. In January 2018, SMUD entered into a 5-year power purchase agreement with ARP-Loyalton Cogen LLC to fulfill 18 MWs of the required 29 MWs with SMUD's share being just over 23 percent. The contract became effective on April 1, 2018. On February 18, 2020, ARP-Loyalton Cogen LLC filed for Chapter 11 bankruptcy and stopped producing and selling energy from the biomass plant. On May 7, 2020, the bankruptcy court approved the sale of the Loyalton facility to Sierra Valley Enterprises, LLC ("SVE"). SVE is interested in bringing the facility back into service to produce power again and is currently reviewing the terms of the agreement. If SVE is not willing to accept the terms of the agreement, the POU parties will discuss their options, which may include amending the agreement or issuing a new request for proposals for the remainder of the five-year term.

Roseburg Forest Products Co. For the remaining SB 859 biomass obligation of 11 MW, SMUD and the other POUs have entered into a five-year power purchase agreement with Roseburg Forest Products Co. SMUD's share of the contract capacity is 2.5795 MW, and the plant began operating under the contract on February 26, 2021.

Sutter Energy Center. SMUD entered into an initial two-year contract (with a third year exercisable option) with Calpine Energy Services, L.P. ("Calpine") for the ability to schedule up to 258 MWs of energy from Sutter Energy Center. The Sutter Energy Center is a natural gas-fired, combined-cycle facility located in Yuba City, California. The initial contract became effective on April 1, 2018. SMUD exercised its option to extend the contract and it expired November 1, 2020. SMUD entered into a new contract with Calpine for the same 258 MWs of energy that became effective January 1, 2021, and had an original expiration date of January 1, 2024. In December 2021, SMUD extended the Sutter Energy Center contract. The contract currently expires December 31, 2026.

Drew Solar, LLC. In June 2018, SMUD entered into a 30-year power purchase agreement with Drew Solar, LLC for the purchase of energy from a 100 MW solar PV project located in Imperial County, California. The project's commercial operation date was set to be December 31, 2021. The scheduled commercial operation date is delayed to June 2022 due to Force Majeure claims surrounding the COVID pandemic and supply chain constraints caused by changes in Federal regulatory requirements.

Wildflower Solar. In October 2018, SMUD entered into a 25-year power purchase agreement with Wildflower Solar I, LLC, for the purchase of energy, capacity, and RECs from a 13 MW solar PV project located in Rio Linda, California. The project began commercially operating on December 18, 2020.

Coyote Creek (Formerly Sacramento Valley Energy Center, LLC.) In July 2021, SMUD entered into a 30-year power purchase agreement with Sacramento Valley Energy Center, LLC for the purchase of energy from a 200 MW solar PV and 100 MW four-hour Battery Energy Storage System ("BESS") capacity project located in Sacramento County, California. The project's commercial operation date was expected to be December 31, 2023. The scheduled commercial operation date has been delayed to April 2024 as a result of a change in Federal environmental permitting requirements.

SloughHouse Solar, LLC. In September 2021, SMUD entered into a 30-year power purchase agreement with SloughHouse Solar, LLC for the purchase of energy from a 50 MW solar PV project located in Sacramento County, California. The project's commercial operation date is expected to be December 31, 2023.

Country Acres Solar. In December 2021, SMUD issued a Request for Offers ("RFO") seeking qualified Power Purchase Agreement offers for a utility scale PV with BESS project under development which will interconnect to SMUD's North Area transmission system. The project site is located on over 1,000 acres in Placer County near the city of Roseville. SMUD received and is currently evaluating RFO responses. SMUD's early-stage development efforts are underway to support the start of construction mobilization in the first quarter 2023 with an expected commercial operation date in late 2024.

McClellan Solar. In December 2021, SMUD issued a RFO seeking qualified power purchase agreement offers for a utility scale PV with BESS project under development which will interconnect to SMUD's distribution electric system by tapping into SMUD's existing 69 kV distribution line. The project site is located on approximately 170 acres, in McClellan Park in Sacramento County. SMUD received and is currently evaluating RFO responses. SMUD's early-stage development efforts are underway to support the start of construction mobilization in the third quarter of 2023 with an expected commercial operation date in late 2024.

Geysers Power Company, LLC. In March 2021, SMUD executed a 10-year power purchase agreement with Geysers Power Company, LLC for 100 MW of capacity from The Geysers geothermal energy plant located in Lake and Sanoma Counties, California. SMUD will start to receive deliveries on January 1, 2023.

Transmission Service Agreements

TANC California-Oregon Transmission Project. The 340 mile COTP is one part of a three 500-kV line coordinated system known as the California-Oregon Intertie ("COI"). The COTP is allocated one-third of the 4,800 MW capability of the COI system (see related agreements below). TANC is entitled to use 1,390 MW and is obligated to pay approximately 80% of the operating costs of the COTP. SMUD is a member of TANC and a party to Project Agreement No. 3 ("PA3"), under which it is entitled to 378 MW and obligated to pay on an unconditional take-or-pay basis about 27.5% of TANC's COTP debt service and operations costs, subject to a "step-up" obligation of up to 25% of its entitlement share upon the un-remedied default of another TANC member-participant. In 2009, SMUD entered into a long-term layoff agreement with certain members that increased SMUD's entitlement by 35 MW. In 2014, SMUD entered into another long-term layoff agreement with certain other members that increased SMUD's COTP entitlements by 128 MW and amended the 2009 layoff agreement that returned 13 MW to a member. As of December 31, 2018, SMUD was entitled to approximately 528 MW of TANC's transfer capability for imports and 405 MW for exports, and is obligated to pay approximately 38.6% of TANC's COTP debt service and operations costs. SMUD's payments under this contract, like SMUD's payments under its other power purchase and transmission service agreements, are treated as "Maintenance and Operation Costs" or "Energy Payments" under the resolutions securing the Senior Bonds and Subordinated Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below). SMUD relies on its COTP rights to purchase power, access contingency reserves through the Northwest Power Pool, and obtain renewable resources to supplement its own resources to serve its load.

TANC maintains its own property/casualty insurance program. TANC's budget for COTP costs, support services and advocacy expenses is about \$42.2 million for 2022. SMUD's obligation of the TANC budget is about \$16.1 million for 2022.

TANC Tesla-Midway Transmission Service. TANC has a long-term contract with PG&E to provide TANC with 300 MW of transmission service between PG&E's Midway Substation and the electric systems of the TANC Members (the "Tesla-Midway Service"). SMUD's share of the Tesla-Midway Service had been 46 MW. As part of the 2009 long-term layoff agreement, SMUD acquired an additional 2 MW of South-of Tesla Principles ("SOTP") transmission rights for 15 years starting February, 2009 from another TANC member, bringing SMUD's share of the Tesla-Midway Service to 48 MW.

Bonneville Power Administration. In 2009, SMUD entered into a transmission service agreement with the Bonneville Power Administration ("BPA") for 60 MW of firm point-to-point transmission service from BPA's Hilltop substation in north eastern California to the Malin substation at the California-Oregon border for the purpose of transmitting power under SMUD's power purchase agreement with Gradient Resources for Phase 1 of the Patua geothermal project over BPA's 230kV transmission lines. In early 2013, in accordance with BPA's transmission tariff, the transmission service was split into two 30 MW services and deferred as appropriate to better fit the timing of expected commercial operation of the Phase 1 30 MW and Phase 2 30 MW of the Patua project. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Patua Project LLC*." SMUD submitted another request for the 30 MW of transmission procured for Patua Phase 2 to split the service into a 10 MW and a 20 MW service, with the 10 MW of service deferred to be timed with the expected commercial operation date of Phase 2. With the termination of Phase 2 and SMUD's reduced obligation due to the poor performance of Phase 1, much of the transmission reserved for it will no longer be needed. BPA does not have a provision in its transmission tariff for early termination of transmission service. However, the power purchase agreement with Patua requires Patua to cover unused transmission that SMUD has procured for the Patua purchases. On January 1, 2020, SMUD's transmission rights with BPA were reduced to 19 MW. This now aligns with SMUD's Pacificorp transmission rights of 19 MW described below.

Pacificorp. In 2009, SMUD entered into a transmission service agreement with PacifiCorp for 60 MW of firm point-to-point transmission service across PacifiCorp's high voltage step-up transformer at the Malin substation at the California-Oregon border for the purpose of transmitting power under SMUD's power purchase agreement with Gradient Resources for Phase 1 of the Patua geothermal project. In early 2013, in accordance with PacifiCorp's transmission tariff, the commencement of the 60 MW of transmission service was deferred to fit the timing of first deliveries expected from the 30 MW of Phase 1 of the Patua project. In 2013, SMUD terminated the 60 MW of transmission service and requested two new transmission services of 30 MW each, the start of which is timed to better fit with the expected start dates of phases 1 and 2 of the Patua Project. With the reduction in expected Patua output due to the Patua power purchase agreement fourth amendment, SMUD terminated the second 30 MW transmission agreement, and replaced it with a 10 MW transmission service agreement for Patua Phase 2. With the recent termination of Phase 2 of the Patua Project, SMUD terminated the 10 MW Pacificorp transmission service agreement. As a result of the reduced obligation to take power from the Patua Project, SMUD has reduced its Pacificorp transmission service from 30 MW to 19 MW.

Western Area Power Administration. SMUD does not have a direct interconnection of its power system to the COTP. To receive power deliveries that use its COTP rights, SMUD has a long-term transmission service agreement with WAPA for transmission of 342 MW of power from the COTP line (received at WAPA's Tracy or Olinda substations) to SMUD's system. In May of 2011, WAPA completed the Sacramento Voltage Support Transmission Project. Completion of this project has given SMUD an additional 165 MW of transmission service rights on WAPA's system from the COTP at the Olinda Substation to SMUD's system at the Elverta Substation.

Projected Resources

The following tables titled "Projected Requirements and Resources to Meet Load Requirements Energy Requirements and Resources" (the "Energy Table") and "Capacity Requirements and Resources Net Capacity – Megawatts" (the "Capacity Table") describe SMUD's contracted commitments and owned resources available to meet its forecasted load requirements through the year 2031. Resources are shown on an annualized basis with market purchases netted against surplus sales to arrive at a single net position for each year. Because SMUD's available resources do not exactly match its actual load requirements on an hourly basis, there are times during a year when resources available will either exceed or be insufficient to meet SMUD's needs. Expected actual capacity values are included in the tables. These values may differ from measured net demonstrated capacity values of the Local Area Gas-Fired Plants. The table below also includes the impact energy efficiency has on resource requirements as discussed below under "Demand Side Management Programs." See "BUSINESS STRATEGY" and "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*."

Resources listed in both the Energy Table and the Capacity Table are listed as either renewable or non-renewable. Generally, SMUD follows the CEC guidelines for eligibility requirements. Some of SMUD's renewable resources listed include solar, wind, geothermal, small hydroelectric facilities with a capacity of 30 MW or less, and biomass (representing generation from a fuel comprised of agricultural wastes and residues, landscape and tree trimmings, wood and wood waste).

As in any forecast, assumptions are made. In both the Energy Table and the Capacity Table the WAPA and UARP forecasts assume average water conditions throughout the period. On the capacity table, WAPA and SFA renewable capacity is estimated based on the ratio of renewable energy to total WAPA or SFA energy. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Hydroelectric*."

The Uncommitted Purchases (Sales) on the tables represent either anticipated future needs or surpluses. Future needs are met well in advance of delivery. They also include both renewable and non-renewable resources.

The Transmission Losses represent reductions in the amount of energy or capacity from the location it was purchased to the point of entering SMUD's electrical system. This amount reduces the Total Resources available to meet the Total Projected Energy Requirements of the electrical system.

Demand Side Management Programs

SMUD's demand-side management initiatives represent an integral element of its total resource portfolio, and are organized into two major components: energy efficiency and load management programs. Energy efficiency offerings include a wide variety of programs and services to customers to retrofit or upgrade existing equipment and fixtures and to install new energy efficiency measures in existing and new construction facilities. Load management allows SMUD to reduce the load on the electric system by cycling residential air conditioning, and calling upon commercial/industrial customers to curtail energy usage when energy is constrained during the summer or system emergencies. Load management programs are projected to allow SMUD to shed approximately 60 MW of peak load in an emergency on a hot day, representing about 2% of SMUD's maximum system peak demand.

The customer "smart meter" system with 2-way communication capability provides information regarding customer usage patterns, which is expected to help SMUD tailor rate designs that provide customers with both the information and ability to manage their energy usage around high energy cost periods.

PROJECTED REQUIREMENTS AND RESOURCES TO MEET LOAD REQUIREMENTS[1] ENERGY REQUIREMENTS AND RESOURCES (GWh)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Renewable Resources										
District or Joint Powers Authority Owned:										
UARP - Small Hydro[3]	70	89	99	96	103	103	103	104	104	104
Solano Wind	584	597	777	854	836	836	838	836	836	836
SFA – Shell Landfill Gas and Digester Gas[2]	146	811	784	767	767	759	761	760	760	760
Total	**800**	**1,497**	**1,660**	**1,716**	**1,706**	**1,698**	**1,702**	**1,700**	**1,701**	**1,701**
Purchases										
Western (WAPA) – Small Hydro[3]	10	19	20	19	19	19	19	19	19	19
Patua (Gradient/Vulcan) – Geothermal	140	147	147	147	147	147	147	147	147	147
Cal Energy – Geothermal	223	223	224	223	223	223	224	223	223	223
Iberdrola (PPM) – Wind	95	98	98	45	--	--	--	--	--	0
Grady – Wind	883	897	900	897	897	897	900	897	897	897
Recurrent SolarShares	174	171	170	171	171	170	169	168	167	167
Rancho Seco PV2	311	333	332	330	328	327	325	323	322	320
Feed-in-Tariff Photovoltaic – Solar	215	210	209	208	207	206	205	204	203	202
Drew Solar	178	301	301	298	297	295	294	292	291	289
Sloughhouse Solar	--	0	132	131	130	130	129	128	128	127
Calpine Geothermal	--	876	878	876	876	876	876	876	876	876
Wildflower Solar	33	31	31	31	31	30	30	30	30	30
Planned Solar with Storage	--	--	--	761	757	753	749	745	742	738
Coyote Creek Solar	--	--	414	522	507	505	502	500	497	495
Other Long-Term Contracts	189	180	171	160	52	28	28	28	28	28
Future Variable Renewable Projects	--	--	--	--	756	867	1,687	1,959	2,787	2,787
Future Firm Renewable Projects	--	--	--	--	--	--	100	1,040	1,040	1,040
Total	**2,451**	**3,486**	**4,027**	**4,819**	**5,399**	**5,474**	**6,385**	**7,582**	**8,397**	**8,385**
Non-Renewable										
District or Joint Powers Authority Owned:										
UARP – Large Hydro[3]	1,149	1,481	1,599	1,606	1,609	1,609	1,609	1,609	1,609	1,609
SFA – Cosumnes	3,496	3,246	3,136	3,067	3,082	2,439	1,731	1,165	513	513
CVFA – Carson Ice	314	357	319	262	9	2	--	2	3	3
SCA – P&G	726	626	553	524	241	133	40	2	1	1
SPA – McClellan	16	7	2	--	--	--	--	--	--	--
SPA – Campbell Soup	663	389	362	179	--	--	--	--	--	--
Total	**6,363**	**6,106**	**5,970**	**5,639**	**4,941**	**4,183**	**3,380**	**2,778**	**2,125**	**2,125**
Purchases										
Western (WAPA) – Large Hydro[3]	337	613	641	629	629	629	629	629	629	629
Western (WAPA) Customers (wheeling)[3]	20	36	38	38	38	38	38	38	38	38
Calpine Sutter	852	1,300	1,141	1,003	82	--	--	--	--	--
Total	**1,209**	**1,950**	**1,820**	**1,670**	**749**	**667**	**667**	**667**	**667**	**667**
Total Resources	**10,823**	**13,039**	**13,476**	**13,844**	**12,795**	**12,022**	**12,134**	**12,726**	**12,890**	**12,878**
Uncommitted Purchases / (Sales)	(109)	(2,391)	(2,816)	(3,200)	(2,113)	(1,267)	(1,289)	(1,779)	(1,785)	(1,607)
Transmission Losses (COTP/CVP)	(38)	(36)	(29)	(33)	(31)	(29)	(27)	(25)	(23)	(21)
Total Projected Energy Requirements	**10,676**	**10,612**	**10,632**	**10,611**	**10,651**	**10,727**	**10,819**	**10,922**	**11,082**	**11,250**
Energy Efficiency (EE) Board Goals	109	183	254	321	393	448	504	550	581	611
SB1 Photovoltaic Goals	60	121	168	211	763	819	876	931	985	1,036
Expected Electric Vehicle (EV) Charging	(17)	(44)	(77)	(121)	(182)	(247)	(324)	(408)	(499)	(600)
Electric Building (EB)	(9)	(21)	(37)	(58)	(106)	(144)	(190)	(256)	(345)	(437)
Battery Storage (Utility)	--	(1)	(1)	(1)	(129)	(137)	(177)	(209)	(262)	(262)
Battery Storage (BTM)	--	--	--	(1)	(2)	(4)	(7)	(11)	(16)	(20)
Total Gross Energy Requirements before EE, SB1 and EV Charging	**10,819**	**10,852**	**10,939**	**10,962**	**11,388**	**11,462**	**11,501**	**11,520**	**11,526**	**11,577**

(1) Totals may not sum due to rounding.

(2) Includes a biomethane contract counted as renewable (see "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Renewable Natural Gas Supply*").

(3) 2022 based on current precipitation levels as of March 31, 2022. All other years assume average precipitation.

CAPACITY REQUIREMENTS AND RESOURCES[1]
NET CAPACITY – MEGAWATTS

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Load:										
Planned Peak	**2,874**	**2,863**	**2,853**	**2,844**	**2,878**	**2,882**	**2,888**	**2,907**	**2,929**	**2,952**
Transmission Losses	28	28	28	28	28	28	28	28	28	28
Dispatchable Demand Resource	(71)	(71)	(71)	(71)	(146)	(165)	(183)	(202)	(165)	(165)
Adjusted Peak	**2,831**	**2,820**	**2,810**	**2,801**	**2,760**	**2,745**	**2,733**	**2,733**	**2,792**	**2,815**
15% Reserve Margin	425	423	421	420	414	412	410	410	419	422
Adjusted Peak with Reserves	**3,255**	**3,244**	**3,231**	**3,221**	**3,174**	**3,157**	**3,143**	**3,143**	**3,210**	**3,237**
Renewable Resources										
District or Joint Powers Authority Owned:										
UARP – Small Hydro	45	45	45	45	45	45	45	45	45	45
Solano Wind	120	98	117	163	46	39	37	38	34	31
SFA – Shell Landfill Gas and Digester Gas[2]	29	114	114	114	120	120	120	120	120	120
Total	**193**	**256**	**276**	**322**	**211**	**204**	**202**	**202**	**199**	**196**
Purchases										
Western (WAPA) – Small Hydro	8	10	10	9	10	10	10	10	10	10
Iberdrola (PPM) – Wind	32	15	7	--	--	--	--	--	--	--
Grady – Wind	45	32	27	24	54	60	55	55	55	56
Patua (Gradient/Vulcan) – Geothermal	12	12	12	12	12	12	12	12	12	12
CalGeo – Geothermal	26	26	26	26	26	26	26	26	26	26
Geysers – Geothermal	--	95	95	95	95	95	95	95	95	95
Recurrent Solar	39	6	5	3	2	2	3	2	2	2
RanchoSeco – Solar	73	64	25	20	4	3	3	3	3	3
Coyote Creek Solar	--	--	140	124	29	23	17	13	11	13
Sloughhouse Solar	--	--	11	0	2	2	2	1	2	1
NTUA Navajo Drew Solar	56	32	12	14	12	12	10	10	8	8
Feed-in-Tariff Photovoltaic – Solar	27	23	2	3	3	4	3	3	3	3
Planned Solar with Storage	--	--	--	196	64	54	30	21	16	19
Generic Storage	--	--	--	--	362	387	442	444	422	407
Future Variable Renewable Projects	--	--	--	--	51	51	139	144	150	158
Future Firm Renewable Projects	--	--	--	--	--	--	12	125	125	125
Other Long-Term Contracts	28	26	27	29	3	3	3	2	3	2
ELCC Portfolio Benefit	(53)	96	218	(35)	494	484	481	488	540	497
Total	**292**	**436**	**617**	**519**	**1,221**	**1,228**	**1,342**	**1,455**	**1,483**	**1,436**
Non-Renewable										
District or Joint Powers Authority Owned:										
UARP – Large Hydro	640	640	640	640	640	640	640	640	640	640
SFA (Cosumnes)	542	456	456	456	456	456	456	456	456	456
CVFA (Carson-Ice)	103	103	103	103	103	100	100	100	100	100
SCA (Procter & Gamble)	166	166	166	166	166	166	166	100	100	100
SPA (McClellan)	72	72	72	--	--	--	--	--	--	--
SPA (Campbell Soup)	170	170	170	170	--	--	--	--	--	--
Hedge Battery	4	4	4	4	4	4	4	4	4	4
Total	**1,697**	**1,611**	**1,611**	**1,539**	**1,369**	**1,366**	**1,366**	**1,300**	**1,300**	**1,300**
Purchases										
Western (WAPA) – Large Hydro	250	309	309	303	303	303	303	303	303	303
Western (WAPA) Customers (wheeling)	15	18	18	18	18	18	18	18	18	18
Sutter Energy Center	258	258	258	258	258	258	258	258	258	258
Firm Contract Reserves[3]	14	17	17	17	17	17	17	17	17	17
Committed Purchases	450	250	--	--	--	--	--	--	--	--
Total	986	**852**	602	**596**	**596**	596	**596**	**596**	**596**	**596**
Uncommitted Purchases / (Sales)	88	88	126	246	(223)	(237)	(363)	(410)	(367)	(291)
Total Resources	**3,255**	**3,244**	**3,231**	**3,221**	**3,174**	**3,157**	**3,143**	**3,143**	**3,210**	**3,237**

(1) Based on information available as of March 31, 2022. Totals may not sum due to rounding. Capacity values for wind, solar, storage, and future variable renewable projects shown are based on resource effective load carrying capability (ELCC) modeling.

(2) The SFA Project is a 495 MW plant that includes 100 MW capacity attributable to a biogas contract counted as renewable (see "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Renewable Natural Gas Supply*") and 395 MW capacity from natural gas.

(3) SMUD assumes that for all firm system purchases, the suppliers will be planning 5% reserves.

Balancing Authority Area Agreements

Background. SMUD began operating as an independent control area, later termed a Balancing Authority, on June 18, 2002 within the WECC reliability organization's region. This reduced SMUD's exposure to the costs and reliability risks of the CAISO's markets. SMUD expanded its operational footprint beyond SMUD's service territory to include WAPA's electric system, including the MID, Roseville, and Redding service areas (on January 1, 2005) and the COTP (on December 1, 2005). As described further below, SMUD ceased to be the Balancing Authority on April 30, 2011, as BANC took SMUD's place as the Balancing Authority. SMUD remains the operator of the Balancing Authority through a contract with BANC. SMUD administers the contracts with WAPA and TANC to provide specified Balancing Authority-related and other services, and is compensated by WAPA and TANC for its added labor expense. TANC recovers such Balancing Authority services costs as a part of its annual operating budget from the COTP Participants and WAPA recovers its Balancing Authority services costs through its rates for power and transmission service. The agreement with WAPA, among other terms, establishes operating reserve obligations between the parties. WAPA in turn has agreements with electric systems connected to it to assure that such systems also operate reliably (i.e., MID, Roseville and Redding). As a result of the transition to BANC as the Balancing Authority, SMUD assigned or terminated its interconnection and operations agreements with other interconnecting Balancing Authority areas (i.e., CAISO, BPA and TID). BANC is now the party to these agreements as they primarily address only Balancing Authority matters required for compliance with the reliability standards issued by the North American Electric Reliability Corporation ("NERC"), such as emergency assistance arrangements. See also "OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY – Energy Imbalance Market."

Reliability Standards. The Energy Policy Act of 2005 gave FERC authority to enforce reliability standards for the bulk electric system. In June 2007, these standards became mandatory for SMUD and BANC.

In late 2019, SMUD and BANC underwent a combined NERC/WECC audit to evaluate compliance with applicable reliability standards. These audits occur every three years. At the conclusion of the audit, regulators determined that neither entity had any compliance violations related to the Operations and Planning or Critical Infrastructure Protection Standards. Resolutions to minor recommendations and areas of concern were completed in 2020. SMUD and BANC will undergo another NERC/WECC audit sometime in 2022.

Balancing Authority of Northern California. SMUD, MID, Redding and Roseville executed a Joint Exercise of Powers Agreement (the "BANC JPA Agreement") creating BANC on May 8, 2009. BANC became operational on May 1, 2011 as a Balancing Authority and replaced SMUD as the entity responsible for Balancing Authority-related reliability standards. Since that time, the Trinity Public Utilities District and the City of Shasta Lake have also become members of BANC. As provided in the BANC member agreement, liability for penalties associated with such Balancing Authority-related reliability standards are shared on a pro rata basis among the members of BANC. SMUD is the Balancing Authority operator under contract and performs Balancing Authority operational functions on behalf of BANC, much as it did when it was the Balancing Authority. The BANC JPA Agreement assigns cost responsibility based on member load within the BANC Balancing Authority, with SMUD representing approximately 70% of the total load.

Power Pool and Other Agreements

Northwest Power Pool Agreement. The Northwest Power Pool ("NWPP") is an agreement among over 30 utilities and public agencies in the western United States to coordinate contingency reserve sharing, referred to as the NWPP Reserve Sharing Program ("RSP"). The RSP permits participants to rely on one another in the event that any participant experiences a generating resource outage. While SMUD became an RSP participant in 2009, participation is limited to Balancing Authorities, which SMUD relinquished to BANC in 2011. Under the RSP, BANC and TID (also a NWPP member) share their reserve amounts and when necessary may call upon NWPP reserves using BANC member systems and unused COTP rights. The NWPP RSP permits members to operate more efficiently by reducing the contingency reserves that they would otherwise need to have available if they could not rely on each other.

TANC-SMUD OASIS Administration Agreement. SMUD entered into an agreement with TANC to provide OASIS services (transmission sales and scheduling related services in the BANC BA of TANC members' COTP rights) on September 29, 2005. SMUD is compensated for performing these services. TANC and SMUD entered into a letter agreement dated October 25, 2010 to clarify each party's role for regulatory reliability standards compliance responsibilities and take into account SMUD's increased efforts related to supporting TANC's compliance requirements. TANC includes the costs of this service in its annual budgets and recovers the costs from its members who use the TANC OASIS to make their COTP transmission available to third parties.

Other Agreements with PG&E

Background. SMUD's electric system was originally purchased from PG&E in 1947. SMUD's service area is mostly surrounded by PG&E's service area and the two electric systems are interconnected at SMUD's Rancho Seco and Lake 230-kV substations.

Interconnection Agreement. PG&E and SMUD executed a Replacement Interconnection Agreement ("RIA") which became effective on January 1, 2010. The RIA provides that SMUD and PG&E operate their interconnections reliably, plan their electric systems to meet their load requirements, and avoid or mitigate impacts they cause by certain electric system modifications. The new agreement has a termination date of December 31, 2024, subject to FERC approval.

Generator Interconnection Agreements. SMUD signed a Large Generator Interconnection Agreement with CAISO and PG&E for the Solano 3 Wind Project, effective December 16, 2008, with a 50-year term. The Solano Wind Project Phase 1 has interconnection rights granted through a Small Generator Interconnection Agreement with the CAISO and PG&E and the Solano Wind Project Phase 2 has interconnection rights granted through a Large Generator Interconnection Agreement, also with the CAISO and PG&E. Both agreements became effective in January 2010 and both have terms of 20 years. SMUD entered into a Large Generator Interconnection Agreement with the CAISO and PG&E on June 3, 2021for the planned 90.8 MW Solano 4 Wind project.

Other generator interconnection agreements include a Small Generator Interconnection Agreement with PG&E for Slab Creek with a 22-year term which became effective on January 14, 2010, and a Small Generator Interconnection Agreement with PG&E for the Chili Bar Project with a 10-year term which became effective on June 2, 2021.

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SELECTED OPERATING DATA

Selected operating data of SMUD for the four years ended December 31, 2018 through 2021 are presented in the following table.

SMUD SELECTED OPERATING DATA
CUSTOMERS, SALES, SOURCES OF ENERGY AND REVENUES

	Year Ended December 31,			
	2021	**2020**	**2019**	**2018**
Customers at End of Period:				
Residential	572,786	568,741	565,103	559,907
Commercial and industrial	69,426	68,628	68,203	67,782
Other	7,345	7,354	7,406	7,448
Total	649,557	644,723	640,712	635,137
MWh Sales:				
Residential	4,749,079	4,906,566	4,493,548	4,515,031
Commercial and industrial	5,649,474	5,453,120	5,616,920	5,661,449
Other	54,473	55,590	55,770	57,031
Total	10,453,026	10,415,276	10,166,238	10,233,511
Surplus power/out of area sales	2,774,907	2,259,991	1,878,205	1,516,289
Total	13,227,933	12,675,267	12,044,443	11,749,800
Sources of Energy Sold MWh:				
Generated by SMUD	6,776,244	6,414,380	7,143,944	7,089,430
Purchased or exchanged	6,884,003	6,691,279	5,324,217	5,078,432
Total	13,660,247	13,105,659	12,468,161	12,167,862
Less System losses and SMUD usage	432,314	430,392	423,718	418,062
Total	13,227,933	12,675,267	12,044,443	11,749,800
Gross System peak demand (kW)[(1)]	3,019,000	3,057,000	2,927,000	2,944,000
Average kWh sales per residential customer[(2)]	8,316	8,650	7,987	8,101
Average Revenue per kWh Sold:				
Residential[(2)] (cents)	16.20	15.27	14.90	14.43
Commercial & industrial[(2)] (cents)	13.95	13.17	12.71	12.57

(1) Peak system MW values are measured at the four SMUD interconnection points and exclude SMUD's generation losses. Historical values include the impacts of dispatchable, non-dispatchable, and energy efficiency program capacity savings.

(2) The average kWh sales per residential customer and the average revenue per kWh sold are calculated based upon billed and unbilled sales.

Source: SMUD

SELECTED FINANCIAL DATA

SMUD Financial Information

The following table presents selected financial data of SMUD. Under generally accepted accounting principles, data with respect to SMUD's component units, such as the Authorities, is included with that of SMUD. The following presents data for SMUD only and not its component units, such as the Authorities. SMUD's audited financial statements for the years ended December 31, 2021, and December 31, 2020, are included in APPENDIX B attached to this Official Statement. The following unaudited data for SMUD (excluding its component units) is drawn from SMUD's financial records that have been subjected to the auditing procedures applied in the audits of SMUD's and its component units' financial statements for the years ended December 31, 2018 through 2021.

SMUD FINANCIAL DATA[1]
(thousands of dollars)

	Year Ended December 31,			
	2021	2020	2019	2018 (restated)
Summary of Income				
Operating Revenues[2]	$ 1,784,313	$1,582,979	$1,553,167	$1,589,612
Operating Expenses	(1,463,138)	(1,397,845)	(1,412,199)	(1,376,987)
Operating Income (Loss)	321,175	185,134	140,968	212,625
Interest and Other Income (Expense)	108,564	63,014	(21,113)	76,966
Interest Expense	(81,692)	(80,699)	(66,185)	(73,021)
Change in Net Position	$ 348,047	$ 167,449	$ 53,670	$ 216,570
Selected Statement of Net Position Information				
Net Plant in Service	$ 3,448,439	$3,234,208	$3,187,135	$2,995,505
Construction Work in Progress	365,478	460,155	351,584	396,794
Electric Utility Plant – Net	$ 3,813,917	$3,694,363	$3,538,719	$3,392,299
Unrestricted Cash	$ 569,001	$ 662,155	$ 451,800	$ 434,103
Rate Stabilization Fund	$ 188,992	$ 168,726	$ 143,669	$ 96,694
Total Assets	$ 6,020,991	$5,826,449	$5,429,137	$5,254,839
Net Position	$ 2,292,640	$1,944,593	$1,777,145	$1,723,476
Long-Term Debt[3]	$ 2,387,686	$2,523,921	$2,166,389	$1,803,840
Debt Service Coverage Ratios				
Parity Debt Service Coverage Ratio	2.59x	2.25x	2.11x	2.37x
Parity and Subordinate Debt Service Coverage Ratio	2.47x	2.14x	2.06x	2.37x

(1) The financial statements of SMUD comprise financial information of SMUD along with its component units, CVFA, SPA, SCA, SFA, NCGA and NCEA. This table includes only financial information of SMUD excluding its component units. Net operating revenues and expenses and Electric Utility Plant and Capitalization of CVFA, SPA, SCA, SFA, NCGA and NCEA are not included in this table, although amounts paid to or received from the Authorities by SMUD are included.

(2) Operating Revenues reflect net transfers to (from) the Rate Stabilization Fund for each full year as follows:
2021 $20.3 million
2020 $25.1 million
2019 $47.0 million
2018 ($3.2 million)
Transfers to the Rate Stabilization Fund reduce operating revenues in the year transferred; transfers from the Rate Stabilization Fund increase operating revenues. Transfers from the HGA balancing account in the Rate Stabilization Fund are automatic based on the amount of precipitation received. See "RATES AND CUSTOMER BASE – Rates and Charges" above.

(3) Long-Term Debt includes Long-Term Debt due within one year and unamortized premiums.

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Financial Information of SMUD and the Authorities

The following table presents a summary of selected financial information for SMUD and the Authorities.

SUMMARY OF FINANCIAL INFORMATION OF SMUD AND THE AUTHORITIES FOR THE YEARS ENDED DECEMBER 31, 2021 AND 2020 (thousands of dollars)

	Year Ended December 31, 2021			Year Ended December 31, 2020		
	SMUD	Authorities	Total[1]	SMUD	Authorities	Total[1]
Summary of Income						
Operating Revenues[2]	$ 1,784,313	$ 270,694	$ 1,790,568	$1,582,979	$ 267,211	$1,587,905
Operating Expenses	(1,463,138)	(250,952)	(1,449,651)	(1,397,845)	(252,832)	(1,388,392)
Operating Income	321,175	19,742	340,917	185,134	14,379	199,513
Interest and Other Income	108,564	790	107,968	63,014	1,605	63,022
Interest Expense	(81,692)	(27,608)	(109,300)	(80,699)	(28,601)	(109,300)
Change in Net Position	$ 348,047	$ (7,076)	$ 339,585	$ 167,449	$ (12,617)	$ 153,235
Selected Statement of Net Position Information						
Net Plant in Service	$3,448,439	$ 301,773	$3,467,673	$3,234,208	$ 334,011	$3,285,840
Construction Work in Progress	365,478	1,819	367,297	460,155	1,164	461,319
Electric Utility Plant – Net	$3,813,917	$ 303,592	$3,834,970	$3,694,363	$ 335,175	$3,747,159
Unrestricted Cash	$ 569,001	$ 61,375	$ 630,376	$ 662,155	$ 52,261	$ 714,416
Rate Stabilization Fund	$ 188,992	--	$ 188,992	$ 168,726	--	$ 168,726
Total Assets	$6,020,991	$1,173,867	$6,843,061	$5,826,449	$1,220,049	$6,689,080
Net Position	$2,292,640	$ 286,996	$2,297,097	$1,944,593	$ 295,299	$1,957,512
Long-Term Debt[3]	$2,387,686	$ 826,171	$3,213,857	$2,523,921	$ 862,781	$3,386,702

(1) Financial information for SMUD and the SMUD JPAs (CVFA, SPA, SCA, SFA, NCGA and NCEA) include intercompany balances. The financial information reflects balances after the elimination of intercompany accounts including Authorities distributions to SMUD of $1.4 million in 2021 and $1.6 million in 2020.

(2) Operating Revenues reflect net transfers to (from) the Rate Stabilization Fund as follows:
2021: $20.3 million
2020: $25.1 million
Transfers to the Rate Stabilization Fund reduce operating revenues in the year transferred; transfers from the Rate Stabilization Fund increase operating revenues. Transfers from the HGA balancing account in the Rate Stabilization Fund are automatic based on the amount of precipitation received. See "RATES AND CUSTOMER BASE – Rates and Charges" above.

(3) Long-Term Debt includes Long-Term Debt due within one year and unamortized premiums.

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Management's Discussion of SMUD's Operating Results

Year Ended December 31, 2021. For the year ended December 31, 2021, SMUD reported an increase in net position of $348.0 million as compared to an increase of $167.4 million for 2020.

Operating revenues were $201.3 million higher than 2020. This was primarily due to higher sales to customers ($70.1 million), sales of surplus gas ($65.4 million), sales of surplus power ($47.1 million), transfers from the RSF ($18.2 million), AB 32 revenue ($17.9 million) and gain on sale of carbon allowance futures ($3.1 million), partially offset by transfers to the RSF ($13.4 million) and lower public good revenue ($3.5 million).

Operating expenses were $65.3 million higher than 2020. This was primarily due to higher production operating expenses ($89.6 million), purchased power expenses ($71.8 million), and depreciation expenses ($11.9 million), partially offset by lower amortization of pension and OPEB ($84.2 million), public good expenses ($10.7 million), customer accounts expenses ($6.8 million) and transmission and distribution maintenance expenses ($5.5 million).

Non-Operating income increased by $45.5 million primarily due to California Arrearage Payment Program funding ($41.4 million), a settlement related to Rancho Seco damages ($15.0 million), higher investment income ($11.5 million), higher contributions in aid of construction ($4.0 million), offset by dissolution of RBC CSCDA gas prepay contract ($10.9 million), lower insurance proceeds ($8.6 million), lower interest income ($7.3 million), lower unrealized holding gains ($4.0), lower distributions from the JPAs ($2.6 million) and lower legal settlement costs ($2.2 million).

Interest expense increased $1.0 million from 2020.

Year Ended December 31, 2020. For the year ended December 31, 2020, SMUD reported an increase in net position of $167.4 million as compared to an increase of $53.7 million for 2019.

Operating revenues were $29.8 million higher than 2019. This was primarily due to higher sales to customers ($42.8 million), transfers from the RSF ($23.1 million), sales of surplus power ($22.3 million), LCFS credit sales revenue ($5.9 million) and other electric revenue ($3.7 million), partially offset by lower sales of surplus gas ($32.7 million), AB 32 revenue ($26.9 million), miscellaneous service revenue ($5.4 million) and customer late fee revenue ($2.3 million).

Operating expenses were $14.4 million lower than 2019. This was primarily due to lower production operating expenses ($42.5 million), administrative and general expenses ($17.4 million), public good expenses ($6.4 million), depletion expense ($4.1 million), production maintenance expenses ($4.1 million) and transmission and distribution operating expenses ($3.0 million), partially offset by higher purchased power expenses ($21.4 million), transmission and distribution maintenance expenses ($17.7 million), depreciation expenses ($14.8 million) and amortization of regulatory assets ($8.7 million).

Non-Operating income increased by $84.1 million due to no divestment of its interests in the Rosa Unit ($52.1 million), lower write-off of preliminary projects in 2020 ($11.6 million), dissolution of RBC CSCDA gas prepay contract ($10.9 million), higher insurance proceeds ($8.3 million), higher distributions from the JPAs ($4.0 million) and lower CCA costs net of higher revenues ($2.8 million), partially offset by lower contributions in aid of construction ($2.7 million) and lower unrealized holding gains ($2.4 million).

Interest expense increased $14.5 million from 2019.

Regulatory Assets. In accordance with Governmental Accounting Standards Board ("GASB") No. 62, "Regulated Operations," SMUD defers, as regulatory assets, certain types of expenditures. These assets are amortized and collected through future rates.

As of December 31, 2021, SMUD had a total of $703.7 million recorded for regulatory assets. Regulatory assets associated with costs related to implementation of GASB No. 68 which requires SMUD to record a net pension liability was $357.6 million at December 31, 2021. Regulatory assets associated with costs related to implementation of GASB No. 75 which requires SMUD to record a net Other Post Employment Benefit (OPEB) liability was $293.8 million at December 31, 2021. Regulatory assets associated with Rancho Seco decommissioning costs totaled $83.8 million at December 31, 2021. Nuclear fuel storage costs and non-radiological decommissioning costs have been collected in rates since 2009. For a complete description of these regulatory assets, see Note 8 (Regulatory Deferrals) to SMUD's financial statements.

The Board has authorized the deferral of any charges or credits that result from the change in valuation of ineffective hedges that should be reported as Investment Revenue/Expense on the Statements of Revenues, Expenses and changes in net position. The Board's resolution establishes that such charges or credits are not included in rates based on market value changes but are included in rates when the underlying transactions occur. Therefore, under GASB No. 62, "Regulated Operations," any such changes are included in the Statement of Net Position as regulatory assets or liabilities. For a complete description of these derivative financial instruments, see Note 9 (Derivative Financial Instruments) to SMUD's financial statements.

RANCHO SECO DECOMMISSIONING

Overview. The 913 MW Rancho Seco Nuclear Power Plant ("Rancho Seco") began Nuclear Regulatory Commission ("NRC") licensed operations in 1974. In June 1989, the electorate of SMUD voted against allowing SMUD to continue to operate Rancho Seco as a nuclear generating facility, and the plant was shut down. In 1991, SMUD submitted a report (the "Financial Assurance Plan") providing required financial assurance to the NRC that SMUD will have sufficient funds available to pay for the cost of decommissioning. On March 17, 1992, the NRC granted SMUD a change from an operating to a possession-only license for Rancho Seco that relieved SMUD from compliance with a number of NRC regulations applicable to operating nuclear power plants. SMUD also filed a proposed decommissioning plan with the NRC (the "Decommissioning Plan"), which was approved in March 1995.

After the decommissioning efforts began, no suitable disposal option was available to SMUD for the Class B and Class C low level radioactive waste generated during the plant decommissioning. With the used nuclear fuel stored onsite requiring oversight staff, SMUD opted to store the Class B and Class C radioactive waste in an existing interim onsite storage building until a suitable disposal option was available. In November 2007, the possession-only license for Rancho Seco was amended to update the Decommissioning Plan to terminate the possession-only license for the Class B and Class C waste in two phases. Phase I of the decommissioning was completed at the end of 2008. Following verification of the site conditions, SMUD submitted a request to the NRC to reduce the licensed facility from 2,480 acres to the interim onsite storage building and about one acre surrounding it. The request was approved by the NRC in September 2009. Phase II of decommissioning included approximately the two-acre interim storage building containing the Class B and Class C radioactive waste and surrounding area. In September 2013, SMUD entered into a contract with the operator of the low-level radioactive waste disposal facility located in Andrews, Texas. Shipment of the Class B and Class C radioactive waste for disposal was completed in November 2014. SMUD conducted additional clean-up activities and radiological surveys, which were followed by NRC confirmatory surveys. The results of these surveys demonstrated unit dose criteria well below NRC release criteria, and the NRC approved the Phase II area for unrestricted use. On

September 21, 2017, SMUD formally requested the termination of the possession-only license. On August 31, 2018, the NRC officially terminated SMUD's possession-only license for the remaining Class B and Class C waste at Rancho Seco.

As part of the Decommissioning Plan, the nuclear fuel and Greater Than Class C ("GTCC") radioactive waste is being stored in a dry storage facility (the Independent Spent Fuel Storage Installation or "ISFSI") constructed by SMUD, adjacent to the former reactor facility. The NRC has separately licensed this facility. The DOE, under the Nuclear Waste Policy Act of 1982, is responsible for permanent disposal of used nuclear fuel and GTCC radioactive waste. SMUD has a contract with the DOE for the removal and disposal of this waste. The DOE was to have a waste repository operating by 1998, but has experienced significant and ongoing delays. The Nuclear Waste Policy Act designates Yucca Mountain in Nevada as the final and exclusive repository for the nation's used nuclear fuel. The DOE discontinued the Yucca Mountain license review activities in 2010, but after a court ordered the NRC to resume its review in 2013, the NRC published its final safety evaluation report in 2015. The final safety report, and the final environmental impact statement, concluded that the proposed repository would be safe and environmentally sound for one million years.

Nevertheless, seeking alternatives to Yucca Mountain, the Blue Ribbon Commission on America's Nuclear Future delivered its final report in January 2012 with several recommendations. The Department of Energy (the "DOE") responded to the recommendations by issuing a report in January 2013 (Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste). Key to both documents is a focus on used fuel from decommissioned sites including Rancho Seco. The DOE report accepts most of the Blue Ribbon Commission recommendations, and contains timelines for fuel management options which proposed removing the fuel from Rancho Seco as early as 2021. However, any progress on the strategies proposed by the DOE is dependent on legislative action by Congress. With no legislative action taken to date, the 2021 projected date for fuel removal slips year-for-year. Therefore, SMUD cannot determine at this time when the DOE will fulfill its contractual obligations to remove the nuclear fuel and GTCC waste from the Rancho Seco facility. In the meantime, SMUD continues to incur costs of approximately $5 to $6 million per year for storage of used nuclear fuel at the ISFSI. SMUD has filed a series of successful lawsuits against the federal government for recovery of past spent fuel costs, with recoveries to date from the DOE in excess of $104 million. SMUD plans to continue pursuing cost recovery claims to ensure it is reimbursed for all such costs in the future. The ISFSI will be decommissioned and its license terminated after the fuel and GTCC is removed.

Financial Assurance Plan. In accordance with the Financial Assurance Plan, SMUD established and funded an external decommissioning trust fund currently held by Wells Fargo Bank (the "Decommissioning Trust Fund"). Pursuant to the Financial Assurance Plan, SMUD made the final deposit into the Decommissioning Trust Fund in 2008. Additional deposits are not expected but will be made if increased cost estimates or reduced fund interest earnings require it. In 2011, the NRC began requiring that SMUD demonstrate financial assurance for decommissioning the ISFSI as well as the former power facility, increasing the overall cost for decommissioning Rancho Seco. The estimated total cost for decommissioning the ISFSI was approximately $5.7 million at December 31, 2019. The decommissioning cost estimate is required to be updated every three years. As of December 31, 2021, the balance of the Decommissioning Trust Fund was $8.87 million, excluding unrealized gains and losses. Based on the current decommissioning cost estimate and the value of the fund, SMUD's existing Decommissioning Trust Fund provides sufficient funds to complete decommissioning and terminate the ISFSI license.

In addition to these costs, SMUD also estimates that it would cost approximately $13.1 million to restore the site to make it available for other SMUD uses with some major structures remaining intact. Site restoration is not a legal requirement. No site restoration is currently underway.

EMPLOYEE RELATIONS

SMUD has approximately 2,231 employees, most of whom are covered by a civil service system. SMUD is a contracting member of the California Public Employees' Retirement System ("PERS"). Approximately 50% of SMUD's work-force is represented as to wages, hours and other terms and conditions of employment, by one of three recognized employee organizations, the International Brotherhood of Electrical Workers ("IBEW") Local 1245, the Organization of SMUD Employees ("OSE"), and the SMUD Public Safety Officers' Association ("PSOA"). The remaining 50% of SMUD's work-force, which includes managers, professional, administrative, supervisory, confidential and security staff, is unrepresented.

SMUD negotiated four-year Memoranda of Understanding ("MOU") with IBEW and the OSE, effective January 1, 2022, through December 31, 2025. Both contracts contain a no-strike/no-lockout clause effective during the life of the agreements. The PSOA recently obtained recognition status in 2018, and in 2019, SMUD negotiated an MOU with PSOA effective through December 31, 2022. SMUD expects to begin negotiations with PSOA prior to the expiration of the PSOA MOU. SMUD has experienced only one labor interruption, which occurred in January 1980 that lasted four days.

RETIREMENT BENEFITS AND POST-EMPLOYMENT MEDICAL BENEFITS

Pension Plans

SMUD participates in PERS, an agent multiple-employer public employee defined benefit pension plan. PERS provides retirement and disability benefits, annual cost-of-living adjustments, and death benefits to plan members and beneficiaries. PERS acts as a common investment and administrative agent for participating public entities within the State. Benefit provisions and all other requirements are established by State statute and SMUD policies. The pension plan provides retirement benefits, survivor benefits, and death and disability benefits based upon employees' years of credited service, age, and final compensation.

As of June 30, 2020, the last actuarial valuation date for SMUD's plan within PERS, the market value of the SMUD plan assets was $1.94 billion. The plan is 79.1% funded on a market value of assets basis, an increase of 0.7% compared to the June 30, 2019 funded status based on the market value of assets.

As an employer, SMUD is required to contribute a percentage of payroll each year to PERS to fund SMUD's plan based on actuarial valuations performed by PERS. PERS collects the normal cost based on a percentage of payroll and the unfunded liability portion is based on a dollar amount. SMUD also makes partial contributions required of SMUD employees on their behalf and for their account. At the PERS fiscal year ended June 30, 2021, SMUD's required employer contribution rate for normal cost was 9.1% of payroll and the unfunded liability contribution was $33.5 million. During 2021, SMUD contributed $57.6 million to PERS (including SMUD's contributions to cover required employee contributions), and SMUD employees paid $15.4 million for their share of the PERS contribution.

For the fiscal years ending June 30, 2022 and June 30, 2023, SMUD is required to contribute 9.0% and 8.9% of payroll for normal costs and $36.3 million and $22.4 million for the unfunded liability contribution, respectively. Assuming no amendments to the plan and no liability gains or losses (which can have a significant impact), PERS has projected that SMUD will be required to contribute 8.7% of payroll to the plan for normal costs and $23.8 million for the unfunded liability contribution for the fiscal year ending June 30, 2024, not including SMUD contributions to cover required employee contributions. The amount SMUD is required to contribute to PERS is expected to increase in the future. The actual amount of such increases will depend on a variety of factors, including but not limited to investment returns, actuarial methods and assumptions, experience and retirement benefit adjustments.

SMUD has the option to prepay an annual lump sum payment to PERS for the unfunded accrued liability portion only (not including SMUD contributions to cover required employee contributions). SMUD made an annual lump sum prepayment of $31.3 million, and also voluntarily made an additional payment of $175.1 million, for the unfunded accrued liability for the fiscal year ended June 30, 2021. SMUD also made an annual lump sum prepayment of $35.0 million, and voluntarily made an additional payment of $25.0 million for the unfunded accrued liability for the fiscal year ending June 30, 2022.

While SMUD has some ability to adjust the retirement benefits provided to its employees, PERS determines the actuarial methods and assumptions used with respect to assets administered by PERS (including the SMUD plan assets) and makes the investment decisions with respect to such assets. For a description of such actuarial methods and assumptions (including the smoothing conventions used by PERS when setting employer contribution rates) and investments, see the comprehensive annual financial report of PERS (SMUD's plan is part of the Public Employees' Retirement Fund of PERS) available on its website at www.calpers.ca.gov. SMUD cannot guarantee the accuracy of such information and neither the comprehensive annual financial report of PERS nor any other information contained on the PERS website is incorporated by reference in or part of this Official Statement. Actuarial assessments are "forward-looking" information that reflect the judgment of the fiduciaries of the pension plans, and are based upon a variety of assumptions, one or more of which may prove to be inaccurate or be changed in the future. Actuarial assessments will change with the future experience of the pension plans.

GASB issued statement No. 68 "Accounting and Financial Reporting for Pensions – An Amendment of GASB Statement No. 27" ("GASB No. 68"). The primary objective of GASB No. 68 is to improve accounting and financial reporting by state and local governments for pensions. Under GASB No. 68, SMUD is required to report the net pension liability (i.e., the difference between the total pension liability and the pension plan's net position or market value of assets) in its Statement of Net Position. This standard requires shorter amortization periods for recognition of non-investment gains and losses and actuarial assumption changes, as well as for recognition of investment gains and losses. GASB No. 68 separates financial reporting from funding requirements for pension plans. The net pension asset as of December 31, 2021 is $27.7 million and the net pension liability as of December 31, 2020 is $469.8 million.

SMUD provides its employees with two cash deferred compensation plans: one pursuant to Internal Revenue Code ("IRC") Section 401(k) (the "401(k) Plan") and one pursuant to IRC Section 457 (the "457 Plan" and collectively, the "Plans"). The Plans are contributory plans in which SMUD's employees contribute the funds. Each of SMUD's eligible full-time or permanent part-time employees may participate in either or both Plans, and amounts contributed by employees are vested immediately. Such funds are held by a trustee in trust for the employees upon retirement from SMUD service and, accordingly, are not subject to the general claims of SMUD's creditors. SMUD makes annual contributions to the 401(k) Plan on behalf of certain employees pursuant to a memorandum of understanding with both of its collective bargaining units. SMUD matches non-represented employee contributions to the 401(k) Plan up to a set amount. SMUD also makes limited discretionary contributions to non-represented employees hired after January 1, 2013, which contributions fully vest after five years. SMUD made contributions into the 401(k) Plan of $6.1 million in 2021 and $5.8 million in 2020. Prior to 2022, SMUD did not match employee contributions, nor make contributions on behalf of its employees to the 457 Plan. Beginning in 2022, SMUD makes annual contributions to the 457 Plan on behalf of certain employees and matches employee contributions up to a set amount pursuant to a memorandum of understanding with one of its collective bargaining units. Participating employees made contributions into both Plans totaling $30.6 million in 2021 and $28.8 million in 2020.

Other Post-Employment Benefits

SMUD provides post-employment healthcare benefits, in accordance with SMUD policy and negotiated agreements with employee representation groups in a single employer defined benefit plan, to all employees who retire from SMUD, and their dependents. SMUD also provides post-employment healthcare benefits to covered employees who are eligible for disability retirement. SMUD contributes the full cost of coverage for retirees hired before January 1, 1991, and a portion of the cost based on credited years of service for retirees hired after January 1, 1991. SMUD also contributes a portion of the costs of coverage for these retirees' dependents. Retirees are required to contribute the portion that is not paid by SMUD. The benefits, benefit levels, retiree contributions and employer contributions are governed by SMUD and can be amended by SMUD through its personnel manual and union contracts.

SMUD's post-employment health care benefits are funded through the PERS California Employers' Retiree Benefit Trust ("CERBT"), an agent multiple-employer plan. The funding of a plan occurs when the following events take place: the employer makes payments of benefits directly to or on behalf of a retiree or beneficiary; the employer makes premium payments to an insurer; or the employer irrevocably transfers assets to a trust or other third party acting in the role of trustee, where the plan assets are dedicated to the sole purpose of the payments of the plan benefits, and creditors of the government do not have access to those assets.

SMUD has elected to contribute the normal costs to the CERBT but annually receive reimbursement for cash benefit payments from the CERBT. In 2022 and 2021, SMUD decided to forgo making a contribution for the normal costs to the CERBT because there was a net OPEB asset at December 31, 2021 and 2020. In May 2020, SMUD made contributions for the normal costs to the CERBT in the amount of $9.5 million. SMUD can elect to make additional contributions to the trust. During 2021 and 2020, SMUD made healthcare benefit contributions by paying actual medical costs of $24.1 million and $23.8 million, respectively. During 2021 and 2020, SMUD received a $23.3 million and $20.0 million reimbursement for cash benefit payments from the CERBT, respectively.

At June 30, 2021 and 2020, SMUD estimated that the actuarially determined accumulated post-employment benefit obligation was approximately $398.2 and $405.8 million, respectively. At June 30, 2021 and 2020, the plan was 113.1% and 97.9% funded, respectively.

SMUD's actuary uses PERS economic and other assumptions as the basis for the calculation of the post-employment benefit obligation. The actual accumulated post-employment benefit obligation will vary substantially if such PERS assumptions, such as interest rate and life expectancy, among others, prove to be inaccurate or different than SMUD's actual experience. Although SMUD believes that such assumptions and estimates are reasonable, no assurance can be given that any such assumptions will prove to be accurate, or that SMUD's actual accumulated post-employment benefit obligation will not materially exceed its estimates. Additional information is available in Note 15 (Other Postemployment Benefits) and "Required Supplementary Information" to SMUD's consolidated financial statements.

GASB previously issued SGAS No. 75 "Accounting and Financial Reporting for Postemployment Benefits Other than Pensions". The primary objective of GASB No. 75 is to improve accounting and financial reporting by state and local governments for post-employment benefits other than pensions ("OPEB"). Under GASB No. 75, SMUD is required to report the net OPEB asset or net OPEB liability (i.e., the difference between the total OPEB liability and the OPEB plan's net position or market value of assets) in its Statement of Net Position. This standard requires shorter amortization periods for recognition of non-investment gains and losses and actuarial assumption changes, as well as for recognition of investment gains and losses. The net OPEB asset as of December 31, 2021 and December 31, 2020 is $57.5 million and $0.8 million, respectively.

CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS

Estimated Capital Requirements

SMUD has a projected capital requirement of approximately $2.124 billion for the period 2022 through 2026 as shown in the table below. Approximately 60% of this requirement is anticipated to be funded with internally generated funds and cash on hand.

Special projects include costs relating to construction of large substations and the potential construction of Solano Phase 4. The Estimated Capital Requirements table below includes $207 million for Solano Phase 4. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – Solano 4 Project."

ESTIMATED CAPITAL REQUIREMENTS

(Dollars in Thousands)

	Service Area and Other System Improvements Including Distribution System	Improvements to Existing Generation Plant	General Plant	Special Projects	Total Capital Requirements
2022	$202,367	$77,635	$80,862	$90,393	$451,258
2023	137,181	50,563	110,371	220,775	518,890
2024	215,652	46,751	73,569	57,373	393,346
2025	215,252	46,751	73,569	57,373	392,946
2026	189,452	46,751	73,569	57,373	367,146

Outstanding Indebtedness

General. SMUD typically finances its capital requirements through the sale of revenue bonds, the sale of commercial paper, from draws on its Revolving Credit Facility (as defined below) and from internally generated funds.

SMUD's Electric Revenue Bonds (the "Senior Bonds") are issued pursuant to Resolution No. 6649 (the "Senior Resolution") adopted in 1971, as amended and supplemented (the "Senior Resolution"). As of May 1, 2022, SMUD had Senior Bonds in the aggregate principal amount of $1,966,925,000 outstanding. Immediately following the issuance of the [2022 Series J Bonds] and the refunding of the Refunded Bonds, as described in the forepart of this Official Statement, Senior Bonds in the aggregate principal amount of $[_________]* will be outstanding under the Senior Resolution. See "PLAN OF FINANCE" in the forepart of this Official Statement. The Senior Bonds are payable solely from the Net Revenues of SMUD's Electric System. The Senior Bonds are subordinate in right of payment to the prior payment of "Maintenance and Operation Costs" and "Energy Payments" as defined in the Master Resolution, including payments by SMUD to TANC under PA3, payments by SMUD under power purchase agreements related to the Authorities and payments by SMUD to NCGA and NCEA under their respective gas supply contracts.

SMUD's Subordinated Electric Revenue Bonds (the "Subordinated Bonds") are issued pursuant to Resolution No. 85-11-1 of SMUD, adopted on November 7, 1985, as amended and supplemented (the

* Preliminary, subject to change.

"Subordinate Resolution"). As of May 1, 2022, SMUD had Subordinated Bonds in the aggregate principal amount of $200,000,000 outstanding. The Subordinated Bonds are payable solely from the Net Subordinated Revenues of SMUD's Electric System. The Subordinated Bonds are subordinate in right of payment to the prior payment of principal of and interest on the Senior Bonds.

SMUD issues commercial paper notes (the "Notes") from time to time. As of May 1, 2022, no Notes were outstanding. Currently, Notes in the aggregate principal amount of $300,000,000 may be outstanding at any one time, but SMUD reserves the right to increase or decrease the aggregate principal amount of the Notes that may be outstanding at any one time in the future. The Notes are secured by letters of credit issued by commercial banks. The Notes (and SMUD's obligations to repay drawings under the letters of credit) are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Senior Bonds and the Subordinated Bonds. Drawings under the letters of credit, to the extent not repaid immediately from the proceeds of commercial paper or other available SMUD funds, are repayable with interest over a period of five years. The letters of credit currently expire in February, and August of 2025.

SMUD also entered into a revolving credit agreement with a commercial bank and issued its taxable and tax-exempt revolving notes thereunder (collectively, the "Revolving Credit Facility") in February 2022. As of May 1, 2022, no principal was outstanding under the Revolving Credit Facility. Currently, the aggregate principal amount that can be outstanding under the Revolving Credit Facility at any one time is limited to $100,000,000. However, SMUD reserves the right to increase or decrease the aggregate principal amount that can be outstanding at any one time under the Revolving Credit Facility in the future. SMUD's payment obligations under the Revolving Credit Facility are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Bonds (including the [2022 Series J Bonds]) and the Subordinated Bonds. The current term of the Revolving Credit Facility expires in February 2026.

Joint Powers Authorities. SMUD has entered into long-term power purchase agreements with SFA relating to the Local Gas-Fired Plants. Under such agreements, SMUD has exclusive control of the dispatch of all five of the Local Gas-Fired Plants and takes all of the power produced by the Local Gas-Fired Plants. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*." The Authorities are each treated as component units of SMUD for accounting purposes. Only SFA has outstanding debt, which relates solely to the SFA Project and is payable solely from capacity payments made by SMUD under the related power purchase agreement. The SPA bonds were redeemed on July 1, 2015. The CVFA bonds were defeased in September 2019. The SCA bonds were defeased in September 2019. The SFA power purchase agreement relating to the SFA Project is on a take-or-pay basis whereby payments must be made by SMUD regardless of plant performance. As of June 1, 2022, bonds issued by SFA to finance the SFA Project were outstanding in the aggregate principal amount of $101,185,000. SMUD's payments under the power purchase agreements relating to the Local Gas-Fired Plants are payable from revenues of SMUD's Electric System prior to the payment of principal of and interest on the Senior Bonds and Subordinated Bonds as either "Maintenance and Operation Costs" or "Energy Payments" under the Senior Resolution and Subordinate Resolution.

SMUD and Sacramento Municipal Utility District Financing Authority formed a joint powers authority called the Northern California Gas Authority No. 1 ("NCGA"). NCGA is treated as a component unit of SMUD for accounting purposes. NCGA issued $757,055,000 in bonds in May 2007 for the purpose of paying Morgan Stanley Capital Group in advance for natural gas to be delivered to NCGA and then sold to SMUD pursuant to a long-term purchase contract. SMUD's obligation under the purchase contract is limited to payment for gas supplies delivered by NCGA. SMUD's payments under the purchase contract are payable from revenues of SMUD's Electric System prior to the payment of principal and interest on the Senior Bonds and the Subordinated Bonds as either "Maintenance and Operation Costs" or "Energy

Payments" under the Senior Resolution and the Subordinate Resolution. SMUD is not obligated to make any payments in respect of debt service on the NCGA bonds. As of May 1, 2022, related bonds in the aggregate principal amount of $163,485,000 remain outstanding.

SMUD and Sacramento Municipal Utility District Financing Authority formed a joint powers authority called the Northern California Energy Authority ("NCEA"). NCEA is treated as a component unit of SMUD for accounting purposes. NCEA issued $539,615,000 in bonds in December 2018 for the purpose of paying J. Aron & Company LLC in advance for natural gas or electricity to be delivered to NCEA and then sold to SMUD pursuant to a long-term purchase contract. SMUD's obligation under the purchase contract is limited to payment for gas or electricity supplies delivered by NCEA. SMUD's payments under the purchase contract are payable from revenues of SMUD's Electric System prior to the payment of principal and interest on the Senior Bonds and the Subordinated Bonds as either "Maintenance and Operation Costs" or "Energy Payments" under the Senior Resolution and the Subordinate Resolution. SMUD is not obligated to make any payments in respect of debt service on the NCEA bonds. As of May 1, 2022, related bonds in the aggregate principal amount of $539,615,000 remain outstanding.

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Interest Rate Swap Agreements. SMUD has two interest rate swap agreements relating to previously or currently outstanding Subordinated Bonds and three forward starting interest rate swap agreements relating to potential refunding bonds to be issued in the future, as shown in the following table. For more information, see Note 9 (Derivative Financial Instruments) to SMUD's consolidated financial statements.

Effective Date	Termination Date	SMUD Pays		SMUD Receives	Notional Amount (000's)	Counterparty
7/2/1997	7/1/2024	Floating	SIFMA	5.154%	$55,835	J Aron & Company LLC
7/15/2003	8/15/2028	Fixed	2.894%	63% of 1M LIBOR	74,375	Morgan Stanley Capital Services, Inc.
07/20/2022	08/15/2033	Fixed	1.607%	SIFMA	157,785	Morgan Stanley Capital Services, Inc.
07/12/2023	08/15/2041	Fixed	0.718%	70% of 1M LIBOR	132,020	Barclays Bank
07/12/2023	08/15/2033	Fixed	0.554%	70% of 1M LIBOR	75,680	Barclays Bank

The obligations of SMUD under the swap agreements are not secured by a pledge of revenues of SMUD's electric system or any other property of SMUD. SMUD does not currently have any collateral posting requirements with respect to the interest rate swap agreements but SMUD may be required to post collateral under certain circumstances. [In connection with the refunding of the Refunded Bonds, as described in the forepart of this Official Statement, SMUD expects to terminate the SIFMA swap with Morgan Stanley Capital Services, Inc. that would otherwise be effective on July 20, 2022. See "PLAN OF FINANCE" in the forepart of this Official Statement.]

Build America Bonds Subsidy Payments. SMUD's Electric Revenue Bonds, 2009 Series V (the "2009 Series V Bonds") and Electric Revenue Bonds, 2010 Series W (the "2010 Series W Bonds") were issued as "Build America Bonds" under the provisions of the American Recovery and Reinvestment Act of 2009. At the time the 2009 Series V Bonds and 2010 Series W Bonds were issued, SMUD expected to receive an annual cash subsidy payment from the United States Treasury equal to 35% of the interest payable on the 2009 Series V Bonds and the 2010 Series W Bonds. However, as a result of the federal budget process, many payments from the federal government, including Build America Bonds subsidy payments, have been reduced. Absent the federal budget reductions, the aggregate annual cash subsidy payable to SMUD with respect to the 2009 Series V Bonds and the 2010 Series W Bonds would be approximately $9.8 million. With the current federal budget reductions, SMUD has typically been receiving aggregate annual cash subsidy payments with respect to the 2009 Series V Bonds and the 2010 Series W Bonds of approximately $9.2 million. It is possible that future federal budget actions could further reduce, or eliminate entirely, the annual cash subsidy payments with respect to Build America Bonds, including the annual cash subsidy payments payable to SMUD with respect to the 2009 Series V Bonds and the 2010 Series W Bonds. SMUD cannot predict the likelihood of the further reduction or elimination of the Build America Bonds subsidy payments. A significant reduction or elimination of the cash subsidy payments payable to SMUD with respect to the 2009 Series V Bonds or the 2010 Series W Bonds could be material.

Debt Service Requirements. The following table sets forth SMUD's debt service requirements with respect to SMUD's Senior Bonds and Subordinated Bonds.

[DEBT SERVICE REQUIREMENTS][TO BE UPDATED][(1)]
(As of [May 1], 2022)

Calendar Year	Senior Bonds Debt Service[(2)]	Subordinated Bonds Debt Service[(3)]	Total Debt Service
2021	$ 202,767,394	$ 10,000,000	$ 212,767,394
2022	202,721,025	10,000,000	212,721,025
2023	210,915,894	10,861,111	221,777,005
2024	179,387,306	7,483,333	186,870,639
2025	180,108,381	8,833,333	188,941,714
2026	180,206,231	5,500,000	185,706,231
2027	180,295,231	6,000,000	186,295,231
2028	180,403,513	6,000,000	186,403,513
2029	129,030,387	6,000,000	135,030,387
2030	139,100,391	6,000,000	145,100,391
2031	144,711,032	6,000,000	150,711,032
2032	144,555,595	6,000,000	150,555,595
2033	144,411,102	6,000,000	150,411,102
2034	144,261,606	6,000,000	150,261,606
2035	144,110,773	6,000,000	150,110,773
2036	143,962,001	6,000,000	149,962,001
2037	83,681,613	6,000,000	89,681,613
2038	83,528,863	6,000,000	89,528,863
2039	80,375,800	6,000,000	86,375,800
2040	80,382,550	6,000,000	86,382,550
2041	85,735,800	6,000,000	91,735,800
2042	31,422,350	28,490,000	59,912,350
2043	31,214,150	28,490,300	59,704,450
2044	31,008,750	28,490,350	59,499,100
2045	30,799,950	28,494,550	59,294,500
2046	25,391,750	28,492,150	53,883,900
2047	25,392,000	28,492,700	53,884,700
2048	25,392,500	28,490,450	53,882,950
2049	25,390,750	28,489,800	53,880,550
2050	25,394,250	-	25,394,250
Total	$ 3,316,058,938	$ 370,608,077	$ 3,686,667,015

(1) Does not include outstanding bonds issued by the Authorities for the Local Gas-Fired Plants. Does not include bonds issued by NCGA, NCEA or SMUD's portion of bonds issued by TANC. Payments by SMUD which are used by the Authorities, NCGA, NCEA, and TANC to pay debt service on such bonds constitute either "Maintenance and Operation Costs" or "Energy Payments" under the Senior Resolution and the Subordinate Resolution.

(2) Does not include debt service for the 2022 Series J Bonds or reflect the refunding of the Refunded Bonds. Debt service is not reduced by the amount of any subsidy that SMUD currently expects to receive in connection with the 2009 Series V Bonds and 2010 Series W Bonds.

(3) Based on an assumed interest rate of 3% per annum following (i) the initial scheduled Mandatory Purchase Date of October 17, 2023 for SMUD's Subordinated Electric Revenue Bonds, 2019 Series A and (ii) the initial scheduled Mandatory Purchase Date of October 15, 2025 for SMUD's Subordinated Electric Revenue Bonds, 2019 Series B.

Note: Amounts may not add due to rounding.

INSURANCE

SMUD maintains a comprehensive property/casualty insurance program designed to protect against catastrophic losses that would have an adverse effect on its financial position or operational capabilities. Insurance programs are continuously reviewed and modified when construction, operational exposures, or developments in the insurance industry so warrant. Long term relationships with a variety of insurers minimize SMUD's susceptibility to the effects of market cycles. SMUD budgets reserves to meet potential insurance deductibles and self-insured liability claims.

SMUD safeguards assets with all-risk property and boiler/machinery insurance with limits of $800 million per occurrence for physical damage and business interruption combined. Various coverage sublimits and deductibles apply to losses arising from certain perils, such as business interruption, earthquake, or flood, respectively. Liability insurance is in effect to defend and indemnify SMUD against third party claims, including general, automobile and sudden and accidental pollution claims with policy limits of $140 million, and wildfire coverage with policy limits of $250 million, all of which include a variety of self-insured retentions.

Nuclear property and liability insurance policies are maintained in accordance with the NRC's requirements for decommissioned nuclear plants that maintain dry storage of spent fuel on-site. This includes $100 million in first party property damage and decontamination, $100 million for nuclear liability arising from accidents on-site, $200 million for supplier's and transporter's nuclear liability, and $300 million for nuclear worker liability. SMUD is exposed to possible retrospective assessments for nuclear property events occurring at other nuclear facilities in the United States capped at ten times SMUD's annual nuclear property premium (currently the maximum retrospective assessment is approximately $1,000,000).

Other types of insurance include non-owned aircraft liability, workers' compensation, crime, cyber security, fidelity, fiduciary liability, directors' and officers' liability, professional errors and omissions, transportation and installation, and builder's risk for major facilities under construction.

LEGAL PROCEEDINGS

SMUD is a party to numerous actions arising out of the conduct of its business and affairs, some of which are discussed below. SMUD believes that any losses or adverse financial results it may suffer in these current actions, to the extent not covered by insurance, would not, in the aggregate, have an adverse material impact on SMUD, its business and affairs, the results of its operations, financial position or liquidity.

Environmental Litigation

SMUD was one of many potentially responsible parties that had been named in a number of actions relating to environmental claims and/or complaints. SMUD has resolved these environmental claims and/or complaints and entered into settlement agreements and/or consent orders. These settlement agreements and consent orders have statutory reopener provisions which allow regulatory agencies to seek additional funds for environmental remediation under certain limited circumstances. While SMUD believes it is unlikely that any of the prior settlements or consent orders will be reopened, the possibility exists. If any of the settlements or consent orders were to be reopened, SMUD management does not believe that the outcome will have a material adverse impact on SMUD's financial position, liquidity or results of operations.

Claim for Accidental Death

In February 2020, SMUD received a claim alleging an employee of a gutter company died after he accidentally came into contact with a SMUD electrical line during an installation. The claim is for approximately $43 million. SMUD concluded the electrical lines at the site of the accident exceeded required clearances and there is no basis for the claim against SMUD. SMUD management believes that SMUD has no potential liability in this matter and that any costs ultimately borne by SMUD will not have a material adverse impact on SMUD's financial position, liquidity or results of operations.

Proposition 26 Lawsuit

Two SMUD customers jointly filed a complaint against SMUD in October 2019. The complaint states that SMUD violated Proposition 26 (see "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Proposition 26*" for a description of Proposition 26) when SMUD's Board on June 24, 2019 adopted rate increases for 2020 and 2021. The Plaintiffs contend the rate increases do not reflect SMUD's reasonable cost of service because they include a 9.2% scalar that SMUD applied to its TOD residential rate restructure in the 2017 rate process which SMUD's Board of Directors adopted at that time. Therefore, the plaintiffs contend SMUD's 2020 and 2021 rates should be decreased by this scalar amount because the scalar exceeded SMUD's cost of service, and refunded to SMUD customers. Because SMUD has a strong evidentiary record supporting the Board's rate decisions in 2017 and 2019, and views the lawsuit as having little merit, SMUD anticipates the court will rule in SMUD's favor. The plaintiffs have requested to amend the complaint, which has delayed the court's proceeding until the amended complaint is filed. While SMUD believes the court will rule in its favor, SMUD is unable to predict the outcome of the litigation or, if or to the extent SMUD ultimately is not successful in the litigation, what remedies against SMUD may be available. SMUD management believes that if SMUD is not successful in the litigation, and to the extent the outcome would have a material adverse impact on SMUD's financial position, liquidity, or results of operations, the Board would make appropriate rate modifications based on an evidentiary record consistent with guidance from a judicial decision in the case.

Other Litigation Matters

Currently, SMUD is party to various claims, legal actions and complaints relating to its operations, including but not limited to: property damage and personal injury, contract disputes, torts, and employment matters. SMUD management believes that the ultimate resolution of these matters will not have a material adverse effect on SMUD's financial position, liquidity or results of operation.

FERC Administrative Proceedings

SMUD is involved in a number of FERC administrative proceedings related to the operation of wholesale energy markets, regional transmission planning, gas transportation and the development of NERC reliability standards. While these proceedings are complex and numerous, they generally fall into the following categories: (i) filings initiated by the CAISO (or other market participants) to adopt/modify the CAISO Tariff and/or establish market design and behavior rules; (ii) filings initiated by existing transmission owners (i.e., PG&E and the other IOUs) to pass-through costs to their existing wholesale transmission customers; (iii) filings initiated by FERC on market participants to establish market design and behavior rules or to complain about or investigate market behavior by certain market participants; (iv) filings initiated by transmission owners under their transmission owner tariffs for the purpose of establishing a regional transmission planning process; (v) filings initiated by providers of firm gas transportation services under the Natural Gas Act; and (vi) filings initiated by NERC to develop reliability standards applicable to owners, users, and operators of the bulk electric system. In addition, SMUD is an active participant in other FERC administrative proceedings, including those related to reliability and cybersecurity standards, variable resource integration, and transmission planning and cost allocation. SMUD management believes that the ultimate resolution of these matters will not have a material adverse effect on SMUD's financial position, liquidity or results of operations.

CPUC Administrative Proceedings

In July 2016, the CPUC adopted a final decision on PG&E's triennial gas transmission and storage ("GT&S") rate case. The case affects SMUD through several tariff rates SMUD pays to move natural gas along PG&E's backbone transmission lines. As a result of the 2010 San Bruno pipeline explosion, PG&E has applied for a significant increase in its revenue requirement to pay for enhanced safety measures on its entire gas pipeline system, including the backbone. PG&E proposed to increase the transportation tariff significantly for the period 2015-2017 in order to collect revenues to finance dramatic capital expenditures to implement over 75 remedies to enhance pipeline safety improvements of PG&E's gas transmission pipeline system. The CPUC authorized an 85% increase in PG&E's revenue requirement, which included an even larger rate increase for electric generators who use local transmission to supply their power plants. Some of those affected parties advocated for a single transportation rate that would eliminate the cost-based distinction between the high local rate that they would pay and the low backbone transmission rate that SMUD would pay. SMUD opposed those parties. In the final decision, CPUC ruled in SMUD's favor resulting in a backbone rate that remained essentially unchanged through 2018. While certain parties impacted by the increased local transportation rates sought a rehearing on the final decision and later filed a petition for modification of that decision, the CPUC has not acted on the petition for rehearing and it denied the petition for modification.

PG&E's 2019 GT&S rate case (the "2019 GT&S Case") was filed on October 30, 2017, and seeks to significantly increase the backbone transmission rates SMUD pays. Unlike the prior GT&S case described in the preceding paragraph, in the 2019 GT&S Case, PG&E is also seeking to divest itself of some of its primary gas storage assets, as well as upgrade those which will remain in its portfolio. This is largely in response to increased regulations and needed costly modifications imposed by the Division of Oil, Gas, and Geothermal Resources in the wake of the Aliso Canyon gas storage leak that occurred in 2016. PG&E estimated that these regulatory changes would reduce the capacity of its gas storage assets by nearly forty percent. Moreover, changes in PG&E's resource mix due to State policies favoring carbon-free resources, make this divestiture a key part of its overall resource portfolio strategic plan.

SMUD actively participated in the 2019 GT&S Case and was successful in affirming the application of cost causation principles to prevent excessive and unreasonable costs being shifted to electric generator backbone customers like SMUD, either through proposed changes in PG&E's natural gas storage strategy or through cost shifts within the electric generator customer class. In August 2020, PG&E hosted a workshop on local transmission study parameters and approaches. Several parties presented studies showing varying levels of cost allocation between core and non-core customers.

PG&E filed its 2023 General Rate Case ("GRC") in June 2021 which includes its gas transmission and storage revenue requirements. In September 2021, PG&E filed an application for approval of its Gas Cost Allocation and Rate Design Proposals ("CARD"). SMUD will actively participate in PG&E's GRC and CARD proceedings to ensure that costs are fairly allocated to non-core customers, including electric generator backbone customers. Separately, SMUD continues to participate and monitor a proceeding at the CPUC concerning long-term gas system planning. At this point in these proceedings, SMUD management does not anticipate that the ultimate resolution of such cases will have a material adverse effect on SMUD's financial position, liquidity, or results of operation.

DEVELOPMENTS IN THE ENERGY MARKETS

Background; Electric Market Deregulation

In 1996, the State partially deregulated its electric energy market. CAISO was established, as well as an independent power exchange, the PX. The PX was originally established to permit power generators to sell power on a competitive spot market basis; however, the PX has ceased all power exchange operations and filed for bankruptcy protection.

During 2000 and 2001, the State and many of the other western states experienced significantly higher and more volatile prices for natural gas and wholesale electricity. In reaction to such conditions, SMUD made significant changes to its business strategy to mitigate the impacts of the more volatile and unpredictable energy markets. While the difficult market conditions have moderated substantially, volatility in energy prices in the State are always a potential risk due to a variety of factors which affect both the supply and demand for electricity in the western United States. These factors include, but are not limited to, the implementation of the CAISO market design changes, insufficient generation resources, the increase in intermittent renewable energy resources, natural gas price volatility, fuel costs and availability, weather, transmission constraints and levels of hydroelectric generation within the region. While SMUD has taken a number of steps to mitigate its exposure to price volatility associated with these factors, this price volatility under extreme conditions may contribute to greater volatility in SMUD's net revenues from the sale of electric energy and, therefore, could materially adversely affect the financial condition and liquidity of SMUD. For a discussion of SMUD's current resource planning activities and risk management strategies, see "BUSINESS STRATEGY" above.

Cybersecurity

In 2015, Congress passed the Cybersecurity Information Sharing Act, which facilitated the secure sharing of information about cybersecurity threats between electric utilities and the federal government. SMUD participates in sharing and receiving information about cyber security threats in real time through the Electricity Information Sharing and Analysis Center ("E-ISAC"), the central hub for such data to actively manage risk related to potential cyber intrusion.

SMUD also participates in NERC's development of mandatory, enforceable cyber security standards to address vulnerabilities in electric utility systems. SMUD also adopts voluntary measures suggested as best practices by the National Institute of Standards and Technology ("NIST") in its national framework.

Cyber-security continues to be a top priority for SMUD. SMUD's prudent response to this ever-changing threat requires constant monitoring and frequent updates to implement new regulatory requirements as they are developed. SMUD manages risk related to frequently changing regulatory requirements by participating in the development of standards at NERC and NIST and through active engagement in the cyber security policy dialogue in Congress. The Omnibus Spending Bill for Fiscal Year 2022 signed into law by President Biden on March 15, 2022 included a measure which SMUD and other public power entities opposed as redundant to existing E-ISAC reporting without increasing security, being a requirement that critical infrastructure owners and operators report significant cyber incidents to the Cybersecurity and Infrastructure Security Agency ("CISA") within 72 hours and ransomware payments within 24 hours. Under the measure, CISA is directed to publish a notice of proposed rulemaking to implement the reporting requirements within 24 months.

Notwithstanding regulatory developments, cyberattacks are becoming more sophisticated and certain cyber incidents, such as surveillance, may remain undetected for an extended period. Critical infrastructure sectors such as the electric grid may be specific targets of cybersecurity attacks or threats. Attacks or threats directed at critical electric or energy sector operations could damage or cause the shut-down of generation, transmission or distribution assets that are essential to SMUD's ability to serve its customers, cause operational malfunctions and outages affecting SMUD's electric system, and result in costly recovery and remediation efforts. The costs of security measures or of remedying breaches could be material.

Federal Legislation and Regulatory Proceedings

Energy Policy Act of 2005. On August 8, 2005, the Energy Policy Act of 2005 (the "EPAct of 2005") was signed into law. The law includes a number of energy-related provisions, including among other things limited FERC jurisdiction over interstate transmission assets of municipal utilities, cooperatives and federal utilities to order these entities to provide transmission services on rates and terms comparable to those the entities charge and provide to themselves; the grant of authority to FERC to establish and certify an electric reliability organization to develop and enforce reliability standards for users of the bulk power transmission system; and prohibitions of certain market practices including the provision of false information and related expansion of FERC civil and criminal penalty authority. So far, the most visible impact of the EPAct of 2005 on SMUD has been the development of federal reliability standards.

Federal Regulation of Transmission Access. The Energy Policy Act of 1992 (the "Energy Policy Act") made fundamental changes in the federal regulation of the electric utility industry, particularly in the area of transmission access. The Energy Policy Act provided FERC with the authority to require a transmitting utility to provide transmission services at rates, charges, terms and conditions set by FERC. The purpose of these changes, in part, was to bring about increased competition in the electric utility industry. Under the Energy Policy Act, electric utilities owned by municipalities and other public agencies which own or operate electric power transmission facilities which are used for the sale of electric energy at wholesale are "transmitting utilities" subject to the requirements of the Energy Policy Act.

In April 1996, FERC issued its Order No. 888 to implement the competitive open access to transmission lines authorized by the Energy Policy Act. Order No. 888 requires the provision of open access transmission services on a nondiscriminatory basis by all "jurisdictional utilities" (which, by definition, does not include municipal entities like SMUD) by requiring all such utilities to file OATTs. Order No. 888 also requires "nonjurisdictional utilities" (which, by definition, does include SMUD) that purchase transmission services from a jurisdictional utility under an open access tariff and that owns or controls transmission facilities to provide open access service to the jurisdictional utility under terms that are comparable to the service that the nonjurisdictional utility provides itself. Section 211A of the EPAct of 2005 authorizes, but does not require, FERC to order unregulated transmission utilities to provide transmission services. Specifically, FERC may require an unregulated transmitting utility to provide access to their transmission facilities (1) at rates that are comparable to those that the unregulated transmitting utility charges to itself; and (2) on terms and conditions (not relating to rates) that are comparable to those under which the unregulated transmitting utility provides transmission services to itself that are not unduly discriminatory or preferential.

On February 16, 2007, FERC issued Order 890, which concluded that reform of the pro forma OATT was necessary to reduce the potential for undue discrimination and provide clarity in the obligations of transmission providers and customers. Significantly, in Order 890 FERC stated that it will implement its authority under Section 211A on a case-by-case basis and retain the current reciprocity provisions.

On July 21, 2011, FERC issued Order 1000, which among other things requires public utility (jurisdictional) transmission providers to participate in a regional transmission planning process that produces a regional transmission plan and that incorporates a regional and inter-regional cost allocation methodology. Similar to Order 890, FERC states that it will implement its authority under Section 211A on a case-by-case basis. However, in Order 1000, FERC appears to expand upon the current reciprocity provisions. Further, FERC states that it has the authority to allocate costs to beneficiaries of services provided by specific transmission facilities even in the absence of a contractual relationship between the owner of the transmission facilities and the identified beneficiary.

SMUD, individually, and through the Large Public Power Council ("LPPC"), unsuccessfully sought a rehearing of Order 1000 and subsequently appealed Order 1000 to the D.C. Circuit Court of Appeals. On August 15, 2014, the D.C. Circuit Court of Appeals rejected all of the arguments raised on appeal, upholding the entirety of Order 1000. LPPC filed a request for en banc review solely on FERC's ability to allocate costs in the absence of a contractual relationship. The D.C. Circuit Court of Appeals denied rehearing on October 17, 2014. LPPC did not petition the U.S. Supreme Court for writ of certiorari.

The jurisdictional members of WestConnect filed their proposed regional planning process and cost allocation methodology through a series of compliance filings. FERC accepted binding cost allocation for jurisdictional transmission providers of WestConnect and mandated that non-jurisdictional transmission providers identified as beneficiaries of a project have the ability to not accept the cost allocation. Following FERC's acceptance of the final WestConnect Order 1000 process on May 14, 2015, SMUD executed the WestConnect Order 1000 transmission planning participation agreement with its membership effective January 1, 2016 for the start of the 2016-2017 planning cycle.

However, in response to FERC's WestConnect orders on compliance, El Paso Electric Company ("El Paso"), a jurisdictional transmission provider, petitioned to the Court of Appeals for the 5th Circuit. In its appeal, El Paso contends that FERC's WestConnect orders violate Order 1000's cost causation principle because WestConnect's binding cost allocation applies only to the jurisdictional transmission providers and thus forces jurisdictional transmission providers to subsidize projects benefitting non-jurisdictional transmission providers that opt-out of projects. SMUD and the other non-jurisdictional transmission providers agreed on a settlement to resolve the matters on appeal in the 5th Circuit, and filed the settlement with FERC on February 16, 2022. Importantly, the settlement does not affect the ability of non-jurisdictional transmission providers to not accept cost allocation for a project. If approved by FERC, the jurisdictional transmission providers have agreed to dismiss their 5th Circuit appeal. The court has held the case in abeyance during the settlement discussions while the parties develop the settlement documents for the FERC filings. In the meantime, SMUD continues to participate in the WestConnect process.

In addition to regional planning, Order 1000 includes an interregional transmission planning component. WestConnect and the other two regional planning entities in the western interconnection (CAISO and Northern Grid), have developed a common FERC-approved approach to jointly evaluate transmission projects that interconnect two or more regions. While El Paso did not appeal FERC's orders on WestConnect's interregional planning, the decision of the Court of Appeals for the 5th Circuit described above does implicate the interregional cost allocation process because it defers to WestConnect's regional cost allocation methodology.

SMUD is unable to predict at this time the full impact that Order 1000 will have on the operations and finances of SMUD's electric system or the electric industry generally. However, WestConnect has conducted planning cycles under its Order 1000 planning process and has not identified any project eligible for cost allocation. SMUD will continue to take any action necessary, including withdrawing from a cost allocation determination and engaging in FERC proceedings, to ensure that it is not required to pay for transmission costs in the absence of an agreement or service relationship.

Of note, on July 15, 2021, FERC issued an Advance Notice of Proposed Rulemaking on Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator

Interconnection (the "ANOPR"). The ANOPR asks questions and seeks input on reforms that could impact the Order 1000 planning and cost allocation process. It is still early in the rulemaking proceeding, and FERC has not issued any further proposal. However, SMUD will continue to monitor and be engaged in any developments at FERC that impact the Order 1000 process and its participation in WestConnect.

NERC Reliability Standards. The Energy Policy Act ("EPAct") of 2005 required the FERC to certify an electric reliability organization ("ERO") to develop mandatory and enforceable reliability standards, subject to FERC review and approval. On February 3, 2006, FERC issued Order 672, which certified the NERC as the ERO. Many reliability standards have since been approved by FERC, including those aimed at protecting the bulk electric system from physical and cyber threats.

The ERO or the regional entities, such as the WECC, may enforce the reliability standards, subject to FERC oversight or the FERC may independently enforce reliability standards. Potential monetary sanctions include fines of up to $1,307,164 per violation per day. Order 693 provides the ERO and regional entities with the discretion necessary to assess penalties for such violations, while also having discretion to calculate a penalty without collecting the penalty if circumstances warrant. On March 18, 2010, FERC issued a Policy Statement on Penalty Guidelines, which appeared to envision the option of more serious penalties than would be imposed by NERC. NERC and a significant part of the industry challenged that Policy Statement. On September 17, 2010, FERC issued a Revised Policy Statement on Penalty Guidelines, which clarified and tempered some of its prior statements, although the revised guidelines maintained that it was appropriate to use the United States Criminal Sentencing Guidelines Model as an analytical tool for assessing penalties. FERC further clarified that its Revised Policy Statement on Penalty Guidelines would only be applied to investigations conducted by FERC.

Anti-Market Manipulation Rules. EPAct of 2005 gave the FERC the authority to issue rules to prevent market manipulation in jurisdictional wholesale power and gas markets, and in jurisdictional transmission and transportation services. These anti-market manipulation rules apply to non-jurisdictional entities such as SMUD. Further, EPAct of 2005 provided the FERC civil penalty authority, which the Commission has stated that it will exercise carefully by assuring that its market manipulation rules are clear.

Greenhouse Gas Emissions. The United States Environmental Protection Agency (the "EPA") has taken steps to regulate GHG emissions under existing law. In 2007, the U.S. Supreme Court held that the Clean Air Act ("CAA") directed EPA to regulate GHG emissions from new motor vehicles if it judged that such emissions contribute to climate change. In 2009, the EPA finalized an "Endangerment Finding" under the CAA, declaring that six identified GHGs – carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride – cause global warming, and that global warming endangers public health and welfare. Subsequently, EPA promulgated GHG standards for passenger cars and light-duty trucks (the so-called "Tailpipe Rule").-Although that rulemaking was later withdrawn by a different administration, prompting litigation and re-proposal of the standards that has only recently been finalized, the original promulgation of the Tailpipe Rule required EPA to also address emissions of the same pollutants from other sources, namely, the electric sector.

In 2014, the EPA issued a proposed rule under section 111(d) of the CAA called the Clean Power Plan (the "CPP") that projected power sector emissions reductions of 30% below 2005 levels by 2030. The proposed CPP would have established a rate-based emissions goal for each state, providing states the responsibility to develop a State Implementation Plan ("SIP") describing how each will meet the goal assigned by EPA using the "Best System of Emissions Reduction" ("BSER") established by EPA. The BSER under the CPP featured a suite of emissions reduction measures including fuel switching, emissions trading, and other measures. Significantly for the State and its regulated entities, the proposed CPP included a "state measures" plan that allowed for continued operation of successful state programs that achieve CPP goals. The rule was finalized in October 2015.

In November 2015, 27 states and numerous corporations challenged the CPP in court, alleging that EPA had exceeded its authority under the CAA. The U.S. Supreme Court stayed implementation of the CPP pending disposition of the petitions for review in the D.C. Circuit and any subsequent review by the U.S. Supreme Court. The D.C. Circuit Court of Appeals held oral arguments on the petitioner's claims, but before the court issued a decision, the 2016 presidential election resulted in a change of administration.

The new administration quickly moved for an abeyance (or stay) of the case for as long as the agency needed to review and withdraw the CPP. The court issued a series of 60-day abeyances and ultimately dismissed the case on September 17, 2019. Meanwhile, in August 2018, the EPA proceeded to withdraw the CPP and proposed a different rule under the same provision of the CAA. The new rule, known as the Affordable Clean Energy ("ACE") rule, would establish a BSER that only includes measures that can be undertaken at an individual power plant, rather than the broader suite of measures envisioned under the CPP. The ACE rule would also allow states to decide individually, on a case-by-case basis, the standards to be achieved by the best system of emission reductions, as well as exempt certain upgrades of fossil-fuel power plants from the CAA's New Source Review program, and extend the time to implement SIPs after the ACE rule is finalized. The ACE rule was challenged in court by environmental groups and states alleging that the revised rule inadequately responds to the EPA's responsibility to protect public health and welfare. SMUD joined in this litigation along with other challengers. The D.C. Circuit vacated the ACE rule on Jan. 19, 2021 and remanded it to EPA for review and revision, just days before a new presidential administration took office. Several states led by West Virginia and coal industry members appealed the decision, and the U.S. Supreme Court is expected to issue its ruling in the case later in 2022. The current administration is expected to issue a new rulemaking pending the U.S. Supreme Court's ruling.

Federal Clean Energy Legislation. SMUD expects the 117th Congress may consider substantial legislation related to clean energy and carbon emissions. SMUD actively participates in dialogues at the federal level regarding legislation that would meaningfully alter SMUD's existing GHG reduction strategies or impose new requirements for electric generators, including, but not limited to, discussions about a proposed federal clean energy standard.

SMUD is unable to predict with certainty at this time whether legislation will ultimately be considered or enacted, whether any new EPA rulemakings will be undertaken, and what the full impact of the reduction of fossil-based generation over time will have on the operations and finances of SMUD's electric system or the electric utility industry generally.

State Legislation and Regulatory Proceedings

A number of bills affecting the electric utility industry have been enacted by the State Legislature. In general, these bills provide for reduced GHG emission standards and greater investment in energy efficient and environmentally friendly generation alternatives through more stringent RPS. Additionally, ongoing regulatory proceedings address water flow and quality issues related to the Sacramento – San Joaquin River Delta. The following is a brief summary of these bills and regulatory proceedings.

Greenhouse Gas Emissions. On June 1, 2005, the Governor of the State signed Executive Order S-03-05, which emphasized efforts to reduce GHG emissions by establishing statewide GHG reduction targets. The targets are: (i) a reduction to 2000 emissions levels by 2010; (ii) a reduction to 1990 levels by 2020; and (iii) a reduction to 80% below 1990 levels by 2050. The Executive Order also called for the California Environmental Protection Agency ("Cal/EPA") to lead a multi-agency effort to examine the impacts of climate change on the State and develop strategies and mitigation plans to achieve the targets. On April 25, 2006, the Governor of the State signed Executive Order S-06-06 which directs the State to increase production of biofuels in the State and to meet 20% of its renewable energy goals in 2010 and 2020 using biomass resources.

On September 27, 2006, the Governor of the State signed into law AB 32, the Global Warming Solutions Act of 2006 ("AB 32"). AB 32 requires the California Air Resources Board ("CARB") to adopt enforceable GHG emission limits and emission reduction measures in order to reduce GHG emissions to 1990 levels by 2020. In addition, AB 32 establishes a mandatory reporting program for all IOUs, local, publicly-owned electric utilities and other load-serving entities (electric utilities providing energy to end-use customers) ("LSEs"). The AB 32 reporting program allows CARB to adopt regulations using market-based compliance mechanisms such as a "cap-and-trade" system.

On December 16, 2010, CARB approved a resolution adopting cap-and-trade regulations for the State. The regulations became effective on January 1, 2012. As adopted, the cap-and-trade program covers sources accounting for 85% of the State's GHG emissions, the largest program of its type in the United States.

The cap-and-trade program has been implemented in phases. The first phase of the program (through December 31, 2014) introduced a hard emissions cap on the combined electric utility and large industrial sectors, covering all sources emitting more than 25,000 metric tons of carbon dioxide-equivalent greenhouse gases ("CO2e") per year. In 2015, the program was expanded to cover distributors of transportation, natural gas, and other fossil fuels. The cap declined about 2 percent in 2014, and declined 3 percent annually from 2015 to 2020. The cap-and-trade program requires covered entities to retire compliance instruments (allowances and carbon offsets) for each metric ton of CO2e they emit. Initially, CARB allocated free allowances to LSEs and most industrial facilities at roughly 90% of their average emissions. SMUD was granted a higher amount because of early action taken to reduce GHG emissions. In the case of electric utilities, the value of allowances must be used to benefit ratepayers and achieve GHG emission reductions. As the program matures, some covered entities will be required to buy an increasing portion of their allowances at auction or on the secondary market. The cap-and-trade program will also allow covered entities to use offset credits for compliance purposes (not exceeding 8% of a regulated entity's compliance obligation). Offsets must be obtained from certified projects in sectors that are not regulated under the cap-and-trade program.

In November of 2012, CARB conducted its first allowance auction and auctions now occur on a quarterly schedule. On January 1, 2014, CARB linked the State cap and trade program with a companion program in the Canadian province of Quebec. The first quarterly joint auction for the linked programs occurred in November, 2014. On January 1, 2018, CARB linked the State's cap-and-trade program with Ontario's companion program. Immediately thereafter, an entity in any one of the three jurisdictions was able to purchase allowances on the secondary market in a linked jurisdiction, and as of February 21, 2018 (the date of the first joint auction) could purchase allowances in the joint auction. In June 2018, elections in Ontario changed political parties and the new administration formally withdrew from the Cap and Trade linkage. CARB has limited purchase and use of Ontario allowances in response. The August 2018 Cap and Trade auction did not include Ontario. The Washington state legislature recently passed a Cap and Trade bill, which will interact with the State's markets. Future potential near-term links to the CARB cap-and-trade program also include the states of Oregon and New Mexico.

On October 7, 2015, the Governor of the State signed SB 350 that contained aggressive goals for reducing carbon emissions by 2030, including raising the proportion of renewable energy to 50%, reducing the use of petroleum fuel in cars and trucks by up to 50%, and doubling the energy efficiency of existing buildings. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*" for additional information. In addition, SB 350 established requirements for larger POUs to adopt (by January 1, 2019) and file with the CEC Integrated Resource Plans ("IRPs") by April 2019 that would show planned procurement to achieve the 50% RPS and State GHG goals established by CARB. The CEC developed "guidelines" for these IRPs for POUs in 2017 and updated them in 2018. CARB established specific GHG target ranges for these IRPs in summer 2018, with SMUD's planning target set at 1.1 – 1.9 million metric tons of emissions. SMUD developed and adopted an IRP in 2018 through a comprehensive public process and filed the adopted IRP with the CEC on April 29, 2019. SMUD's adopted IRP plans for a greater than 60% net reduction in GHG emissions by 2030 relative to 1990 levels, which equals approximately 1.3 million metric tons of GHG emissions. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*."

On April 29, 2015, the Governor of the State signed Executive Order B-30-15, establishing a goal for the State to reduce GHG emissions to 40% below 1990 levels by 2030. In 2016, the State Legislature passed Senate Bill 32 ("SB 32"), which codified Governor Brown's goal of reducing the State's GHG emissions to 40% below 1990 levels by 2030. In 2017, the State Supreme Court resolved a final lawsuit, ruling that the Cap and Trade program was not a "fee" or "tax", and hence a two-thirds legislative vote for AB 32 was not required. In 2017, the State Legislature passed Assembly Bill 398 ("AB 398"), explicitly authorizing the continuation of the cap and trade program, with designated changes, through 2030. Subsequently, CARB adopted an initial set of regulatory changes extending the Cap and Trade program, including establishing utility sector allowance allocations through 2030. In 2018, CARB completed a rulemaking to implement the cap and trade program changes designated by AB 398. These changes include development of a hard price ceiling for the cap and trade program and two price-containment points below that ceiling, in an attempt to ensure stable prices in the program. CARB adopted final regulations on December 13, 2018.

In addition, any new projects constructed in the State, including power plants, that may cause a significant adverse impact on the environment must be analyzed under CEQA. Some State agencies have begun using CEQA in novel ways to require mitigation of "significant" GHG emissions caused, either directly or indirectly, by a project. Pursuant to Senate Bill 97 passed in 2007, CARB will assist the Governor's Office of Planning and Research in setting thresholds of significance under CEQA of GHG impacts from new projects. This is an area of State law that is evolving and untested in the courts. However, there is a risk that any project proponent of an electric system infrastructure project might have to mitigate such potential impacts to a level of less than significance.

On December 3, 2012, the Superior Court issued a ruling in Cleveland National Forest Foundation v. San Diego Association of Governments ("SANDAG"), Case No. 2100-00101593, that sided with the State Attorney General and the other petitioners stating that the SANDAG did not follow CEQA when it adopted a $257 billion regional transportation plan in 2011. The ruling expressly invalidated the certification of the Environmental Impact Report ("EIR") on the grounds that the EIR should have analyzed the plan's consistency with the governor's policy goal to reduce GHG emissions by 80% by 2050 as articulated in the 2005 Executive Order S-03-05. On November 24, 2014, the Fourth Appellate District upheld the trial court in a published decision, and SANDAG appealed to the State Supreme Court. On July 13, 2017, the Supreme Court reversed and held that SANDAG's decision not to adopt the 2050 goal was not an abuse of discretion. Nevertheless, the Court articulated three clear principles for agencies to follow in their CEQA review of planning documents: 1) agencies must take seriously the significance of even small increases in GHG emissions; 2) they must consider science-based State policy guidance in their decision-making; and 3) they are required to use the best scientific information available to determine whether their planning decisions are consistent with the State's goals. These principles will apply to SMUD in CEQA reviews of future projects.

On September 29, 2006, the Governor of the State signed into law Senate Bill 1368 ("SB 1368"), the GHG Emissions Performance Standard ("EPS"). SB 1368 limits long-term investments in baseload generation by the State's utilities to power plants that meet an EPS jointly established by the CEC and the CPUC. The agencies have set the EPS at 1,100 pounds CO_2 per MWh, which is roughly half of the CO_2 emissions rate of a conventional coal-fired power plant. CEC regulations to implement the law for POUs were approved by the Office of Administrative Law on October 16, 2007.

SMUD's primary supply and demand-side resource needs to meet customers' electricity usage patterns over the next 10 years are for peaking resources. Currently there is a ban in the State that prohibits the development of nuclear power plants until there is a permanent storage solution for spent fuel rods. With the effective ban on new coal power imports under SB 1368, natural gas-fired, combined cycle power plants would appear to be the primary viable option for fossil fuel based baseload power plant development absent the implementation of new technologies in connection with other resource options. The reliance on a single fuel source will continue to put pressure on the natural gas market in the United States. SMUD has in place a natural gas procurement plan to mitigate natural gas volatility, see "POWER SUPPLY AND TRANSMISSION – Fuel Supply" above.

Energy Efficiency. Senate Bill 1037 ("SB 1037"), signed by Governor Schwarzenegger on September 29, 2005, requires that each municipal electric utility, including SMUD, prior to procuring new energy generation resources, first acquire all available energy efficiency, demand reduction and renewable resources that are cost effective, reliable and feasible. SB 1037 also requires each municipal electric utility to report annually to its customers and to the CEC its investment in energy efficiency and demand reduction programs. Further, State Assembly Bill 2021 ("AB 2021"), signed by the Governor on September 29, 2006 requires that the publicly owned utilities establish energy efficiency and demand reduction targets and report and explain the basis of the targets beginning June 1, 2007 and every three years thereafter for a ten year horizon. Future reporting requirements as set forth in AB 2021 include: (i) the identification of sources of funding for the investment in energy efficiency and demand reduction programs, (ii) the methodologies and input assumptions used to determine cost effectiveness, and (iii) the results of an independent evaluation to measure and verify energy efficiency savings and demand reduction program impacts. The information obtained from local publicly owned utilities will be used by the CEC to present the progress made by the publicly owned utilities on the State's goal of reducing electrical consumption by 10% in ten years and amelioration with the GHG targets presented in Executive Order S-3-05 enacted by the Governor of the State on June 1, 2005.

In response to SB 1037 and AB 2021, SMUD established a specific goal of reducing energy consumption by 15% by 2018 and adopted annual targets for gigawatt hour and megawatt savings. SMUD revisits its energy efficiency goals and programs on a regular basis to ensure compliance with State policies established by SB 1037 and AB 2021 (as modified by SB 350).

SB 350 (passed in 2015) requires the CEC to develop statewide energy efficiency targets for 2030 aimed at doubling the achieved savings, and requires POUs to establish efficiency targets that are "consistent" with those targets. In 2017, the CEC developed a report on the doubling of energy efficiency targets required by SB 350. Both SB 350 and the CEC report contemplate the use of fuel substitution to meet energy efficiency targets and have a strong focus on carbon reduction. In response, SMUD developed a methodology and carbon tool to count fuel substitution, namely switching natural gas end-uses to efficient electric end uses and measuring savings in carbon emissions. SMUD presented its methodology to the joint state agency working group known as the Fuel Substitution Working Group several times in 2019 and adopted a carbon-based metric in early 2020 to guide overall SMUD carbon targets. This goal is expected to facilitate substantial expansion of building electrification and result in more than double the overall amount of energy efficiency being delivered per year, when measured on a carbon reduction basis. The vast majority of this energy efficiency (more than 85%) is expected to be delivered through efficient electrification by 2030.

Also passed in 2015 was AB 802. This bill directed the CEC to develop a State-wide building energy use benchmarking and public disclosure program for those buildings greater than 50,000 square feet. As set forth in regulations adopted by the CEC, building owners are required to report building characteristic information and energy use data each year. The reporting began in 2018 for buildings without residential utility accounts and in 2019 for buildings with 17 or more residential utility accounts. Energy utilities must provide building-level energy use data to building owners upon request.

In order to support the implementation of SB 350 and AB 802, the CEC opened a rulemaking to amend its Title 20 Data Collection regulations, resulting in an expansion of customer data utilities must report to the CEC. The CEC adopted regulations pursuant to the rulemaking in February 2018, and the regulations were approved and went into effect in the Summer of 2018. SMUD has made several data filings under the new regulations. In 2020, the CEC opened a second phase of Data Collection rulemaking to amend regulations necessary to develop the policy reports and analysis as required by statue to assist in the CEC's energy forecasting and assessment activities. The OAL approved the codifying of the regulations from that proceeding on December 30, 2021.

Governor's Zero Emission Vehicle Executive Orders

Executive Order B-48-18, enacted January 2018, ordered all state entities to work with the private sector and all appropriate levels of government to put at least 5 million zero-emission vehicles on California roads by 2030, as well as 250,000 zero-emission vehicle chargers by 2025.

Executive Order N-79020 states the goal of 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035 and 100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations feasible.

Increases in zero-emission vehicle adoption and deployment will result in increased customer usage of electricity.

Rooftop Solar Mandate. In February, 2018, the CEC approved updates to the 2019 Title 24, Part 6, Building Energy Efficiency Standards to require installation of rooftop photovoltaic solar systems for residential buildings under three stories constructed starting in 2020, with an option to satisfy the requirement through community solar systems or energy storage There is a "Community Solar" option for compliance with the mandate that permits a utility to provide solar power to the residential customers instead of rooftop solar, and SMUD submitted an application to the CEC for that option. The CEC approved SMUD's Community Solar program, Neighborhood SolarShares, on February 20, 2020. In 2021, the CEC revised the Community Solar option in the 2022 Building Energy Efficiency Standards to include an "opt-out" provision, which will impact the design and implementation of SMUD's Neighborhood SolarShares program. SMUD is updating our Neighborhood SolarShares program to incorporate the 2022 revisions, which take effect in January 2023.. See also "BUSINESS STRATEGY – Serving SMUD's Customers – *Renewable Options*."

Renewables Portfolio Standard. Senate Bill 100 was passed by the Legislature and approved by Governor Brown on September 10, 2018. The bill sets a 50% RPS target for 2026 and sets compliance period targets at 44% by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. The bill also created a statewide planning goal to meet all of the state's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045. Along with SB 100, Governor Brown signed a new Executive Order that directs the State to achieve carbon neutrality by 2045 and net negative greenhouse gas emissions thereafter. The new goal of carbon neutrality by 2045 would be in addition to existing statewide targets of reducing greenhouse gas emission. By expanding the State's carbon reduction goal, the State will also look to reduce carbon through sequestration in forests, soils and other natural landscapes.

Advanced Clean Fleets Rule. In September 2020, Governor Newsom signed Executive Order N-79-20 to accelerate actions to mitigate and adapt to climate change, and to more quickly move toward a low-carbon, sustainable and resilient future. Executive Order (EO) N-79-20 set a goal that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035; and 100 percent of medium- and heavy-duty vehicles in the State shall be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks. In 2021, CARB released the proposed draft regulation for the Advanced Clean Fleets (the "ACF Rule"). The ACF Rule is part of a comprehensive strategy to achieve the mandates outlined in EO N-79-20 and includes requirements to achieve zero-emission truck and bus fleets significantly earlier for market segments such as public fleets, like SMUD. The ACF Rule introduces zero-emissions vehicle purchasing requirements starting in 2024 that will apply when SMUD adds vehicles to its fleet. This regulation is currently in the pre-rulemaking phase and is scheduled for adoption by the CARB Board in the fall of 2022.

Load Management Standards. Sections 25213, 25218(e) and 25403.5 of the Public Resources Code mandate and authorize the CEC to adopt rules and regulations to reduce the uneconomic and unnecessary consumption of energy and to manage energy loads, or demand, to help maintain electrical grid reliability. The original Load Management Standards ("LMS") regulations were adopted in 1979 and required the implementation of marginal cost pricing industrial time-of-use rates, and residential load control programs. In 2020, the CEC proposed to update the LMS regulations to require the five largest electric utilities in California (including SMUD) to develop retail electricity rates that change at least hourly to reflect locational marginal costs and submit those rates to the utility's governing body for approval. The LMS is currently in the formal rulemaking phase, with the 45-Day Language released in December 2021. The LMS proposes the following: a) voluntary hourly or sub-hourly rates for each customer class or b) a cost-effective program, to be implemented by the utilities by January 2026. The LMS was tentatively scheduled to be presented to the CEC for approval in May 2022, but the LMS presentation to the CEC was postponed and a new date has not been set. The effective date of the LMS regulation is expected to be January 2023, although this could be subject to change.

Energy Storage Systems. In September 2010, the State Legislature enacted, and the Governor signed into law, Assembly Bill 2514 ("AB 2514"). On or before March 1, 2012, the governing board of each POU was required to initiate a process to determine appropriate targets, if any, for the utility to procure viable and cost-effective energy storage systems to be achieved by December 31, 2016, and December 31, 2020. The bill required each POU to report certain information to the CEC. In 2014, SMUD set a 0 MW target for 2017, and in 2017 set a 9 MW target for 2020. In 2018, SMUD identified a potential need for 246 MW of storage by 2030. Following SMUD's 2020 compliance report to the CEC in January 2021, going forward SMUD will evaluate and report energy storage planning as part of its IRP update every five years. The next update will be in 2023. See also "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Energy Storage Systems*."

Sacramento-San Joaquin River Bay-Delta Processes. The Sacramento-San Joaquin River Delta is an expansive inland estuary, formed at the western edge of the California Central Valley by the confluence of the Sacramento and San Joaquin rivers ("Delta"). There are two substantial Delta planning processes with the potential to affect (1) energy available for SMUD's purchase from the Central Valley Project ("CVP") and (2) flows within the Upper American River watershed. These processes are called the Bay-Delta Water Quality Control Plan ("Bay-Delta Plan") and the Delta Conveyance Project.

The Bay-Delta Water Quality Control Plan is updated periodically by the State Water Resources Control Board ("SWRCB"), the last time being in 2006. The current Bay-Delta Plan update process is being implemented in four phases. The first phase considered southern Delta water quality, with a significant focus on San Joaquin River tributaries. Phase 2, which is initially being addressed by a document under development by SWRCB staff, will address Sacramento River tributaries and various flow related issues, including the critically important one of those tributaries' contribution to Delta outflow. Phase 3 will concern changes to water rights needed to implement Phase 2. A substantial change in Delta outflow requirements could have a major impact on the timing of hydroelectric energy generation by the CVP. SMUD has a long-term agreement with WAPA to purchase some of this power (see "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Western Area Power Administration*"). On July 18, 2018, the SWRCB released an updated Framework document signaling its staff's intent to propose Delta outflow requirements of 45–65% unimpaired flows for the Sacramento River tributaries (which includes the American River, the upper portions of which are where the UARP sits), though the report will analyze requirements of 35–75%. If these criteria were implemented, they could cut CVP generation by 50 to 63%. Governor Newsom has urged the SWRCB, other agencies and affected parties to execute voluntary agreements to address species' needs and outflow requirements. Although the negotiations stalled during the last year of the Trump Administration the interested parties are expected to pursue them more vigorously since President Biden assumed office, though there is as yet no certainty that all affected parties will agree on terms. If the agreements do not come to fruition, SMUD plans to fully participate in all regulatory and legal proceedings to argue for consideration and minimization of impacts to hydropower generation. SMUD will assess the potential impacts of proposed modifications to the present outflow objectives on SMUD's operations once the SWRCB makes those available.

On January 15, 2020, the State Department of Water Resources ("DWR") announced it will prepare an Environmental Impact Report ("EIR") to evaluate the potential impacts of carrying out the Delta Conveyance Project. The Project is expected to entail construction of two intakes on the Sacramento River that will carry water to a main tunnel to the California Aqueduct for delivery south of the Delta. The Project may pose the potential to exacerbate impacts to already imperiled aquatic species, and in turn could have indirectly prompted regulatory agencies to require third parties, such as SMUD, to compensate by making changes to their operations. SMUD will be actively involved in reviewing the draft EIR, the schedule for which has not been released, and any regulatory proceedings to ensure any impacts to SMUD interests are minimized.

Proposition 26. Proposition 26 was approved by the electorate on November 2, 2010 and amends Article XIII A and Article XIII C of the State Constitution. Proposition 26 imposes a two-thirds voter approval requirement for the imposition of fees and charges by the State, unless the fees and charges are expressly excluded. It also imposes a majority voter approval requirement on local governments with respect to fees and charges for general purposes, and a two-thirds voter approval requirement with respect to fees and charges for special purposes, unless the fees and charges are expressly excluded. The initiative, according to its supporters, is intended to prevent the circumvention of tax limitations imposed by the voters pursuant to Proposition 13, approved in 1978, and other measures through the use of non-tax fees and charges. Proposition 26 expressly excludes from its scope a charge imposed for a specific local government service or product provided directly to the payor that is not provided to those not charged, and which does not exceed the reasonable cost to the local government of providing the service or product. Proposition 26 is not retroactive as applied to local governments. Although SMUD believes that the initiative was not intended to apply to fees for utility services such as those charged by SMUD and its fees and charges meet the criteria of the exclusion described above, it is possible that Proposition 26 could be interpreted to further limit fees and charges for electric utility services and/or require stricter standards for the allocation of costs among customer classes. SMUD is unable to predict at this time how Proposition 26 will be interpreted by the courts or what its ultimate impact will be. As of the date of this Official Statement, SMUD is unaware of any fees or charges relating to SMUD's service that would have to be reduced or eliminated because of Proposition 26.

Wildfire Legislation. In September 2016, Governor Brown signed into law Senate Bill 1028 ("SB 1028"), which requires POUs (including SMUD), IOUs, and electrical cooperatives to construct, maintain and operate their electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by electrical lines and equipment. SB 1028 also requires the governing board of POU's to make an initial determination whether any portion of that geographical area has a significant risk of catastrophic wildfire resulting from those electrical lines and equipment, based on historical fire data and local conditions, and in consultation with the fire departments or other entities responsible for control of wildfires within the geographical area.

Senate Bill 901 ("SB 901"), signed into law in September 2018 by Governor Brown, further addresses response, mitigation and prevention of wildfires. The bill requires POUs, including SMUD, before January 1, 2020, and annually thereafter, to prepare a wildfire mitigation plan and present it in a public meeting to their governing board. SB 901 requires POU's to accept comments on the wildfire mitigation plan from the public, other local and State agencies, and interested parties, and to verify that the plan complies with all applicable rules, regulations, and standards, as appropriate. The bill requires a qualified independent evaluator to review and assess the comprehensiveness of its wildfire mitigation plan and present its report to the board in a public meeting.

In 2019, Governor Newsom released his comprehensive strategy on wildfires, laying the groundwork for legislative discussions on utility wildfire liability and allocating costs associated with catastrophic wildfires, among other things. While the Governor supported a modification of State's current inverse condemnation doctrine, under which utilities are held liable for wildfire damage without regard to the fault of the utility, no bill was introduced. AB 1054 (Holden) did pass in 2019 that included several provisions for solvent investor owned utilities, including the development of a fund to help pay victim claims for utility ignited wildfires. The bill also created a new Wildfire Safety Division within the CPUC to prioritize wildfire safety throughout the State, and established an appointed Wildfire Safety Advisory Board to advise and make recommendations relating to wildfire safety to this new Division. For POUs, the bill requires submittal of annual wildfire mitigation plans to the Advisory Board for review and advisory opinions.

Senate Bill 247 ("SB 247"), signed by Governor Newsom on October 2, 2019, establishes notification, audit and reporting guidelines for electrical corporations relating to vegetation management requirements in the wildfire mitigation plan. SB 247 also specifies the qualifications for electrical line clearance tree trimmers performing work to comply with the vegetation management requirements in an electrical corporation's wildfire mitigation plan and requires that qualified line clearance tree trimmers be paid no less than a specified prevailing wage rate. POUs are not required to adhere to SB 247, but the market impacts are projected to significantly increase SMUD's annual vegetation management costs.

Nonstock Security. SMUD sponsored legislation in 2019, Assembly Bill 689, which was signed into law by Governor Newsom on September 5, 2019. This bill expressly allows SMUD the ability to operate a pilot project, of up to three acquisitions, to hold nonstock security in a corporation or other private entity if acquired as part of a procurement of goods or services from that entity, provided that no separate funding is expended solely for the nonstock security. This will allow SMUD to realize the financial benefits of its investments, partnerships, and intellectual property.

Future Regulation

The electric industry is subject to continuing legislative and administrative reform. States and Federal entities routinely consider changes to the way in which they regulate the electric industry. Recently, both further deregulation and forms of additional regulation have been proposed for the industry, which has been highly regulated throughout its history. SMUD is unable to predict at this time the impact any such proposals will have on the operations and finances of SMUD or the electric utility industry generally.

OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY

CAISO Market Initiatives

The CAISO has initiated a number of initiatives and stakeholder processes that propose certain operational and market changes. SMUD has mitigated the impact of certain CAISO initiatives by taking actions aimed at remaining independent from the CAISO market. Consequently, SMUD participates in the CAISO market for only a small percentage of energy needs (2-3%), and the remaining CAISO usage is discretionary (including EIM, described below). SMUD will continue to monitor the various initiatives proposed by the CAISO and participate in its stakeholder processes to ensure that its interests are protected.

Resource Adequacy Filing

In September 2005, the State Legislature enacted and the Governor signed into law Assembly Bill 380 ("AB 380"), which requires the CPUC to establish resource adequacy requirements for all LSEs within the CPUC's jurisdiction. In addition, AB 380 requires publicly owned utilities, including SMUD, to meet the most recent resource adequacy standard as adopted by the WECC. In October 2005, the CPUC issued a decision stating that LSEs under its jurisdiction would be required, by June 2006, to demonstrate that they have acquired capacity sufficient to serve their forecast retail customer load plus a 15-17% planning reserve margin. In March 2021, the CPUC issued a decision requiring the three largest investor owned utilities (PG&E, Southern California Edison, and San Diego Gas & Electric) to target a minimum of 2.5% of incremental resources for their planning reserve margin for 2021 and 2022. Subsequently, in December 2021, the CPUC issued another decision that increased the investor-owned utilities' minimum target by an additional 2.5-5% of incremental resources for 2022 (which creates an effective planning reserve margin of 20-22%) and extended this target to 2023. The WECC has yet to formally adopt a resource adequacy requirement. However, consistent with current WECC practices, SMUD utilizes a 15% planning reserve margin when assessing the need for future resources.

Energy Imbalance Market

Federal and state policymakers have long-promoted the development of organized markets in the west as a means (among other reasons) to better integrate intermittent renewable resources into the electric system, the first of which markets is the Western EIM, operated by the CAISO. The CAISO successfully launched the EIM, a real time only imbalance market, on October 1, 2014, with PacifiCorp as the first participant. Since this time, the EIM has grown significantly with the additions of NV Energy in 2015, Arizona Public Service and Puget Sound Energy in 2016, Portland General Electric in 2017, Idaho Power and Powerex in 2018, BANC (Phase 1) in 2019, the Salt River Project and Seattle City Light in 2020, BANC (Phase 2), the Turlock Irrigation District, the Los Angeles Department of Water and Power, NorthWestern Energy, and the Public Service Company of New Mexico in 2021, and Avista and Tacoma Power in early 2022. Additionally, the EIM footprint will continue to expand further in 2022 and 2023 with the additions of Tucson Electric Power and the Bonneville Power Administration later in 2022 and WAPA Desert Southwest Region and El Paso Electric in 2023. The EIM will number 22 participating Balancing Authority Areas by Spring of 2023.

To date, participation in the EIM by SMUD has shown significant financial and operational benefits, in addition to furthering an already favorable working partnership between SMUD and the CAISO to develop solutions to integrate renewable resources in support of carbon reduction goals.

BANC's participation not only signaled the first public power participant in the EIM, but it was also implemented utilizing a unique phased approach, with SMUD (as the largest member of BANC) implementing in Phase 1 in 2019, while the other BANC members and WAPA (the "Phase 2 Parties") would join after evaluation and approvals in 2021. Upon completion of the EIM Phase 2 "gap assessment" (done to determine what was incrementally required for other BANC members and WAPA to participate in the EIM along with SMUD), it was decided to proceed. The BANC Commission therefore approved BANC to move forward with BANC EIM Phase 2 implementation, and the other BANC members and WAPA began EIM participation under Phase 2 on March 25, 2021.

All of the BANC EIM Phase 2 participants independently obtained approvals from their own governing bodies and executed an agreement with BANC to participate in Phase 2. Part of their Phase 2 participation included reimbursement to SMUD for their respective shares of the upfront infrastructure costs incurred by SMUD in Phase 1 to establish BANC as an EIM Entity. This reimbursement to SMUD by the Phase 2 Parties has been completed.

The CAISO and EIM participants, including SMUD and BANC, have participated in a study and stakeholder process to examine the benefits and develop a design framework to extend the successful EIM real time framework to the CAISO's day ahead market, referred to as the "extended day ahead market" or "EDAM." Like EIM, EDAM would broaden the access to regional resources for the reliable integration of renewable resources, only over a longer (day ahead) time horizon. This longer timeframe will allow for a more economic and efficient optimization of regional resources by providing grid operators greater time (day ahead as opposed to real time) to commit or decommit units based on market price signals. Only participants in the EIM will be allowed to extend their participation to EDAM. The CAISO launched a public stakeholder initiative in February of 2020, but due to significant power supply disruptions which occurred in August 2020, the EDAM initiative was put on hold. The process, however, was restarted during the Summer of 2021 and the CAISO and stakeholders are developing a proposal. Should the stakeholder process produce a final EDAM framework and tariff and attract participants, it could be in place by 2024. SMUD will likely need to consider its participation, should an EDAM develop, sometime in 2023.

Community Choice Aggregation

State Assembly Bill 117 (2002) created Community Choice Aggregation by authorizing Community Choice Aggregators ("CCAs") to aggregate customer electric load and purchase electricity for customers. CCAs can only be formed in IOU territory, and the IOU still transmits and delivers the power to customers, as well as provides metering, billing and customer service. A customer within the CCA territory is automatically "opted in" to the CCA program unless the customer takes affirmative action to receive electric service from the IOU. Various counties and cities in the State have formed CCAs, and many more are in the process of formation. The primary purposes of CCAs are local decision making and to provide greener electricity options for their respective community.

Valley Clean Energy Alliance ("VCE") is a CCA formed in 2016 by the County of Yolo, the City of Davis, and City of Woodland. The City of Winters joined VCE in 2021. SMUD has for 70 years performed many of the same services required by CCAs and CCAs' public power and clean energy objectives are in alignment with SMUD's track record in these areas. SMUD has contracted with VCE as a service provider to support VCE's data management, call center, power procurement, and technical energy service needs. The initial term of the contract is 5 years beginning May 2018.

SMUD has also contracted with East Bay Community Energy ("EBCE") to provide call center and data management services for an initial term of three years beginning January 2018. EBCE is a joint powers agency formed in 2016 by the cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Oakland, Piedmont, San Leandro and Union City in Alameda County to implement a local CCA program. The cities of Pleasanton, Newark, and Tracy joined ECBE in 2021. SMUD and EBCE executed a contract extension through December 31, 2024.

Additionally, in June 2019, SMUD contracted with Silicon Valley Clean Energy ("SVCE") for an initial term of two years, and the parties extended the contract until the end of 2022. Under this contract, SMUD provides program services that will help local SVCE communities reduce carbon pollution while delivering engaging customer experiences through promoting energy efficiency and grid integration, as well as electrifying transportation, buildings and homes. SVCE is a joint powers agency formed in 2016 by the cities of Campbell, Cupertino, Gilroy, Lost Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and Unincorporated Santa Clara County to implement a local CCA program.

SMUD management does not expect its current arrangements with VCE, EBCE, and SVCE to have a material adverse impact on SMUD's financial position, liquidity or results of operations.

SMUD will assess the CCA market as it expands and determine whether new opportunities to assist other CCAs provide SMUD a net financial benefit.

See also "BUSINESS STRATEGY – Leveraging Core Competencies – *Community Choice Aggregation*."

PG&E Bankruptcy

On January 14, 2019, PG&E and its parent company, PG&E Corporation, announced their intention to file, on or about January 29, 2019, for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code (the "Bankruptcy Code") mainly as a result of wildfire liability claims and exposure. On January 29, 2019, PG&E and PG&E Corporation filed for bankruptcy protection under Chapter 11 of the Bankruptcy Code (the "Bankruptcy Code"). On May 28, 2020, the CPUC approved PG&E's Plan of Reorganization. On June 20, 2020 the United States Bankruptcy Court for the Northern District of California confirmed PG&E's Plan of Reorganization. SMUD does not anticipate any material impacts to SMUD in connection with PG&E's Plan of Reorganization.

In addition, other electric utilities, including the other major IOUs in the State, Southern California Edison and San Diego Gas & Electric Company, have experienced credit rating downgrades as a result of potential wildfire liabilities exposure, which may have implications for the electric market generally.

Other Factors

The electric utility industry in general has been, or in the future may be, affected by a number of other factors which could impact the financial condition and competitiveness of many electric utilities and the level of utilization of generating and transmission facilities. In addition to the factors discussed above, such factors include, among others, (a) effects of compliance with rapidly changing environmental, safety, licensing, regulatory and legislative requirements other than those described above; (b) changes resulting from conservation and demand side management programs on the timing and use of electric energy; (c) changes resulting from a national energy policy; (d) effects of competition from other electric utilities (including increased competition resulting from mergers, acquisitions, and "strategic alliances" of competing electric and natural gas utilities and from competitors transmitting less expensive electricity from much greater distances over an interconnected system) and new methods of, and new facilities for, producing low cost electricity; (e) the repeal of certain federal statutes that would have the effect of increasing the competitiveness of many IOUs; (f) increased competition from independent power producers and marketers, brokers and federal power marketing agencies; (g) "self-generation" or "distributed generation" (such as solar, microturbines and fuel cells) by industrial and commercial customers and others; (h) issues relating to the ability to issue tax exempt obligations, including severe restrictions on the ability to sell to nongovernmental entities electricity from generation projects and transmission service from transmission line projects financed with tax exempt obligations; (i) effects of inflation on the operating and maintenance costs of an electric utility and its facilities; (j) changes from projected future load requirements; (k) increases in costs and uncertain availability of capital; (l) issues relating to supply chains and the uncertain availability or increased costs of necessary materials; (m) shifts in the availability and relative costs of different fuels (including the cost of natural gas); (n) sudden and dramatic increases in the price of energy purchased on the open market that may occur in times of high peak demand in an area of the country experiencing such high peak demand, such as has occurred in the State; (o) issues relating to risk management procedures and practices with respect to, among other things, the purchase and sale of natural gas, energy and transmission capacity; (p) other legislative changes, voter initiatives, referenda and statewide propositions; (q) effects of changes in the economy; (r) effects of possible manipulation of the electric markets; (s) natural disasters or other physical calamities, including, but not limited to, earthquakes, droughts, severe weather, wildfires and floods; (t) changes to the climate, including increasing volatility in rainfall in the Western United States and a reduction in the depth and duration of the Sierra snowpack; (u) issues relating to cyber-security; and (v) outbreaks of infectious diseases or the occurrence of pandemics. Any of these factors (as well as other factors) could have an adverse effect on the financial condition of any given electric utility, including SMUD's electric utility, and likely will affect individual utilities in different ways.

SMUD is unable to predict what impact such factors will have on the business operations and financial condition of SMUD's electric system, but the impact could be significant. SMUD has taken major steps to mitigate the impacts of many of the changes. This Official Statement includes a brief discussion of certain of these factors. This discussion does not purport to be comprehensive or definitive, and these matters are subject to change subsequent to the date hereof. Extensive information on the electric utility industry is available from the legislative and regulatory bodies and other sources in the public domain, and potential purchasers of the [2022 Series J Bonds] should obtain and review such information.

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APPENDIX B

2020 AND 2021 CONSOLIDATED FINANCIAL STATEMENTS AND REPORT OF INDEPENDENT ACCOUNTANTS

APPENDIX C

BOOK-ENTRY SYSTEM

The information in this Appendix regarding DTC has been provided by DTC, and SMUD takes no responsibility for the accuracy or completeness thereof. SMUD cannot and does not give any assurances that DTC, DTC Participants or Indirect Participants will distribute the Beneficial Owners either (a) payments of interest or principal with respect to the 2022 Series J Bonds or (b) certificates representing ownership interest in or other confirmation of ownership interest in the 2022 Series J Bonds, or that they will so do on a timely basis or that DTC, DTC Participants or DTC Indirect Participants will act in the manner described in this Official Statement.

The Depository Trust Company ("DTC") New York, NY, will act as securities depository for the 2022 Series J Bonds. The 2022 Series J Bonds will be issued as fully registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully registered Bond certificate will be issued for each maturity of the 2022 Series J Bonds, each in the aggregate principal amount of such maturity, and will be deposited with DTC.

DTC, the world's largest depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934, as amended. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues and money market instruments from over 100 countries that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations and certain other organizations. DTC is a wholly owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others, such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has a Standard & Poor's rating of AA+. The DTC rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com.

Purchases of the 2022 Series J Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the 2022 Series J Bonds on DTC's records. The ownership interest of each actual purchaser of each 2022 Series J Bond ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the 2022 Series J Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their beneficial ownership interests in the 2022 Series J Bonds, except in the event that use of the book-entry system for the 2022 Series J Bonds is discontinued.

To facilitate subsequent transfers, all 2022 Series J Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co. or such other name as may be requested by an authorized representative of DTC. The deposit of the 2022 Series J Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the 2022 Series J Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such 2022 Series J Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of the 2022 Series J Bonds may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the 2022 Series J Bonds, such as redemptions, tenders, defaults, and proposed amendments to the Bond documents. For example, Beneficial Owners of the 2022 Series J Bonds may wish to ascertain that the nominee holding the 2022 Series J Bonds for their benefit has agreed to obtain and transmit notices to Beneficial Owners.

Redemption notices shall be sent to DTC. If less than all of a maturity of the 2022 Series J Bonds is being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in the 2022 Series J Bonds of such maturity to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the 2022 Series J Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to SMUD as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the 2022 Series J Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal, premium, redemption proceeds and interest payments on the 2022 Series J Bonds will be made to Cede & Co. or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts, upon DTC's receipt of funds and corresponding detail information from SMUD or the Trustee, on a payment date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participants and not of DTC, its nominee, the Trustee or SMUD, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal, premium, redemption proceeds and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the Trustee. Disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of the Direct and Indirect Participants.

DTC may discontinue providing its services as depository with respect to the 2022 Series J Bonds at any time by giving reasonable notice to SMUD or the Trustee. Under such circumstances, in the event that a successor depository is not obtained, Bond certificates are required to be printed and delivered.

SMUD may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, Bond certificates for such 2022 Series J Bonds will be printed and delivered to DTC.

Neither SMUD or the Trustee will have any responsibility or obligation to Participants, to Indirect Participants or to any Beneficial Owner with respect to (i) the accuracy of any records maintained by DTC, any Participant, or any Indirect Participant; (ii) the payment by DTC or any Participant or Indirect Participant of any amount with respect to the principal of or premium, if any, or interest on the 2022 Series J Bonds; (iii) any notice which is permitted or required to be given to Holders under the Resolution; (iv) the selection by DTC, any Participant or any Indirect Participant of any person to receive payment in the event of a partial redemption of 2022 Series J Bonds; (v) any consent given or other action taken by DTC as Bondholder; or (vi) any other procedures or obligations of DTC, Participants or Indirect Participants under the book-entry system.

APPENDIX D

SUMMARY OF CERTAIN PROVISIONS OF THE RESOLUTION

The following is a summary of certain provisions of the Resolution. Other provisions of the Resolution are described under the captions "THE 2022 SERIES J BONDS" and "SECURITY FOR THE BONDS." This summary is not to be considered a full statement of the terms of the Resolution and accordingly is qualified by reference thereto and is subject to the full text thereof. Capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed thereto in the Resolution.

Between July 1997 and August 2003, SMUD received consents to amend the Resolution from the owners of the requisite percentage of Outstanding Bonds. Pursuant to the authority granted by such consents, SMUD amended the Resolution in October 2003 by adopting the Forty-Eighth Supplemental Resolution and the Forty-Ninth Supplemental Resolution. The following summary of the Resolution reflects such amendments.

The purchasers of the 2022 Series J Bonds, by virtue of their purchase of the 2022 Series J Bonds, will consent to certain amendments to the Resolution (the "Proposed Amendments"). Such amendments are described in ***bold italic*** font in the forepart of this Official Statement under "SECURITY FOR THE BONDS – Rates and Charges" and "—Limitations on Additional Obligations Payable from Revenues" and in this summary of the Resolution under the captions "Certain Definitions" and "Reserve Fund for Certain Bonds." The written consents to the Proposed Amendments of the holders and registered owners of at least 60% of the Bonds outstanding have been filed with SMUD or the Trustee, as required by the Resolution. However, while certain Bonds remain outstanding SMUD must also obtain the written consents of certain bond insurers to implement the Proposed Amendments. SMUD expects to implement the Proposed Amendments when the written consents of such bond insurers are obtained or when the Bonds insured by such bond insurers are no longer outstanding. The final maturity date of the insured Bonds is July 1, 2024.

Certain Definitions

"Assumed Interest Payments" means for any fiscal year or period interest which would accrue during such fiscal year or period on an amount equal to the then unamortized balance of the remaining sum of Assumed Principal Payments at the Assumed Interest Rate.

"Assumed Interest Rate" for any Parity Bond means an interest rate equal to the "Bond Buyer Revenue Bond Index" most recently published in The Bond Buyer prior to the date of issuance of the Parity Bond to which the Assumed Interest Rate is applicable.

"Assumed Principal Payments" means for any fiscal year or period the sum of all amortized portions of each Excluded Principal Payment which fall within such fiscal year or period after the Excluded Principal Payments have been amortized (for purposes of this definition) equally over the years (pro rata in the case of a partial year) in the period commencing on the date of issuance of the Parity Bonds to which such Excluded Principal Payment relates and ending on the date which is 30 years from such date of issuance. Notwithstanding the foregoing, if Parity Bonds determined by SMUD to be an Excluded Principal Payment are refinanced with Parity Bonds determined by SMUD to be another Excluded Principal Payment, (1) Assumed Principal Payments with respect to the refinancing Parity Bonds shall not include any amount of principal which has previously been assumed amortized with respect to the refinanced Parity Bonds and (2) the period over which the refinancing Parity Bonds shall be assumed to be amortized shall be the period commencing on the date of issuance of the refinancing Parity Bonds and ending on the date which is 30 years from the date of issuance of the refinanced Parity Bonds.

“Electric System” means the entire electric system of SMUD, together with all additions, betterments, extensions and improvements.

“Energy Payments” means, when used with respect to the Electric System, all actual costs incurred, or charges made therefor, by SMUD in any particular fiscal year or period to which said term is applicable for purchased power (including power purchased from any special district included within the boundaries of SMUD), electric and thermal energy and capacity under contracts providing for payments by SMUD for electric or thermal energy or capacity whether or not such energy or capacity is delivered or capable of being delivered or otherwise made available to or received by or for the account of SMUD.

“Excluded Principal Payments” means each payment of principal on Parity Bonds which the Board of Directors of SMUD determines (on a date not later than the date of issuance of such Parity Bonds) that SMUD intends to refinance at or prior to the maturity date(s) of such Parity Bonds or otherwise to pay with moneys which are not Revenues. No such determination shall affect the security for such Parity Bonds or the obligation of SMUD to pay such payments from Revenues.

“Financial Products Agreement” means an interest rate swap, cap, collar, option, floor, forward or other hedging agreement, arrangement or security, however denominated, entered into by SMUD with a Qualified Provider not for investment purposes but with respect to specific Parity Bonds for the purpose of (1) reducing or otherwise managing SMUD’s risk of interest rate changes or (2) effectively converting SMUD’s interest rate exposure, in whole or in part, from a fixed rate exposure to a variable rate exposure, or from a variable rate exposure to a fixed rate exposure.

“Financial Product Payments” means payments periodically required to be paid to a counterparty by SMUD pursuant to a Financial Products Agreement.

“Financial Product Receipts” means amounts periodically required to be paid to SMUD by a counterparty pursuant to a Financial Products Agreement.

“Maintenance and Operation Costs” means all actual maintenance and operation costs incurred by SMUD (including purchased power and fuel costs) or charges therefor made in conformity with generally accepted accounting principles, exclusive in all cases of depreciation, or obsolescence charges or reserves therefor, amortization of intangibles or other entries of a similar nature, interest charges and charges for the payment of principal of SMUD debt.

“Net Revenues” for any fiscal period means the sum of (a) the Revenues for such fiscal period plus (b) the amounts, if any, withdrawn by SMUD from the Rate Stabilization Fund for treatment as Revenues for such fiscal period, less the sum of (c) all Maintenance and Operation Costs for such fiscal period, (d) all Energy Payments for such fiscal period not included in Maintenance and Operation Costs for such fiscal period, and (e) the amounts, if any, withdrawn by SMUD from Revenues for such fiscal period for deposit in the Rate Stabilization Fund pursuant to the Resolution.

“Parity Bonds” includes the Bonds and all revenue bonds issued on a parity with the Bonds as provided or permitted in the Resolution. No Parity Bonds (other than the Bonds) are currently outstanding.

“Qualified Provider” means any financial institution or insurance company which is a party to a Financial Products Agreement if the unsecured long-term debt obligations of such financial institution or insurance company (or of the parent or a subsidiary of such financial institution or insurance company if such parent or subsidiary unconditionally guarantees the performance of such financial institution or insurance company under such Financial Products Agreement and the Trustee receives an opinion of counsel to the effect that such guarantee is a valid and binding agreement of such parent or subsidiary), or obligations secured or supported by a letter of credit, contract, guarantee, agreement, insurance policy or surety bond issued by such financial institution or insurance company (or such guarantor parent or subsidiary), are rated in one of the two highest rating categories of a national rating agency (without regard to any gradation or such rating category) at the time of the execution and delivery of the Financial Products Agreement.

"Rate Stabilization Fund" means the fund by that name established in the Resolution. From time to time, after provision for debt service, SMUD may deposit in the Rate Stabilization Fund from remaining Revenues such amounts as SMUD shall determine, provided that deposits may be made until (but not after) the date 120 days after the end of such fiscal year. SMUD may withdraw amounts from the Rate Stabilization Fund only for inclusion in Revenues for any fiscal year, such withdrawals to be made until (but not after) 120 days after the end of such fiscal year. All interest or other earnings on deposits in the Rate Stabilization Fund shall be withdrawn therefrom and accounted for as Revenues. Notwithstanding the foregoing, no deposit of Revenues to the Rate Stabilization Fund may be made to the extent such Revenues were included in an engineer's certificate submitted in connection with the issuance of additional revenue bonds payable from Revenues and withdrawal of the Revenues to be deposited in the Rate Stabilization Fund from the Revenues employed in rendering said engineer's certificate would have caused noncompliance with the provisions of the Resolution restricting issuance of additional obligations or securities payable from Revenues or to the extent any withdrawal of amounts from remaining Revenues for the Rate Stabilization Fund for any fiscal year would have reduced the debt service ratio referred to in this Appendix under the caption "Reserve Fund for Certain Bonds" to or below 1.40.

"Revenues" means all charges received for, and all other income and receipts derived by SMUD from the operation of the Electric System, or arising from the Electric System (consisting primarily of income derived from the sale or use of electric energy generated, transmitted or distributed by facilities of the Electric System, but also including receipts from the sale of property pertaining to the Electric System or incidental to the operation of the Electric System or from services performed by SMUD in connection with the Electric System and revenues derived from certain wholesale, but not retail, sales of water), but exclusive in every case of any moneys derived from the levy or collection of taxes upon any taxable property in SMUD.

"Subsidy" means any subsidy, reimbursement or other payment from the federal government of the United States of America under the American Recovery and Reinvestment Act of 2009 (or any similar legislation or regulation of the federal government of the United States of America or any other governmental entity or any extension of any of such legislation or regulation).

Reserve Fund for Certain Bonds

The Electric Revenue Bond Reserve Fund (the "Reserve Fund") is created under the Resolution. The Reserve Fund secures all Bonds issued prior to January 1, 2004 that are currently outstanding (and not otherwise deemed to be paid and discharged under the Resolution) and may secure additional Bonds issued in the future. However, the Reserve Fund does not secure and will not be available to pay debt service on the 2022 Series J Bonds.

After the close of each fiscal year, SMUD shall determine the ratio (herein called the "debt service ratio") of (1) the Net Revenues during said fiscal year to (2) the maximum annual debt service during the period of three fiscal years next following said fiscal year on all Bonds and Parity Bonds then outstanding. For this purpose, the term "maximum annual debt service" shall mean the sum of (i) the interest falling due on serial bonds and term bonds, (ii) the principal amount of serial bonds falling due by their terms, and (iii) the amount of minimum sinking fund payments required, as computed for the year in which such sum shall be a maximum. Interest during construction which has been funded and provided for shall not be included in "minimum annual debt service" for the purpose of the above calculation.

So long as the debt service ratio shall exceed 1.40, the amount required to be maintained in the Reserve Fund shall be an amount such that the amount in the combined reserve funds of all Parity Bonds then outstanding will at no time be less than the current annual interest requirements on all then outstanding Parity Bonds, except only bonds (if any) for which payment has been provided in advance. If the debt service ratio in any fiscal year shall fall below 1.40, the Treasurer shall set aside in the Reserve Fund or in any other reserve fund or funds established for any one or more issues of the Parity Bonds (on or before the first day of each month of the next succeeding fiscal year) from the first available Net Revenues an amount not less than 15% of the sum of the current monthly interest requirements of all Parity Bonds then outstanding until the next year in which the debt service ratio shall exceed 1.40 or until the aggregate amount in the combined reserve funds established for all of the Parity Bonds (including the Reserve Fund) is equal to the maximum annual debt service on all of the Parity Bonds then outstanding, whichever shall first occur.

For purposes of the above calculation, the interest rates of Bonds which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Bonds bear a rate or rates of interest for a known period or periods of time, such interest rate or rates for such period or periods, and thereafter, for the portion of the calculation period not covered by such known period or periods, the interest rate shall be the greater of the numerical maximum rate that such Bonds may vary or be adjusted to and the numerical maximum rate (if any) that the interest rate for such Bonds may be fixed to, in both cases as set forth in the supplemental resolution authorizing such Bonds, or if such rate or rates have been increased in accordance with such supplemental resolution at such increased rate or rates.

Any amount in the Reserve Fund at any time in excess of the balance required to be then maintained therein shall be released to SMUD for any SMUD use.

SMUD shall not be required, notwithstanding anything herein contained, to maintain in the combined reserve funds appertaining to all Parity Bonds of SMUD, an aggregate amount in excess of the maximum annual debt service requirements in any subsequent fiscal year on all of the then outstanding Parity Bonds.

Any moneys at any time in any of said reserve funds shall be held by the Treasurer in trust for the benefit of the holder or holders from time to time of the Bonds and the coupons appertaining thereto entitled to be paid therewith, and SMUD shall not have any beneficial right or interest in any such moneys.

Notwithstanding the foregoing, a Supplemental Resolution adopted after the Forty-Eighth Supplemental Resolution may provide that a Series of Bonds issued pursuant to such Supplemental Resolution shall not be secured by the Reserve Fund. In such event, (i) payments of the principal of and interest on such Bonds shall be excluded from all calculations made in respect of the amount to be maintained in the Reserve Fund and (ii) amounts on deposit in the Reserve Fund shall not be applied to the payment of the principal of or interest on such Bonds, even if no other moneys are available therefor.

The 2022 Series J Bonds are not secured by the Reserve Fund.

In lieu of maintaining and depositing moneys in the Reserve Fund, SMUD may maintain and deposit in the Reserve Fund, for the sole benefit of the holders of Parity Bonds, a letter of credit (1) which is issued by a bank with a credit rating at the time of deposit of such letter of credit into the Reserve Fund within one of the top two rating categories (without regard to any refinement or graduation of such rating category by numerical modifier or otherwise) of Moody's Investors Service ("Moody's") and Standard & Poor's Rating Group, a division of The McGraw-Hill Companies, Inc. ("S&P"), (2) the repayment obligation with respect to which is not secured by a lien on assets of SMUD senior to any lien which secures the Bondholders and (3) which has a term of at least 364 days from the date of issuance thereof. If the credit rating of the bank issuing such letter of credit falls below such top two rating categories, SMUD shall within twelve months of such downgrading either (a) substitute a new letter of credit satisfying the requirements of this paragraph, (b) fund the Reserve Fund through the deposit of cash or an irrevocable surety bond policy satisfying the requirements of the immediately succeeding paragraph or (c) fund the Reserve Fund through a combination of (a) and (b). At least 120 days prior to the expiration date of a letter of credit on deposit in the Reserve Fund, SMUD shall either (a) substitute a new letter of credit satisfying the requirements of this paragraph, (b) fund the Reserve Fund through the deposit of cash or an irrevocable surety bond policy satisfying the requirements of the immediately succeeding paragraph or (c) fund the Reserve Fund through a combination of (a) and (b). Any such letter of credit shall permit SMUD to draw amounts thereunder for deposit in the Reserve Fund which, together with any moneys on deposit in, or surety bond policy available to fund, the Reserve Fund, are not less than the balance required to then be maintained in the Reserve Fund (the "Reserve Fund Requirement") and which may be applied to any purpose for which moneys in the Reserve Fund may be applied. SMUD shall make a drawing on such letter of credit and deposit the moneys obtained from drawing in the Reserve Fund (a) whenever moneys are required for the purposes for which Reserve Fund moneys may be applied, and (b) prior to any expiration or termination thereof; provided, however, that no such drawing need be made if other moneys or an irrevocable surety bond are available in the Reserve Fund in the amount of the Reserve Fund Requirement.

In lieu of maintaining and depositing moneys in the Reserve Fund, SMUD also may maintain and deposit in the Reserve Fund, for the sole benefit of the holders of the Bonds, an irrevocable surety bond policy (1) which is issued by a bond insurance company with a claims-paying ability rating at the time of deposit of such surety bond policy into the Reserve Fund within one of the top two rating categories (without regard to any refinement or graduation of such rating category by numerical modifier or otherwise) from Moody's and S&P, (2) the repayment obligation with respect to which is not secured by a lien on assets of SMUD senior to any lien which secures the Bondholders and (3) has a term of at least 364 days from the date of issuance thereof. If the credit rating of the bond insurance company issuing such surety bond policy falls below such top two rating categories, SMUD shall, within twelve months of such downgrading, either (a) substitute a new surety bond policy satisfying the requirements of this paragraph, (b) fund the Reserve Fund through the deposit of cash or a letter of credit satisfying the requirements of the immediately preceding paragraph or (c) fund the Reserve Fund through a combination of (a) and (b). At least 120 days prior to the expiration date of a surety bond policy on deposit in the Reserve Fund, SMUD shall either (a) substitute a new surety bond policy satisfying the requirements of this paragraph, (b) fund the Reserve Fund through the deposit of cash or a letter of credit satisfying the requirements of the immediately preceding paragraph or (c) fund the Reserve Fund through a combination of (a) and (b). Any such surety bond policy shall permit SMUD to obtain amounts thereunder for deposit in the Reserve Fund which, together with any moneys on deposit in, or letter of credit available to fund, the Reserve Fund, are not less than the Reserve Fund Requirement and which may be applied to any purpose for which moneys in the Reserve Fund may be applied. SMUD shall make a drawing on such surety bond policy and deposit the proceeds derived from such drawing in the Reserve Fund (a) whenever moneys are required for the purposes for which Reserve Fund moneys may be applied, and (b) prior to any expiration or termination thereof; provided, however, that no such drawing need be made if other moneys or a letter of credit are available in the Reserve Fund in the amount of the Reserve Fund Requirement.

Notwithstanding anything to the contrary in the prior two paragraphs, if at any time that there is on deposit in the Reserve Fund a combination of cash, a letter of credit and/or a surety bond as contemplated above, SMUD shall draw first on such cash to the extent required and available, then on (1) such surety bond and letter of credit on a pro rata basis (if both a surety bond and letter of credit are available) to the extent required and available, or (2) such surety bond or letter of credit (if either a surety bond or letter of credit, but not both, is available) to the extent required and available.

For purposes of calculating the "debt service ratio" and, unless otherwise specified in a Supplemental Resolution providing for the issuance of a series of Parity Bonds, the amount required to be maintained in the Reserve Fund as described above: (1) any calculation of principal of and interest on Parity Bonds for any period of time shall be reduced by the amount of any Subsidy that SMUD receives or expects to receive during such period of time relating to or in connection with such Parity Bonds; and (2) to the extent the calculation of principal of and interest on Parity Bonds is reduced by the Subsidy as provided in clause (1) of this paragraph, any calculation of Net Revenues for any period of time shall be reduced by the amount of any Subsidy received or expected to be received by SMUD with respect to or in connection with such Parity Bonds during such period of time.

Additional Covenants

The Resolution contains the following additional covenants, among others:

1. That the Electric System will be maintained in good repair, working order and condition at all times, and will be continuously operated in an efficient and economical manner.

2. That no electric energy shall be supplied free by SMUD, and a reasonable wholesale charge will be made for water distributed at any cost to SMUD and such charge will be deemed Revenues; but SMUD may supply without charge water furnished to it without distribution cost, and any moneys received from any retail sales of water will not be deemed Revenues.

3. That all taxes and governmental charges and other lawful claims which might become a lien on the Electric System or the Revenues or impair the security of the Bonds will be paid and discharged when due.

4. That SMUD will comply with all lawful orders of any governmental agency or authority having jurisdiction in the premises (except while the validity or application thereof is being contested in good faith) and with all necessary permits and licenses issued by the NRC.

5. That no lease or agreement will be entered into, or sale or other disposition of essential property made, that would impair the operation of the Electric System or the rights of Bondholders with respect to the Revenues; provided, however, that notwithstanding the foregoing or any other provision of the Master Resolution, SMUD may sell or otherwise dispose of its accounts receivable and customer loan balances due to SMUD provided that SMUD delivers to the Trustee:

(a) a Certificate of SMUD to the effect that the amount derived by SMUD from the sale or other disposition of such accounts receivable or loan balances is a result of the sale or other disposition of such accounts receivable or loan balances upon fair and reasonable terms no less favorable to SMUD than the terms of a comparable arm's-length transaction treated as a sale and not a loan under generally accepted accounting principles; and

(b) a written statement or report of an independent certified public accountant to the effect that, based on the audited financial statements of SMUD for the most recent fiscal year for which audited financial statements are available and after giving effect to such transaction by reducing Revenues for such fiscal year by the difference between the face amount of such accounts receivable or loan balances and the amount derived by SMUD from the sale or other disposition of such accounts receivable or loan balances, the debt service ratio computed pursuant to the Master Resolution would not have been reduced to less than 1.40:1.0.

6. That proper records and accounts will be maintained of all transactions relating to the Electric System and the Revenues (open to inspection by the Trustee and the holders of not less than 10 percent in principal amount of the Bonds), to be audited annually by an independent certified public accountant within 90 days after close of the fiscal year, and copies of such financial statements supplied to Bondholders on request.

7. That insurance adequate in amounts and as to risks covered will be maintained against such risks as are usually insurable in connection with similar electric systems, and in addition public liability and property damage insurance in amounts not less than $1,000,000 per accident and adequate fidelity bonds on all officers and employees of SMUD handling or responsible for SMUD funds, subject in each case to the condition that such insurance is obtainable at reasonable rates and upon reasonable terms and conditions. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – INSURANCE" attached to this Official Statement for a description of SMUD's insurance.

8. That the net proceeds realized by SMUD in the event all or any part of the Electric System is taken by eminent domain proceedings will be applied to the redemption or retirement of all Bonds and Parity Bonds if sufficient therefor, and, if not, then pro rata to the redemption or retirement of Bonds and Parity Bonds or to new facilities if the additional Revenues to be derived therefrom will sufficiently offset the loss of Revenues resulting from such eminent domain so that the ability of SMUD to meet its obligations will not be substantially impaired.

9. That SMUD will at all times use its best efforts to maintain the powers, functions and duties now reposed in it pursuant to law.

10. That SMUD will establish and at all times maintain and collect rates and charges for the sale or use of its electric energy sufficient to permit SMUD to purchase power or issue and sell Bonds or Parity Bonds to finance additions, betterments, extensions and improvements to the Electric System as may be reasonably necessary to satisfy its then projected electric demand upon its Electric System, and that unless the Board determines that SMUD will be able to satisfy such demand through the purchase of electric energy, SMUD will proceed with all reasonable diligence to issue and sell such Bonds or Parity Bonds.

11. That SMUD will not create, or permit the creation of, any mortgage or lien upon the Electric System or any property essential to the proper operation of the Electric System or to the maintenance of the Revenues. SMUD will not create, or permit the creation of, any pledge, lien, charge or encumbrance upon the Revenues except only as provided in the Master Resolution; provided that, notwithstanding the foregoing or any other provision of the Master Resolution, SMUD may create a pledge, lien, charge or encumbrance upon its accounts receivable and customer loan balances due to SMUD (which pledge, lien, charge or encumbrance shall be prior to any pledge, lien, charge or encumbrance created or made pursuant to the Master Resolution, including without limitation the pledge of Revenues made pursuant to the Master Resolution) to secure indebtedness with a term of one year or less provided that the principal amount of such indebtedness does not exceed 50% of the aggregate face amount of the accounts receivable and customer loan balances due to SMUD as shown on SMUD's most recent audited financial statements.

Amendment of the Resolution

The Resolution and the rights and obligations of SMUD and of the holders of the Bonds may be modified or amended at any time pursuant to the affirmative vote at a meeting of Bondholders, or with the written consent without a meeting, of the holders of 60 percent in aggregate principal amount of the Bonds then outstanding, provided that no such modification or amendment shall (i) extend the fixed maturity of any Bond, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon or reduce any premium payable upon the redemption thereof, without the consent of the holder of each Bond so affected, or (ii) reduce the aforesaid percentage of Bonds required for consent to an amendment or modification, without the consent of the holders of all the Bonds then outstanding. Modifications or amendments may be made, without the consent of any Bondholders, to add covenants of SMUD or to surrender rights reserved by SMUD in the Resolution, to cure ambiguities or defective or inconsistent provisions or in regard to questions arising under the Resolution without adversely affecting the interests of the Bondholders, or to provide for the issuance of a series of Bonds, subject to the provisions contained in the Resolution with respect thereto.

Events of Default and Remedies of Bondholders

The Resolution declares each of the following to be an event of default:

(a) Failure to pay the principal of and premium on any Bond when due and payable;

(b) Failure to pay any installment of interest on any Bond when due and payable, if such default continues for a period of 30 days;

(c) Default by SMUD in the observance of any of the covenants, agreements or conditions on its part in the Resolution or in the Bonds, if such default continues for a period of 60 days after written notice thereof (specifying such default and requiring the same to be remedied) has been given to SMUD by the Trustee, or to SMUD and the Trustee by the holders of not less than 25 percent in aggregate principal amount of the Bonds at the time outstanding; and

(d) If, under the provisions of any law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of SMUD or of the whole or any substantial part of its property, and such custody or control shall not be terminated or stayed within 60 days.

In the event of default, the Trustee or the holders of not less than a majority in aggregate principal amount of the outstanding Bonds may, upon written notice to SMUD, declare the principal of all outstanding Bonds, and the interest accrued thereon, to be due and payable immediately. The Trustee is appointed as trustee to represent Bondholders and may take such action as may seem appropriate to it, and, upon the written request of the holders of 25 percent in aggregate principal amount of the outstanding Bonds, and upon being furnished with indemnity satisfactory to it, will take such action on behalf of Bondholders as is specified in such written request. Each Bondholder is entitled to proceed to protect and enforce the rights vested in such holder by the Resolution by such appropriate judicial proceedings as such holder deems most effectual.

The rights of Bondholders are limited and restricted to the use and application of Revenues as provided in the Resolution and do not extend to the levy of any attachment or execution upon or forfeiture of any of the properties of SMUD or to any moneys derived by SMUD from the levy or collection of taxes.

In addition to the limitations on remedies contained in the Resolution, the rights and remedies provided by the Bonds and the Resolution, as well as the enforcement by SMUD of contracts with customers of the Electric System, may be limited by and are subject to bankruptcy, insolvency, reorganization and other laws affecting the enforcement of creditors' rights.

Refunding of 2022 Series J Bonds

If Refunding Bonds are issued for the purpose of refunding 2022 Series J Bonds, then SMUD is authorized to apply proceeds of the sale of such Refunding Bonds to the payment of the purchase price of direct noncallable obligations of the United States of America ("Treasury Obligations") to be held by the Trustee to insure the payment or retirement at or before maturity of all or a portion of the outstanding 2022 Series J Bonds. Upon deposit with the Trustee, in trust, of money or Treasury Obligations (including, but not limited to, direct obligations of the United States of America issued in book-entry form on the books of the Department of the Treasury of the United States of America), or any combination thereof, sufficient, together with the interest to accrue on any such Treasury Obligations, to pay or redeem all or a portion of 2022 Series J Bonds then outstanding at or before their maturity date, all liability of SMUD in respect of such 2022 Series J Bonds shall cease, determine and be completely discharged, and the holders thereof shall thereafter be entitled only to payment by SMUD out of the money and Treasury Obligations deposited with the Trustee for their payment. If the liability of SMUD shall cease and determine with respect to all or a portion of the 2022 Series J Bonds, then said 2022 Series J Bonds shall not be considered to be outstanding Bonds for any purpose of the Resolution.

Discharge of Resolution

The Resolution may be discharged by depositing with the Trustee in trust, moneys or Federal Securities or general obligation bonds of the State of California, in such amount as the Trustee shall determine will, together with the interest to accrue thereon, be fully sufficient to pay and discharge the indebtedness on all Bonds at or before their respective maturity dates.

Investment of Funds

Moneys in any fund established by the Resolution may be invested in bonds, notes, certificates of indebtedness, bills, bankers acceptances or other securities in which funds of SMUD may be legally invested as provided by the law in effect at the time of such investment. Currently this investment authority includes, among other things, the Local Agency Investment Fund which is administered by the Treasurer of the State of California for the investment of funds belonging to local agencies in the State of California.

APPENDIX E

PROPOSED FORM OF LEGAL OPINION FOR 2022 SERIES J BONDS

[Closing Date]

Sacramento Municipal Utility District
Sacramento, California

Sacramento Municipal Utility District
Electric Revenue Refunding Bonds, 2022 Series J
(Final Opinion)

Ladies and Gentlemen:

We have acted as bond counsel to the Sacramento Municipal Utility District ("SMUD") in connection with the issuance of $_________ aggregate principal amount of Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2022 Series J (the "2022 Series J Bonds"), issued pursuant to Resolution No. 6649 of the Board of Directors of SMUD, adopted January 7, 1971 (the "Master Resolution"), as supplemented and amended by later resolutions of said Board of Directors (as so supplemented and amended, the "Resolution"), including Resolution No. 22-05-__, adopted May 19, 2022 (the "Sixty-Fifth Supplemental Resolution"). Capitalized terms not otherwise defined herein shall have the meanings ascribed thereto in the Resolution.

In such connection, we have reviewed the Resolution; the Tax Certificate, dated the date hereof (the "Tax Certificate"), executed by SMUD; opinions of counsel to SMUD and the Trustee; certificates of SMUD, the Trustee and others; and such other documents, opinions and matters to the extent we deemed necessary to render the opinions set forth herein.

The opinions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. Such opinions may be affected by actions taken or omitted or events occurring after original delivery of the 2022 Series J Bonds on the date hereof. We have not undertaken to determine, or to inform any person, whether any such actions are taken or omitted or events do occur or any other matters come to our attention after original delivery of the 2022 Series J Bonds on the date hereof. Accordingly, this letter speaks only as of its date and is not intended to, and may not, be relied upon or otherwise used in connection with any such actions, events or matters. Our engagement with respect to the 2022 Series J Bonds has concluded with their issuance, and we disclaim any obligation to update this letter. We have assumed the genuineness of all documents and signatures provided to us and the due and legal execution and delivery thereof by, and validity against, any parties other than SMUD. We have assumed, without undertaking to verify, the accuracy of the factual matters represented, warranted or certified in the documents, and of the legal conclusions contained in the opinions, referred to in the second paragraph hereof. Furthermore, we have assumed compliance with all covenants and agreements contained in the Resolution and the Tax Certificate, including (without limitation) covenants and agreements compliance with which is necessary to assure that future actions, omissions or events will not cause interest on the 2022 Series J Bonds to be included in gross income for federal income tax purposes.

We call attention to the fact that the rights and obligations under the 2022 Series J Bonds, the Resolution and the Tax Certificate and their enforceability may be subject to bankruptcy, insolvency, receivership, reorganization, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. We express no opinion with respect to any indemnification, contribution, liquidated damages, penalty (including any remedy deemed to constitute or to have the effect of a penalty), right of set-off, arbitration, judicial reference, choice of law, choice of forum, choice of venue, non-exclusivity of remedies, waiver or severability provisions contained in the foregoing documents, nor do we express any opinion with respect to the state or quality of title to or interest in any of the assets described in or as subject to the lien of the Resolution or the accuracy or sufficiency of the description contained therein of, or the remedies available to enforce liens on, any such assets. Our services did not include financial or other non-legal advice. Finally, we undertake no responsibility for the accuracy, completeness or fairness of the Official Statement, dated ______, 2022, or other offering material relating to the 2022 Series J Bonds and express no opinion or conclusion with respect thereto.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, we are of the following opinions:

1. The 2022 Series J Bonds constitute the valid and binding limited obligations of SMUD.

2. The Resolution, including the Sixty-Fifth Supplemental Resolution, has been duly adopted by, and constitutes the valid and binding obligation of, SMUD. The Resolution creates a valid pledge, to secure the payment of the principal of and interest on the 2022 Series J Bonds, of the Net Revenues, subject to the provisions of the Resolution permitting the application thereof for the purposes and on the terms and conditions set forth in the Resolution.

3. Interest on the 2022 Series J Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 and is exempt from State of California personal income taxes. Interest on the 2022 Series J Bonds is not a specific preference item for purposes of the federal alternative minimum tax. We express no opinion regarding other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Series J Bonds.

Faithfully yours,

ORRICK, HERRINGTON & SUTCLIFFE LLP

per

APPENDIX F

FORM OF CONTINUING DISCLOSURE AGREEMENT

This Continuing Disclosure Agreement (the "Disclosure Agreement") is executed and delivered by the Sacramento Municipal Utility District (the "Issuer") and U.S. Bank Trust Company, National Association, in its capacity as Dissemination Agent (the "Dissemination Agent") in connection with the issuance of $________ aggregate principal amount of Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2022 Series J (the "2022 Series J Bonds"). The 2022 Series J Bonds are being issued pursuant to the Issuer's Resolution No. 6649, adopted on January 7, 1971, as amended and supplemented by supplemental resolutions, including Resolution No. 22-05-__, adopted on May 19, 2022 (the "Resolution"). Pursuant to Section 140.11 of the Resolution, the Issuer and the Dissemination Agent covenant and agree as follows:

SECTION 1. Purpose of the Disclosure Agreement. This Disclosure Agreement is being executed and delivered by the Issuer and the Dissemination Agent for the benefit of the Holders and Beneficial Owners of the 2022 Series J Bonds and in order to assist the Participating Underwriters in complying with S.E.C. Rule 15c2-12(b)(5).

SECTION 2. Definitions. In addition to the definitions set forth in the Resolution, which apply to any capitalized term used in this Disclosure Agreement unless otherwise defined in this Section 2, the following capitalized terms shall have the following meanings:

"Annual Report" shall mean any Annual Report provided by the Issuer pursuant to, and as described in, Sections 3 and 4 of this Disclosure Agreement.

"Beneficial Owner" shall mean any person which has or shares the power, directly or indirectly, to make investment decisions concerning ownership of any 2022 Series J Bonds (including persons holding Bonds through nominees, depositories or other intermediaries).

"Disclosure Representative" shall mean the Treasurer of the Issuer or his or her designee, or such other officer or employee as the Issuer shall designate in writing to the Trustee from time to time.

"Dissemination Agent" shall mean the U.S. Bank Trust Company, National Association, acting in its capacity as Dissemination Agent hereunder, or any successor Dissemination Agent designated in writing by the Issuer and which has filed with the Trustee a written acceptance of such designation.

"EMMA" shall mean the MSRB's Electronic Municipal Market Access system.

"Financial Obligation" shall mean, for purposes of the Listed Events set out in Section 5(a)(15) and Section 5(a)(16), a (i) debt obligation; (ii) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned debt obligation; or (iii) guarantee of (i) or (ii). The term "Financial Obligation" shall not include municipal securities (as defined in the Securities Exchange Act of 1934, as amended) as to which a final official statement (as defined in the Rule) has been provided to the MSRB consistent with the Rule.

"Listed Events" shall mean any of the events listed in Section 5(a) of this Disclosure Agreement.

"MSRB" shall mean the Municipal Securities Rulemaking Board.

"Participating Underwriter" shall mean any of the original underwriters of the 2022 Series J Bonds required to comply with the Rule in connection with offering of the 2022 Series J Bonds.

"Repository" shall mean the MSRB through EMMA or any other entity or system designated or authorized by the Securities and Exchange Commission to receive reports pursuant to the Rule.

"Rule" shall mean Rule 15c2-12(b)(5) adopted by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as the same may be amended from time to time.

"State" shall mean the State of California.

SECTION 3. Provision of Annual Reports.

(a) The Issuer shall, or shall cause the Dissemination Agent to, not later than one hundred eighty (180) days after the end of the Issuer's fiscal year (presently December 31), commencing with the report for the 2022 Fiscal Year, provide to each Repository an Annual Report which is consistent with the requirements of Section 4 of this Disclosure Agreement. The Annual Report may be submitted as a single document or as separate documents comprising a package, and may include by reference other information as provided in Section 4 of this Disclosure Agreement; provided that the audited financial statements of the Issuer may be submitted separately from the balance of the Annual Report and later than the date required above for the filing of the Annual Report if they are not available by that date. If the fiscal year changes for the Issuer, the Issuer shall give notice of such change in the same manner as for a Listed Event under Section 5 hereof.

(b) Not later than fifteen (15) Business Days prior to the dates specified in subsection (a) for providing the Annual Report to each Repository, the Issuer shall provide its respective Annual Report to the Dissemination Agent. If by such date, the Dissemination Agent has not received a copy of the Annual Report from the Issuer, the Dissemination Agent shall contact the Issuer to determine if the Issuer is in compliance with the first sentence of this subsection (b).

(c) If the Dissemination Agent is unable to verify that an Annual Report of the Issuer has been provided to each Repository by the date required in subsection (a), the Dissemination Agent shall send a notice to each Repository and the MSRB (if the MSRB is not a Repository) in substantially the form attached as Exhibit A.

(d) The Dissemination Agent shall:

(1) determine each year prior to the date for providing the Annual Report the name and address of each Repository and the then-applicable rules and procedures for filing the Annual Report with each Repository, if any; and

(2) file a report with the Issuer certifying that the Annual Report has been provided pursuant to this Disclosure Agreement, stating the date it was provided and listing each Repository to which it was provided.

SECTION 4. Content of Annual Reports.

(a) The Issuer's Annual Report shall contain or include by reference the following:

(1) The audited financial statements of the Issuer for the prior fiscal year, prepared in accordance with generally accepted accounting principles as promulgated to apply to governmental entities from time to time by the Governmental Accounting Standards Board and where not in conflict with the Financial Accounting Standards Board ("FASB") pronouncements or accounting principles prescribed by FASB. If the Issuer's audited financial statements are not available by the time the Annual Report is required to be filed pursuant to Section 3(a), the Annual Report shall

contain unaudited financial statements, and the audited financial statements shall be filed in the same manner as the Annual Report when they become available.

(2) An update of the following types of information contained in Appendix A to the official statement, dated ______, 2022 and related to the 2022 Series J Bonds:

(i) The table entitled "Power Supply Resources."

(ii) The table entitled "Projected Requirements and Resources to Meet Load Requirements."

(iii) The table entitled "Average Class Rates" (to the extent such table relates to rates and revenues of the Issuer).

(iv) The table entitled "Selected Operating Data."

(v) The table entitled "Unconsolidated Financial Data."

(vi) The balance in the Decommissioning Trust Fund, the current estimate of decommissioning costs, the decommissioning costs to date, and the annual contribution level to the Decommissioning Trust Fund, all relating to the Rancho Seco Nuclear Power Plant.

(vii) The table entitled "Estimated Capital Requirements."

(b) Any or all of the items listed above may be included by specific reference to other documents, including official statements of debt issues of the Issuer or public entities related thereto, which have been submitted to each Repository or the Securities and Exchange Commission. If the document included by reference is a final official statement, it must be available from the MSRB. The Issuer shall clearly identify each such other document so included by reference.

SECTION 5. Reporting of Listed Events.

(a) Pursuant to the provisions of this Section 5, the Issuer shall give, or cause to be given, notice of the occurrence of any of the following events with respect to the 2022 Series J Bonds not later than ten (10) business days after the occurrence of the event:

(1) principal and interest payment delinquencies;

(2) non-payment related defaults, if material;

(3) unscheduled draws on any applicable debt service reserves reflecting financial difficulties;

(4) unscheduled draws on credit enhancement reflecting financial difficulties;

(5) substitution of credit or liquidity providers, or their failure to perform;

(6) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701 TEB) or other material notices or determinations with respect to the tax status of the 2022 Series J Bonds or other material events adversely affecting the tax status of the 2022 Series J Bonds;

(7) modifications to rights of Bondholders, if material;

(8) bond calls, if material, and tender offers;

(9) defeasances;

(10) release, substitution or sale of property securing repayment of the 2022 Series J Bonds, if material;

(11) rating changes;

(12) bankruptcy, insolvency, receivership or similar event of the Issuer;

(13) the consummation of a merger, consolidation, or acquisition involving the Issuer or the sale of all or substantially all of the assets of the Issuer, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material;

(14) appointment of a successor or additional trustee or the change of name of the Trustee, if material;

(15) incurrence of a Financial Obligation of the Issuer, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a Financial Obligation of the Issuer, any of which affect Bondholders, if material; and

(16) default, event of acceleration, termination event, modification of terms, or other similar events under the terms of a Financial Obligation of the Issuer, any of which reflect financial difficulties.

(b) For the purpose of the event identified in Section 5(a)(12), the event is considered to occur when any of the following occur: the appointment of a receiver, fiscal agent or similar officer for the Issuer in a proceeding under the U.S. Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the Issuer, or if such jurisdiction has been assumed by leaving the existing governmental body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the Issuer.

(c) Whenever the Issuer obtains knowledge of the occurrence of a Listed Event, the Issuer shall as soon as possible determine if such event is required to be reported pursuant to this Section 5.

(d) If the Issuer has determined that such event is required to be reported pursuant to this Section 5, the Issuer shall promptly notify the Dissemination Agent in writing. Such notice shall instruct the Dissemination Agent to report the occurrence pursuant to subsection (e).

(e) If the Dissemination Agent has been instructed by the Issuer to report the occurrence of a Listed Event, the Dissemination Agent shall file a notice of such occurrence with the MSRB (if the MSRB is not a Repository) and each Repository.

SECTION 6. Termination of Reporting Obligation. The obligations of the Issuer and the Dissemination Agent under this Disclosure Agreement shall terminate upon the legal defeasance, prior redemption or payment in full of all of the 2022 Series J Bonds. If such termination occurs prior to the final maturity of the 2022 Series J Bonds, the Issuer shall give notice of such termination in the same manner as for a Listed Event under Section 5.

SECTION 7. Dissemination Agent; Filings.

(a) The Issuer may, from time to time, appoint or engage a Dissemination Agent to assist it in carrying out its obligations under this Disclosure Agreement, and may discharge any such Dissemination Agent, with or without appointing a successor Dissemination Agent. The Dissemination Agent shall not be responsible in any manner for the content of any notice or report prepared by the Issuer pursuant to this Disclosure Agreement. If at any time there is not any other designated Dissemination Agent, the Issuer shall be the Dissemination Agent. The initial Dissemination Agent shall be U.S. Bank Trust Company, National Association.

(b) Unless and until one or more different or additional Repositories are designated or authorized by the Securities and Exchange Commission, all filings with a Repository which are required by this Disclosure Agreement shall be filed with the MSRB through EMMA and shall be in an electronic format and accompanied by such identifying information as prescribed by the MSRB in accordance with the Rule.

SECTION 8. Amendment; Waiver. Notwithstanding any other provision of this Disclosure Agreement, the Issuer and the Dissemination Agent may amend this Disclosure Agreement, and any provision of this Disclosure Agreement may be waived, provided that the following conditions are satisfied:

(a) If the amendment or waiver relates to the provisions of Sections 3(a), 4, or 5(a), it may only be made in connection with a change in circumstances that arises from a change in legal requirements, change in law, or change in the identity, nature or status of an obligated person with respect to the 2022 Series J Bonds, or the type of business conducted;

(b) The undertaking, as amended or taking into account such waiver, would, in the opinion of nationally recognized bond counsel, have complied with the requirements of the Rule at the time of the original issuance of the 2022 Series J Bonds, after taking into account any amendments or interpretations of the Rule, as well as any change in circumstances; and

(c) The amendment or waiver either (1) is approved by the Holders of 60% of the 2022 Series J Bonds, or (2) does not, in the opinion of nationally recognized bond counsel, materially impair the interests of the Holders or Beneficial Owners of the 2022 Series J Bonds.

In the event of any amendment or waiver of a provision of this Disclosure Agreement, the Issuer shall describe such amendment in its next respective Annual Report, and shall include, as applicable, a narrative explanation of the reason for the amendment or waiver and its impact on the type (or, in the case of a change of accounting principles from those described in Section 4(a)(1), on the presentation) of financial information or operating data being presented by the Issuer. In addition, if the amendment relates to the accounting principles to be followed in preparing financial statements, (1) notice of such change shall be given in the same manner as for a Listed Event under Section 5, and (2) the Annual Report for the year in which the change is made should present a comparison (in narrative form and also, if feasible, in quantitative form) between the financial statements as prepared on the basis of the new accounting principles and those prepared on the basis of the former accounting principles.

SECTION 9. Additional Information. Nothing in this Disclosure Agreement shall be deemed to prevent the Issuer from disseminating any other information, using the means of dissemination set forth in this Disclosure Agreement or any other means of communication, or including any other information in any Annual Report or notice of occurrence of a Listed Event, in addition to that which is required by this Disclosure Agreement. If the Issuer chooses to include any information in any Annual Report or notice of occurrence of a Listed Event in addition to that which is specifically required by this Disclosure Agreement, the Issuer shall have no obligation under this Disclosure Agreement to update such information or include it in any future Annual Report or notice of occurrence of a Listed Event.

SECTION 10. Default. In the event of a failure of the Issuer or the Dissemination Agent to comply with any provision of this Disclosure Agreement, the Trustee shall, at the request of any Participating Underwriter or the Holders of at least 25% aggregate principal amount of Outstanding Bonds and upon being indemnified to its satisfaction from and against any costs, liability, expenses and fees of the Trustee, including, without limitation fees and expenses of its attorneys, or any Holder or Beneficial Owner of the 2022 Series J Bonds may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the Issuer or the Dissemination Agent, as the case may be, to comply with its obligations under this Disclosure Agreement. A default under this Disclosure Agreement shall not be deemed an Event of Default under the Resolution, and the sole remedy under this Disclosure Agreement in the event of any failure of the Issuer or the Dissemination Agent to comply with this Disclosure Agreement shall be an action to compel performance.

SECTION 11. Duties, Immunities and Liabilities of Dissemination Agent. The Dissemination Agent shall have only such duties as are specifically set forth in this Disclosure Agreement, and the Issuer agrees to indemnify and save the Dissemination Agent, its officers, directors, employees and agents, harmless against any loss, expense and liabilities which it may incur arising out of or in the exercise or performance of its powers and duties hereunder, including the costs and expenses (including attorneys' fees) of defending against any claim of liability, but excluding liabilities due to the Dissemination Agent's negligence or willful misconduct. The Dissemination Agent shall have only such duties as are specifically set forth in this Disclosure Agreement and no implied duties for obligation shall be read into this Disclosure Agreement against the Dissemination Agent. The Dissemination Agent has no power to enforce nonperformance on the part of the Issuer. The Dissemination Agent shall be paid compensation by the Issuer for its services provided hereunder in accordance with its schedule of fees provided to the Issuer and all expenses, legal fees and costs of the Dissemination Agent made or incurred by the Dissemination Agent in the performance of its duties hereunder. The obligations of the Issuer under this Section shall survive resignation or removal of the Dissemination Agent and payment of the 2022 Series J Bonds.

SECTION 12. Notices. Any notices or communications to or among any of the parties to this Disclosure Agreement may be given as follows:

To the Issuer:	Sacramento Municipal Utility District 6201 S Street, MS B405 Sacramento, California 95817 Attention: Treasurer Telephone: (916) 732-6509 Fax: (916) 732-5835

To the Dissemination Agent:	U.S. Bank Trust Company, National Association Global Corporate Trust One California Street, Suite 1000 San Francisco, California 94111 Telephone: (415) 677-3699 Fax: (415) 677-3769
To the Trustee:	U.S. Bank Trust Company, National Association Global Corporate Trust One California Street, Suite 1000 San Francisco, California 94111 Telephone: (415) 677-3699 Fax: (415) 677-3769

The Issuer, the Dissemination Agent and the Trustee may, by giving written notice hereunder to the other person listed above, designate a different address or telephone number(s) to which subsequent notices or communications should be sent. Unless specifically otherwise required by the context of this Disclosure Agreement, a party may give notice by any form of electronic transmission capable of producing a written record. Each such party shall file with the Trustee and Dissemination Agent information appropriate to receiving such form of electronic transmission.

SECTION 13. **Beneficiaries**. This Disclosure Agreement shall inure solely to the benefit of the Issuer, the Dissemination Agent, the Participating Underwriters and Holders and Beneficial Owners from time to time of the 2022 Series J Bonds, and shall create no rights in any other person or entity.

SECTION 14. **Counterparts**. This Disclosure Agreement may be executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

Dated: ______, 2022.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By ____
Treasurer

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
as Dissemination Agent

By____
Authorized Officer

ACKNOWLEDGED:

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION, as Trustee

By: ________________________________
Authorized Officer

EXHIBIT A

NOTICE TO REPOSITORIES OF FAILURE TO FILE ANNUAL REPORT

Name of Issuer:	Sacramento Municipal Utility District
Name of Bond Issue:	Electric Revenue Refunding Bonds, 2022 Series J
Name of Borrower:	Sacramento Municipal Utility District
Date of Issuance:	_______, 2022

NOTICE IS HEREBY GIVEN that the Sacramento Municipal Utility District (the "Issuer") has not provided an Annual Report with respect to the above-named Bonds as required by Section 140.11 of Resolution No. 22-05-__, adopted May 19, 2022, by the Issuer. [The Issuer anticipates that the Annual Report will be filed by _____________.]

Dated:_______________

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
on behalf of Sacramento Municipal Utility District

____

cc: Sacramento Municipal Utility District

Attachment G
to Resolution No. 22-05-11

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Subordinated Electric Revenue Refunding Bonds, 2022 Series C

CONTRACT OF PURCHASE

[SALE DATE]

Honorable Board of Directors
Sacramento Municipal Utility District
6201 S Street
Sacramento, California 95817-1899

Dear Directors:

The undersigned Morgan Stanley & Co. LLC, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC (herein collectively called the "Underwriters"), acting for and on behalf of themselves, offer to enter into this Contract of Purchase (the "Contract of Purchase") with the Sacramento Municipal Utility District (the "District") which, upon the District's acceptance, will be binding upon the District and upon the Underwriters. Morgan Stanley & Co. LLC, has been duly authorized to execute this Contract of Purchase and to act hereunder by and based on representations made to it under an Agreement Among Underwriters dated _____, 2022 on behalf of the Underwriters as the Senior Managing Underwriter (the "Senior Underwriter"). This offer is made subject to the District's acceptance on or before 5:00 p.m., Sacramento time, on the date hereof, and if not so accepted, will be subject to withdrawal by the Underwriters upon notice delivered to the District at any time prior to the acceptance hereof by the District.

1. **Purchase, Sale and Delivery of the Bonds.** (a) Subject to the terms and conditions and in reliance upon the representations, warranties and agreements herein set forth, the Underwriters, jointly and severally, hereby agree to purchase from the District, and the District hereby agrees to sell to the Underwriters, all (but not less than all) of the $[PAR] aggregate principal amount of the Sacramento Municipal Utility District Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "Bonds"), dated [CLOSING DATE], bearing interest (payable on the dates set forth in the Official Statement (as hereinafter defined) of the District relating to the Bonds) in each year until maturity or earlier redemption at the rates per annum and maturing on the dates and in the amounts set forth in the Official Statement. The purchase price for the Bonds shall be $[PURCHASE PRICE] (consisting of the principal amount of the Bonds of

$[PAR] plus [net] original issue premium of $[OIP] and minus an Underwriters' discount of $ [UWD]).

(b) The Bonds shall be substantially in the form described in, shall be issued and secured under the provisions of, and shall be payable as provided in, Resolution No. 85-11-1, adopted by the Board of Directors of the District on November 7, 1985, as amended and restated pursuant to Resolution No. 01-06-10, adopted by the Board of Directors of the District on June 21, 2001 (the "Subordinate Master Resolution"), as heretofore amended and supplemented, including the amendments and supplements thereto made by Resolution No. [RESO NO.], adopted by the Board of Directors on [RESO DATE] (the "Thirteenth Supplemental Resolution"). The Subordinate Master Resolution, as supplemented and amended as described in this Contract of Purchase, is herein called the "Subordinate Resolution." The Bonds are authorized to be issued pursuant to applicable California law, including the Municipal Utility District Act (Sections 12850 to 12860 of the Public Utilities Code), the Revenue Bond Law of 1941 (Government Code Section 54300 *et seq.*), Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (section 53580 *et seq.*) and the Subordinate Resolution. The Bonds will be special obligations of the District payable exclusively from, and are secured by a pledge (effected in the manner and to the extent provided in the Subordinate Resolution) of, the Net Subordinated Revenues (as defined in the Subordinate Resolution). The Bonds shall be payable and shall be subject to redemption as provided in the Subordinate Resolution.

(c) The Bonds are being issued to (i) refund the Refunded Bonds (as defined in the Official Statement), and (ii) pay certain costs associated with the issuance of the Bonds. A portion of the proceeds of the Bonds, together with other available funds, will be deposited in an escrow fund established pursuant to an escrow agreement (the "Escrow Agreement") between the District and the Trustee, in its capacity as Escrow Agent (in such capacity, the "Escrow Agent").

(d) The District has heretofore delivered to the Underwriters copies of the Preliminary Official Statement dated [POS DATE], relating to the Bonds (the "Preliminary Official Statement") in connection with the public offering of the Bonds. The Preliminary Official Statement was deemed final by the District as of the date thereof in accordance with paragraph (b)(1) of Rule 15c2-12 of the Securities and Exchange Commission ("Rule 15c2-12"), except for the information not required to be included therein under Rule 15c2-12.

(e) The District shall prepare and deliver to the Underwriters, as promptly as practicable, but in any event not later than two business days prior to the Closing Date (as defined below) or seven business days from the date hereof, a final official statement, with such changes and amendments as may be agreed to by the Underwriters, in such quantities as the Underwriters may reasonably request in order to comply with paragraph (b)(4) of Rule 15c2-12 and the rules of the Municipal Securities Rulemaking Board ("MSRB") (such official statement, including the cover page and Appendices thereto, as the same may be supplemented or amended pursuant to paragraph (i) of Section 2 hereof, is herein referred to as the "Official Statement"). In addition, the District will provide, subject to customary disclaimers regarding the transmission of electronic copies, an electronic copy of the final Official Statement to the Underwriters in the currently required designated electronic format stated in MSRB Rule G-32 and the EMMA Dataport Manual (as defined below). The parties agree that the format in which the Preliminary Official Statement was delivered meets such electronic format requirements.

(f) Within one (1) business day after receipt of the Official Statement from the District, but by no later than the Closing Date, the Underwriters shall, at their own expense submit the Official Statement to EMMA (as defined below). The Underwriters will comply with the provisions of MSRB Rule G-32, including without limitation the submission of Form G-32 and the Official Statement and notify the District of the date on which the Official Statement has been filed with EMMA.

"EMMA" means the MSRB's Electronic Municipal Market Access system, or any other electronic municipal securities information access system designated by the MSRB for collecting and disseminating primary offering documents and information.

"EMMA Dataport Manual" means the document(s) designated as such published by the MSRB from time to time setting forth the processes and procedures with respect to submissions to be made to the primary market disclosure service of EMMA by underwriters under Rule G-32(b).

(g) The District hereby ratifies, confirms and approves the use and distribution by the Underwriters prior to the date hereof of the Preliminary Official Statement and hereby authorizes the Underwriters to use and distribute the Official Statement, the Subordinate Resolution, and this Contract of Purchase, and all information contained in each, and all other documents, certificates and statements furnished by the District to the Underwriters in connection with the transactions contemplated by this Contract of Purchase, in connection with the offer and sale of the Bonds.

The District will covenant pursuant to a Continuing Disclosure Agreement dated as of the date of the issuance of the Bonds (the "Undertaking"), between the District and U.S. Bank Trust Company, National Association (the "Trustee"), to provide annual reports and certain notices as described in Appendix F of the Official Statement.

(h) The District agrees and acknowledges that: (i) the purchase and sale of the Bonds pursuant to this Contract of Purchase is an arm's-length commercial transaction between the District and the Underwriters, (ii) in connection therewith and with the discussions, undertakings and procedures leading up to the consummation of such transaction, the Underwriters are and have been acting solely as principals and are not acting as the agents or fiduciaries of the District, (iii) the Underwriters have not assumed an advisory or fiduciary responsibility in favor of the District with respect to the offering contemplated hereby or the discussions, undertakings and procedures leading thereto (irrespective of whether the Underwriters have provided other services or are currently providing other services to the District on other matters) and the Underwriters have no contractual obligation to the District with respect to the offering contemplated hereby except the contractual obligations expressly set forth in this Contract of Purchase and (iv) it has consulted its own legal, financial and other advisors to the extent it has deemed appropriate.

(i) At 8:00 A.M., Sacramento time, on [CLOSING DATE] or at such earlier or later time or date as shall be agreed upon by the Underwriters and the District (such time and date being herein referred to as the "Closing Date"), the District will deliver the Bonds to The Depository Trust Company, New York, New York ("DTC"), for the account of the Underwriters, duly executed by the District, and the other documents herein mentioned; and the Underwriters will (i) accept such delivery and pay the purchase price of the Bonds as set forth in paragraph (a) of this Section by wire transfer in San Francisco, California to the order of the District. Delivery of the documents herein mentioned shall be made at the offices of Orrick, Herrington & Sutcliffe LLP, 400 Capitol Mall, Suite 3000, Sacramento, California 95814, or such other place as shall have been mutually agreed upon by the District and the Underwriters, except that the Bonds shall be delivered at the offices of DTC in New York, New York or at such other place and in such manner as shall have been mutually agreed upon by the District and the Underwriters.

The Bonds shall be issued initially in fully registered book-entry eligible form (which may be typewritten) in the form of a single registered bond for each maturity of the Bonds, shall bear CUSIP numbers and shall be registered in the name of Cede & Co., as nominee of DTC.

2. **Representations, Warranties and Agreements of the District.** The District hereby represents, warrants to and agrees with the Underwriters that:

(a) The District is a political subdivision of the State of California duly organized and validly existing pursuant to the Municipal Utility District Act as contained in Public Utilities Code Section 11501 *et seq*. (the "Act") and has, and at the Closing Date will have, full legal right, power and authority (i) to enter into this Contract of Purchase, the Escrow Agreement, and the Undertaking, (ii) to adopt the Subordinate Resolution, (iii) to pledge the Net Subordinated Revenues as set forth in the Subordinate Resolution, (iv) to issue, sell and deliver the Bonds to the Underwriters pursuant to the Subordinate Resolution as provided herein, (v) to acquire, construct, operate, maintain, improve and finance and refinance its Electric System (as defined in the Subordinate Resolution) and conduct the business thereof as set forth in and contemplated by the Preliminary Official Statement and the Official Statement, and (vi) to carry out, give effect to and consummate the transactions contemplated by this Contract of Purchase, the Escrow Agreement, the Undertaking, the Subordinate Resolution, and the Preliminary Official Statement and the Official Statement;

(b) The District has complied, and will at the Closing Date be in compliance, in all material respects, with the Act, the Subordinate Resolution, and with the obligations in connection with the issuance of the Bonds on its part contained in the Subordinate Resolution, the Escrow Agreement, the Bonds, the Act, the Undertaking and this Contract of Purchase;

(c) The District has duly and validly adopted the Subordinate Resolution, has duly authorized and approved the execution and delivery of the Bonds, this Contract of Purchase, the Escrow Agreement, the Undertaking and the Official Statement and has duly authorized and approved the performance by the District of its obligations contained in, and the taking of any and all action as may be necessary to carry out, give effect to and consummate the transactions contemplated by, each of said documents and, at the Closing Date, the Bonds will have been validly issued and delivered, the Subordinate Resolution, the Escrow Agreement, the Undertaking and this Contract of Purchase will constitute the valid, legal and binding obligations of the District enforceable in accordance with their respective terms (subject to the effect of, and restrictions and limitations imposed by or resulting from, (i) bankruptcy, insolvency, debt adjustment, moratorium, reorganization or other similar laws affecting creditors' rights, and (ii) judicial discretion) and the Subordinate Resolution will be in full force and effect;

(d) The District is not in breach of or in default under any existing constitutional provision, applicable law or administrative rule or regulation of the State of California, the United States of America, or of any department, division, agency or instrumentality of either or any applicable court or administrative decree or order, or any loan agreement, bond, note, ordinance, resolution, indenture, contract, agreement or other instrument to which the District is a party or to which the District is otherwise subject or bound which in any material way, directly or indirectly, affects the issuance of the Bonds or the validity thereof, the validity or adoption of the Subordinate Resolution or the execution and delivery of the Bonds, this Contract of Purchase, the Escrow Agreement, the Undertaking or the other instruments contemplated by any of such documents to which the District is a party, and the adoption of the Subordinate Resolution and compliance with the provisions of each will not, as of the date hereof and as of the Closing Date, conflict with or constitute a breach of or default in any material way under any existing constitutional provision, applicable law or administrative rule or regulation of the State of California, the United States, or of any department, division, agency or instrumentality of either or any applicable court or administrative judgment, decree or order, or any loan agreement, bond, note, ordinance, resolution, indenture, contract, agreement or other instrument to which the District is a party or to which the District or any of the property or assets of the Electric System (as defined in the Subordinate Resolution) are otherwise subject or bound, and no event which would have a material and adverse effect upon the financial condition of the District has occurred and is continuing which constitutes or with the passage of time or the giving of notice, or both, would constitute a default or event of default by the District under any of the foregoing;

(e) All approvals, consents, authorizations, licenses and permits, elections and orders of or filings or registrations with any governmental authority, legislative body, board, agency or commission having jurisdiction which would constitute a condition precedent to, or the absence of which would materially adversely affect, the due performance by the District of its obligations in connection with the issuance of the Bonds under the Subordinate Resolution, the Undertaking and this Contract of Purchase have been duly obtained or made and are in full force and effect, except for such approvals, consents and orders as may be required under the "Blue Sky" or other securities laws of any state in connection with the offering and sale of the Bonds; and, except as disclosed in the Preliminary Official Statement and the Official Statement, all authorizations, approvals, licenses, permits, consents and orders of any governmental authority, board, agency or commission having jurisdiction in the matters which are required for the due authorization of, which would constitute a condition precedent to, or the absence of which would materially adversely affect the due performance by the District of its respective obligations under, this Contract of Purchase, the Escrow Agreement, the Undertaking, the Bonds or the Subordinate Resolution, or which are necessary to permit the District to carry out the transactions contemplated by the Preliminary Official Statement and the Official Statement to acquire, construct, operate, maintain, improve and finance the Electric System have been duly obtained or, where required for future performance, are expected to be obtained;

(f) The Bonds, when issued and delivered in accordance with the Subordinate Resolution and this Contract of Purchase and paid for by the Underwriters on the Closing Date as provided herein, will be validly issued and outstanding special obligations of the District enforceable against the District in accordance with their terms and entitled to all the benefits and security of the Subordinate Resolution; and, upon the issuance and delivery of the Bonds, the Subordinate Resolution will provide, for the benefit of the holders from time to time of the Bonds, a legally valid and binding pledge of and lien on Net Subordinated Revenues pledged under the Subordinate Resolution, as provided in and contemplated by the Subordinate Resolution;

(g) The Preliminary Official Statement, as of its date and as of the date hereof, did not and does not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(h) At the time of the District's acceptance hereof and (unless the Official Statement is amended or supplemented pursuant to paragraph (i) of Section 2 hereof) at all times subsequent to the date of delivery thereof up to and including the Closing Date, the Official Statement will be true, correct, complete and final in all material respects and will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading;

(i) If, after the date of this Contract of Purchase and until 25 days after the end of the "underwriting period" (as defined in Rule 15c2-12), any event shall occur that might cause the Official Statement to contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, the District hereby covenants and agrees, to the extent it has knowledge of such event, to notify the Underwriters (and for the purposes of this clause to provide the Underwriters with such information as they may from time to time reasonably request), and, if in the opinion of the Underwriters and their counsel such event requires the preparation and publication of a supplement or amendment to the Official Statement, at its expense to supplement or amend the Official Statement in a form and manner approved by the Underwriters and furnish to the Underwriters a reasonable number of copies of such supplement or amendment. For purposes of this Contract of Purchase, the District may assume that the end of the "underwriting period" has occurred on the Closing Date unless the District is otherwise notified by the Underwriters on or prior to the Closing Date. If the Underwriters notify the District that the Closing Date is not the end of the "underwriting period", then the Underwriters shall further notify the District of the date that is the end of the "underwriting period" (as defined in Rule 15c2-12);

(j) If the Official Statement is supplemented or amended pursuant to paragraph (i) of Section 2 of this Contract of Purchase, at the time of each supplement or amendment thereto and (unless subsequently again supplemented or amended pursuant to such paragraph) at all times subsequent thereto during the "underwriting period", the Official Statement as so supplemented or amended will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which made, not misleading;

(k) Except as disclosed in the Preliminary Official Statement and the Official Statement, no litigation, action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, regulatory agency, public board or body, is pending or, to the knowledge of the officer of the District executing this Contract of Purchase after due investigation, threatened (i) in any way affecting the corporate existence of the District or the titles of its officers to their respective offices, (ii) affecting or seeking to prohibit, restrain or enjoin the issuance, sale or delivery of any of the Bonds, the application of the proceeds thereof in accordance with the Subordinate Resolution, or the collection or application of Revenues (as defined in the Subordinate Resolution) or the collection or application of the Net Subordinated Revenues pledged to pay the principal of and interest on the Bonds under the Subordinate Resolution or in any way contesting or affecting the validity or enforceability of any of the Bonds, the Escrow Agreement, the Subordinate Resolution, the Undertaking, this Contract of Purchase or any action of the District contemplated by any of said documents, (iii) which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution facilities, (iv) contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or the powers of the District or its authority with respect to the Bonds, the adoption of the Subordinate Resolution, or the execution and delivery of the Undertaking, the Escrow Agreement, or this Contract of Purchase, or any action of the District contemplated by any of said documents, and (v) which would adversely affect the exclusion from gross income for federal income tax purposes of interest paid on the Bonds, nor to the knowledge of the officer of the District executing this Contract of Purchase is there any basis therefor;

(l) The District will furnish such information, execute such instruments and take such other action in cooperation with the Underwriters as the Underwriters may reasonably request (i) to qualify the Bonds for offer and sale under the "Blue Sky" or other securities laws and regulations of such states and other jurisdictions of the United States as the Senior Underwriter may designate, and (ii) to determine the eligibility of the Bonds for investment under the laws of such states and other jurisdictions and will use its best efforts to continue such qualifications in effect so long as required for the distribution of the Bonds; provided that in connection therewith the District shall not be required to execute or file a general or special consent to service of process or qualify to do business in any jurisdiction and will advise the Senior Underwriter promptly of receipt by the District of any written notification with respect to the suspension of the qualification of the Bonds for sale in any jurisdiction or written notification of the initiation or threat of any proceeding for that purpose;

(m) The audited financial statements of the District for the years ending December 31, 2021 and December 31, 2020 heretofore delivered to the Underwriters and incorporated by reference in the Preliminary Official Statement and the Official Statement as Appendix B fairly present the financial position of the District as of the dates indicated and such financial statements have been prepared in conformity with generally accepted accounting principles applied on a consistent basis;

(n) Between the date hereof and the Closing Date, the District will not, without the prior written consent of the Senior Underwriter, offer or issue any bonds, notes or other obligations for borrowed money, or incur any material liabilities, direct or contingent, nor will there be any adverse change of a material nature in the financial position, results of operations or condition, financial or otherwise, of the District, in either case other than in the ordinary course of its business or as disclosed in the Preliminary Official Statement or the Official Statement or as otherwise disclosed to the Senior Underwriter;

(o) The Bonds, the Escrow Agreement, the Subordinate Resolution and the Undertaking conform to the descriptions thereof contained in the Preliminary Official Statement and the Official Statement;

(p) The District has the legal authority to apply and will apply, or cause to be applied, the proceeds from the sale of the Bonds as provided in and subject to all of the terms and provisions of the Subordinate Resolution and as described in the Preliminary Official Statement and the Official Statement, including for payment of District expenses incurred in connection with the negotiation, marketing, issuance and delivery of the Bonds to the extent required by Section 7 (Expenses), and will not take or omit to take any action which action or omission will adversely affect the exclusion from gross income for federal income tax purposes of the interest on the Bonds;

(q) Any certificate signed by any official of the District, and delivered to the Underwriters, shall be deemed a representation and warranty by the District to the Underwriters as to the statements made therein; and

(r) Except as disclosed in the Preliminary Official Statement and the Official Statement, during the last five years the District has complied in all material respects with all previous undertakings required by Rule 15c2-12.

3. **Conditions to the Obligations of the Underwriters.** The obligations of the Underwriters to accept delivery of and pay for the Bonds on the Closing Date shall be subject to the performance by the District of its obligations to be performed hereunder at or prior to the Closing Date and to the fulfillment of the following conditions:

(a) The representations, warranties and covenants of the District contained herein shall be true, complete and correct on the date hereof and as of the Closing Date as if made on the Closing Date;

(b) At the Closing Date, the Subordinate Resolution shall have been duly adopted and shall be in full force and effect, and shall not have been repealed, amended, modified or supplemented, except as may have been agreed to in writing by the Underwriters, and there shall have been taken in connection therewith, with the issuance of the Bonds and with the transactions contemplated thereby and by this Contract of Purchase, all such actions as, in the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel ("Bond Counsel"), shall be necessary and appropriate;

(c) At the Closing Date, the Official Statement shall not have been amended, modified or supplemented, except as may have been agreed to in writing by the Underwriters;

(d) At or prior to the Closing Date, the Underwriters shall have received copies of the following documents, in each case satisfactory in form and substance to the Underwriters:

(1) The Official Statement executed on behalf of the District by its Chief Executive Officer and General Manager, any Member of its Executive Committee, its Treasurer, its Secretary or its Chief Financial Officer (each an "Authorized Representative");

(2) The Undertaking executed on behalf of the District by an Authorized Representative;

(3) The Thirteenth Supplemental Resolution, with only such supplements or amendments thereto as may have been agreed to by the Underwriters and certified by an authorized officer of the District under its seal as having been duly adopted by the District and as being in full force and effect, and the Subordinate Resolution, certified by an authorized officer of the District as being in full force and effect, with such supplements and amendments thereto adopted after the date hereof as may have been agreed to by the Underwriters;

(4) An opinion or opinions relating to the Bonds, dated the Closing Date and addressed to the District, of Bond Counsel, in substantially the form included in the Official Statement as Appendix F, together with a letter or letters of such Bond Counsel, dated the Closing Date and addressed to the Underwriters, to the effect that the foregoing opinion or opinions addressed to the District may be relied upon by the Underwriters to the same extent as if such opinion or opinions were addressed to them;

(5) An opinion or opinions, dated the Closing Date and addressed to the Senior Underwriter, of Bond Counsel, in substantially the form attached hereto as Exhibit E;

(6) An opinion, dated the Closing Date and addressed to the Senior Underwriter, of General Counsel to the District, in substantially the form attached hereto as Exhibit C;

(7) An opinion, dated the Closing Date and addressed to the Underwriters, of Nixon Peabody LLP, as counsel for the Underwriters ("Underwriters' Counsel"), to the effect that (i) the Bonds are exempt from the registration requirements of the Securities Act of 1933, as amended, and the Subordinate Resolution is exempt from qualification under the Trust Indenture Act of 1939, as amended; (ii) the Continuing Disclosure Agreement complies as to form in all material respects with the requirements of paragraph (b)(5) of the Rule applicable to the primary offering of the Bonds; and (iii) based upon the information made available to them in the course of their participation in the preparation of the Preliminary Official Statement and the Official Statement as counsel to the Underwriters and without having undertaken to determine independently, or assuming any responsibility for, the accuracy, completeness or fairness of the statements contained in the Preliminary Official Statement and the Official Statement, they do not believe that (A) the Preliminary Official Statement, as of its date and as of the date of the Contract of Purchase, and (B) the Official Statement as of its date and as of the Closing Date, contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading (except for the information relating to Cede & Co., DTC or the operation of the book-entry system, the Appendices to the Official Statement, except Appendices C, and E, and summaries thereof and references thereto, and other financial, accounting and statistical data included therein, as to all of which no view need be expressed); and (iii) with respect to such matters as the Underwriters may reasonably require;

(8) A certificate, dated the Closing Date, signed by an Authorized Representative of the District in substantially the form attached hereto as Exhibit D (but in

lieu of or in conjunction with such certificate the Underwriters may, in its sole discretion, accept certificates or opinions of General Counsel to the District, or of other counsel acceptable to the Underwriters, that in the opinion of such counsel the issues raised in any pending or threatened litigation referred to in such certificate are without substance or that the contentions of all plaintiffs therein are without merit);

(9) The Escrow Agreement, executed by the District and the Escrow Agent;

(10) An acceptance of and agreement to the provisions of the Thirteenth Supplemental Resolution executed by the Trustee under the Subordinate Resolution in form and substance acceptable to the Underwriters;

(11) A tax certificate related to the Bonds in substance and form satisfactory to Bond Counsel;

(12) Ratings of the Bonds from S&P Global Ratings ("S&P") of not less than "[AA (stable outlook)]" and from Fitch Ratings, Inc. ("Fitch") of not less than "[AA (stable outlook)]";

(13) A report of [_________], as verification agent (the "Verification Agent") with respect to the sufficiency of amounts deposited pursuant to the Escrow Agreement and an opinion of Bond Counsel respecting the defeasance of the Refunded Bonds;

(14) An opinion of counsel to the Trustee/Escrow Agent, dated the Closing Date, addressed to the Underwriters, to the effect that (i) the Trustee/Escrow Agent is a national banking association duly organized and validly existing under the laws of the United States of America having full power and being qualified to enter into, accept and agree to the provisions of the Subordinate Resolution and to enter into and perform the Undertaking, (ii) the Undertaking and the Escrow Agreement have been duly authorized, executed and delivered by the Trustee/Escrow Agent and, assuming due authorization, execution and delivery by the other parties thereto, constitutes the valid and binding obligation of the Trustee/Escrow Agent enforceable in accordance with its terms, subject to laws relating to bankruptcy, insolvency, moratorium, reorganization or other similar laws affecting creditors' rights generally, to the application of equitable principals and to the exercise of judicial discretion in appropriate cases, and to enter into and perform the Undertaking and the Escrow Agreement, (iii) all approvals, consents and orders of any governmental authority or agency having jurisdiction in this matter that would constitute a condition precedent to the performance by the Trustee/Escrow Agent of its duties and obligations under the Subordinate Resolution, the Escrow Agreement, and the Undertaking have been obtained and are in full force and effect, and (iv) the acceptance of the duties and obligations of the Trustee/Escrow Agent under the Subordinate Resolution, the Escrow Agreement, and the Undertaking and the consummation of the transactions on the part of the Trustee/Escrow Agent contemplated therein, and the compliance by the Trustee/Escrow Agent, as applicable, with the terms, conditions and provisions of such document do not contravene any provisions of applicable law or regulation or any order or decree, writ or injunction or the Articles of Association or Bylaws of the Trustee/Escrow

Agent, and, to the best knowledge of such counsel, will not require the consent under or result in a breach of or a default under, any resolution, agreement or other instrument to which the Trustee/Escrow Agent is a party or by which it may be bound;

(15) A copy of the Blanket Letter of Representations to DTC relating to the Bonds signed by DTC and the District; and

(16) Such additional legal opinions, certificates, instruments and other documents as the Underwriters may reasonably request to evidence the truth and accuracy and completeness, as of the date hereof and as of the Closing Date, of the District's representations and warranties contained herein and of the statements and information contained in the Preliminary Official Statement or the Official Statement, and the due performance or satisfaction by the District at or prior to the Closing Date of all agreements then to be performed and all conditions then to be satisfied by the District in connection with the transactions contemplated hereby and by the Subordinate Resolution and the Preliminary Official Statement or the Official Statement.

If any of the conditions to the obligations of the Underwriters contained in this Section or elsewhere in this Contract of Purchase with respect to the Bonds shall not have been satisfied when and as required herein, all obligations of the Underwriters hereunder with respect to the Bonds may be terminated by the Underwriters at, or at any time prior to, the Closing Date by written notice to the District.

4. **Offering.** The obligations of the District to sell and to deliver the Bonds on the Closing Date to the Underwriters shall be subject to the following conditions:

(a) The entire $[PAR] aggregate principal amount of the Bonds shall be purchased, accepted and paid for by the Underwriters on the Closing Date; and

(b) The District shall receive an Issue Price Certificate of the Senior Underwriter substantially in the form attached hereto as Exhibit F with respect to the Bonds.

5. **Issue Price of the Bonds.**

(a) The Senior Underwriter, on behalf of the Underwriters, agrees to assist the District in establishing the issue price of the Bonds and shall execute and deliver to the District at Closing an "issue price" or similar certificate substantially in the form attached hereto as Exhibit F, together with the supporting pricing wires or equivalent communications, with modifications to such certificate as may be deemed appropriate or necessary, in the reasonable judgment of the Senior Underwriter, the District and Bond Counsel, to accurately reflect, as applicable, the sales price or prices or the initial offering price or prices to the public of the Bonds.

(b) [Except for the maturities set forth in Schedule A attached hereto,] the District will treat the first price at which 10% of each maturity of the Bonds (the "10% test") is sold to the public as the issue price of that maturity (if different interest rates apply within a maturity, each separate CUSIP number within that maturity will be subject to the 10% test).

(c) [The Senior Underwriter confirms that the Underwriters have offered the Bonds to the public on or before the date of this Contract of Purchase at the offering price or prices (the "initial offering price"), or at the corresponding yield or yields, set forth in the final Official Statement. Schedule A sets forth, as of the date of this Contract of Purchase, the maturities, if any, of the Bonds for which the 10% test has not been satisfied and for which the District and the Senior Underwriter, on behalf of the Underwriters, agree that (i) the Senior Underwriter will retain all unsold Bonds of each maturity for which the 10% test has not been satisfied and not allocate any such Bonds to any other Underwriter and (ii) the restrictions set forth in the next sentence shall apply, which will allow the District to treat the initial offering price to the public of each such maturity as of the sale date as the issue price of that maturity (the "hold-the-offering-price rule"). So long as the hold-the-offering-price rule remains applicable to any maturity of the Bonds, the Senior Underwriter will neither offer nor sell unsold Bonds of that maturity to any person at a price that is higher than the initial offering price to the public during the period starting on the sale date and ending on the earlier of the following.

(1) the close of the fifth (5^{th}) business day after the sale date; or

(2) the date on which the Underwriters have sold at least 10% of that maturity of the Bonds to the public at a price that is no higher than the initial offering price to the public.

The Senior Underwriter shall promptly advise the District or the District's municipal advisor when the Underwriters have sold 10% of that maturity of the Bonds to the public at [a price] that is no higher than the initial offering price to the public, if that occurs prior to the close of the fifth (5th) business day after the sale date.

The District acknowledges that, in making the representation set forth in this subsection, the Senior Underwriter will rely on (i) the agreement of each Underwriter to comply with the hold-the-offering-price rule, as set forth in an agreement among underwriters and the related pricing wires, (ii) in the event a selling group has been created in connection with the initial sale of the Bonds to the public, the agreement of each dealer who is a member of the selling group to comply with the hold-the-offering-price rule, as set forth in a selling group agreement and the related pricing wires, and (iii) in the event that an Underwriter is a party to a retail distribution agreement that was employed in connection with the initial sale of the Bonds to the public, the agreement of each broker-dealer that is a party to such agreement to comply with the hold-the-offering-price rule, as set forth in the retail distribution agreement and the related pricing wires. The District further acknowledges that each Underwriter shall be solely liable for its failure to comply with its agreement regarding the hold the offering price rule and that no Underwriter shall be liable for the failure of any other Underwriter, or of any dealer who is a member of a selling group, or of any broker-dealer that is a party to a retail distribution agreement to comply with its agreement regarding the hold-the-offering-price rule as applicable to the Bonds.]

(d) [The Senior Underwriter confirms that:

(1) any agreement among underwriters, any selling group agreement and each retail distribution agreement (to which the Senior Underwriter is a party) relating to the initial sale of the Bonds to the public, together with the related pricing

wires, contains or will contain language obligating each Underwriter, each dealer who is a member of the selling group, and each broker-dealer that is a party to such retail distribution agreement, as applicable, to (A)(ii) report the prices at which it sells to the public the unsold Bonds of each maturity allotted to it until it is notified by the Senior Underwriter that either the 10% test has been satisfied as to the Bonds of that maturity or all Bonds of that maturity have been sold to the public and (ii) comply with the hold-the-offering-price rule, if applicable, in each case if and for so long as directed by the Senior Underwriter and as set forth in the related pricing wires, (B) promptly notify the Representative of any sales of the Bonds that, to its knowledge, are made to a purchaser who is a related party to an underwriter participating in the initial sale of the Bonds to the public (each such term being used as defined below) and (C) acknowledge that, unless otherwise advised by the Underwriter, dealer or broker-dealer, the Representative shall assume that each order submitted by the Underwriter, dealer or broker-dealer is a sale to the public; and

(2) any agreement among underwriters relating to the initial sale of the Bonds to the public, together with the related pricing wires, contains or will contain language obligating each Underwriter that is a party to a retail distribution agreement to be employed in connection with the initial sale of the Bonds to the public to require each broker-dealer that is a party to such retail distribution agreement to (A) report the prices at which it sells to the public the unsold Bonds of each maturity allotted to it until it is notified by the Senior Underwriter or the Underwriter that either the 10% test has been satisfied as to the Bonds of that maturity or all Bonds of that maturity have been sold to the public and (B) comply with the hold-the-offering-price rule, if applicable, in each case if and for so long as directed by the Senior Underwriter or the Underwriter and as set forth in the related pricing wires.]

(e) The Underwriters acknowledge that sales of any Bonds to any person that is a related party to an Underwriter shall not constitute sales to the public for purposes of this section. Further, for purposes of this section:

(1) "public" means any person other than an underwriter or a related party,

(2) "underwriter" means (A) any person that agrees pursuant to a written contract with the District (or with the lead underwriter to form an underwriting syndicate) to participate in the initial sale of the Bonds to the public and (B) any person that agrees pursuant to a written contract directly or indirectly with a person described in clause (A) to participate in the initial sale of the Bonds to the public (including a member of a selling group or a party to a retail distribution agreement participating in the initial sale of the Bonds to the public),

(3) a purchaser of any of the Bonds is a "related party" to an underwriter if the underwriter and the purchaser are subject, directly or indirectly, to (i) more than 50% common ownership of the voting power or the total value of their stock, if both entities are corporations (including direct ownership by one corporation of

another), (ii) more than 50% common ownership of their capital interests or profits interests, if both entities are partnerships (including direct ownership by one partnership of another), or (iii) more than 50% common ownership of the value of the outstanding stock of the corporation or the capital interests or profit interests of the partnership, as applicable, if one entity is a corporation and the other entity is a partnership (including direct ownership of the applicable stock or interests by one entity of the other), and

(4) "sale date" means the date of execution of this Contract of Purchase by all parties.

6. **Termination.** The Underwriters shall have the right to terminate their obligations under this Contract of Purchase to purchase, accept delivery of and to pay for the Bonds, if,

(a) between the date hereof and the Closing Date, the market price or marketability, or the ability of the Underwriters to enforce contracts for the sale, at the initial offering prices set forth in the Official Statement, of the Bonds have been materially adversely affected, in the judgment of the Underwriters, (evidenced by a written notice to the District terminating the obligation of the Underwriters to accept delivery of and pay for the Bonds), by reason of any of the following:

(1) (x) any legislation which is (A) enacted by Congress, (B) favorably reported for passage to either House of the Congress of the United States by any Committee of such House to which such legislation has been referred for consideration, or (C) recommended to the Congress for passage by the President of the United States or the Treasury Department, but only, however, if the occurrence of any of the foregoing events is generally accepted by the municipal bond market as potentially affecting the federal tax status of the District, its property or income or the interest on its bonds or notes (including the Bonds), (y) any decision rendered by a court established under Article III of the Constitution of the United States or the Tax Court of the United States, or (z) a final order, ruling, regulation or official statement issued or made by or on behalf of the Treasury Department of the United States or the Internal Revenue Service with the purpose or effect, directly or indirectly, of imposing federal income taxation upon such interest as would be received by the holders of the Bonds, or upon such revenues or other income of the general character expected to be received by the District; provided, however, that the enactment of legislation which only diminishes the value of, as opposed to eliminating the exclusion from gross income for federal income tax purposes will not give the Underwriters the right to terminate their obligations hereunder;

(2) Legislation enacted (or resolution passed) by the Congress or a final order, ruling, regulation or official statement is issued or made by or on behalf of the Securities and Exchange Commission, or any other governmental agency having jurisdiction of the subject matter, to the effect that obligations of the general character of the Bonds are not exempt from registration under or other requirements of the Securities Act of 1933, as amended, or are not exempt from qualification

under, or other requirements of, the Trust Indenture Act of 1939, as amended, or that the issuance, offering or sale of the Bonds or obligations of the general character of the Bonds, including any or all underlying arrangements, as contemplated hereby or by the Preliminary Official Statement or the Official Statement, otherwise is or would be in violation of the federal securities laws as amended and then in effect;

(3) the outbreak or escalation of hostilities or the declaration by the United States of a national emergency or war or the occurrence of any other local, national or international calamity, crisis or event relating to the effective operation of the government of or the financial community in the United States or an escalation thereof, including, without limitation, a downgrade of the sovereign debt rating of the United States by any major credit rating agency or payment default on United States Treasury obligations;

(4) the declaration of a general banking moratorium by federal, New York or California authorities, or the general suspension of trading on the New York Stock Exchange or any other national securities exchange, or any material disruption in commercial banking or securities settlement or clearing services;

(5) the imposition by the New York Stock Exchange or other national securities exchange, or any governmental authority, of any material restrictions not now in force with respect to the Bonds or obligations of the general character of the Bonds or securities generally, or the material increase of any such restrictions now in force, including those relating to the net capital requirements of, the Underwriters;

(6) the adoption of any amendment to the federal or California Constitution, decision by any federal or California court, or enactment by any federal or California legislative body materially adversely affecting (i) the District or the right of the District to receive or to pledge any of the Net Subordinated Revenues, or (ii) the validity or enforceability of this Contract of Purchase, the Bonds or the Subordinate Resolution;

(7) the adoption of any amendment to the California Constitution, decision by any California court, or enactment by any California legislative body adversely affecting the exemption of state or local income tax upon such interest as would be received by the holders of the Bonds, or

(8) (i) a downgrading or suspension of any rating (without regard to credit enhancement) by Moody’s, S&P, or Fitch of any debt securities issued by the District, or (ii) there shall have been any official statement as to a possible downgrading (such as being placed on “credit watch” or “negative outlook” or any similar qualification) of any rating by Moody’s, S&P or Fitch of any debt securities issued by the District, including the Bonds.

(b) an event occurs, or information becomes known, which, in the judgment of the Underwriters, makes untrue in any material respect any statement or information contained in the Official Statement, or has the effect that the Official Statement contains any untrue statement of material fact or omits to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

7. **Expenses.** (a) Except as set forth in paragraph (b) of this Section, the Underwriters shall be under no obligation to pay, and the District shall pay, or cause to be paid, all expenses incident to the performance of the District's obligations hereunder including, but not limited to, the cost of word processing and reproducing, executing and delivering the Bonds to the Underwriters; the cost of preparation, printing (and/or word processing and reproducing), distribution and delivery of the Subordinate Resolution; the cost of printing and distributing copies of the Preliminary Official Statement and the Official Statement in sufficient quantities for distribution in connection with the sale of the Bonds (including resales in the secondary market); the fees and disbursements of Bond Counsel; the fees and disbursements of Public Financial Management, Inc. for its services as Municipal Advisor to the District; the fees and disbursements of any other engineers, accountants, and any other experts or consultants retained in connection with the issuance of the Bonds; the fees and disbursements of the Trustee/Escrow Agent and Verification Agent; fees charged by the rating agencies for rating the Bonds; any advertising expenses; filing fees; CUSIP charges; or fees and expenses of any credit enhancement; expenses incurred by the Underwriters on behalf of the District relating to food, transportation or lodging for District staff members attending the bond pricing are to be reimbursed by the District through proceeds of the Bonds or available funds of the District (the District's obligations in regard to these expenses survive if delivery of the Bonds fails due to one of the conditions set forth in Section 3 hereof or this Contract of Purchase is terminated pursuant to Section 6 hereof) and any other expenses not specifically enumerated in paragraph (b) of this Section incurred in connection with the issuance of the Bonds.

(b) The District shall be under no obligation to pay, and the Underwriters shall pay (from the expense component of the underwriting discount), the cost of preparation of the Agreement Among Underwriters and the letter of instructions relating thereto and this Contract of Purchase; the cost of wiring funds for the payment of the purchase prices of the Bonds; the fees and expenses of DTC incurred with respect to depositing the Bonds therewith; expenses to qualify the Bonds for sale under any "Blue Sky" laws; fees to the California Debt and Investment Advisory Commission; and all other expenses incurred by the Underwriters in connection with its public offering and distribution of the Bonds not specifically enumerated in paragraph (a) of this Section, including the fees and disbursements of Underwriters' Counsel. Notwithstanding that the fees to the California Debt and Investment Advisory Commission are solely the legal obligation of the Underwriters, the District agrees to reimburse the Underwriters for such fees.

8. **Notices.** Any notice or other communication to be given to the District under this Contract of Purchase may be given by delivering the same in writing to Sacramento Municipal Utility District, at 6201 S Street, Sacramento, California 95817-1899; and any notice or other communication to be given to the Underwriters under this Contract of Purchase may be given by delivering the same in writing to Morgan Stanley & Co. LLC, 555 California Street, 21st Floor, San Francisco, CA 94104 [Attention: John Sheldon, Managing Director].

9. **Parties in Interest.** This Contract of Purchase is made solely for the benefit of the District and the Underwriters (including successors or assigns of any Underwriter) and no other person shall acquire or have any right hereunder or by virtue hereof. The term "successors and assigns" as used in this Section shall not include any purchaser of the Bonds, as such purchaser, from any of the several Underwriters.

10. **Survival of Representations and Warranties.** The representations and warranties of the District, set forth in or made pursuant to this Contract of Purchase, shall not be deemed to have been discharged, satisfied or otherwise rendered void by reason of the closing or termination of this Contract of Purchase and regardless of any investigations or statements as to the results thereof made by or on behalf of the Underwriters and regardless of delivery of and payment for the Bonds.

11. **Counterparts.** This Contract of Purchase may be executed in several counterparts, which together shall constitute one and the same instrument.

12. **California Law Governs; Venue.** The validity, interpretation and performance of this Contract of Purchase shall be governed by the laws of the State of California. Any action or proceeding to enforce or interpret this Contract of Purchase shall be brought, commenced or prosecuted in the County of Sacramento, California.

[remainder of page intentionally left blank]

13. **Entire Agreement.** This Contract of Purchase when accepted by you in writing as heretofore specified shall constitute the entire agreement between us.

14. **Effectiveness.** This Contract of Purchase shall become effective and binding upon the respective parties hereto upon the execution of the acceptance hereof by an authorized officer of the District and shall be valid and enforceable as of the time of such acceptance.

Very truly yours,

MORGAN STANLEY & CO. LLC
BOFA SECURITIES, INC.,
BARCLAYS CAPITAL INC.
CITIGROUP GLOBAL MARKETS INC.
GOLDMAN SACHS & CO. LLC, and
J.P. MORGAN SECURITIES LLC

BY: MORGAN STANLEY & CO. LLC, as Senior Underwriter

____
[John Sheldon
Managing Director]

Accepted: [SALE DATE]

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By:______________________________
Russell Mills
Treasurer

[Signature page to Contract of Purchase]

Exhibit A

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Subordinated Electric Revenue Refunding Bonds, 2022 Series C

Maturity (August 15)	Principal Amount	Interest Rate	Yield	Price

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit B to the Contract of Purchase
(Official Statement)

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit C to the Contract of Purchase
(Opinion of General Counsel to the
Sacramento Municipal Utility District)

[CLOSING DATE]

Morgan Stanley & Co. LLC
555 California St., Fl. 21,
San Francisco, CA 94104

Re: Sacramento Municipal Utility District
$[PAR] Subordinated Electric Revenue Refunding Bonds, 2022 Series C

Ladies and Gentlemen:

This opinion is being delivered pursuant to Paragraph 3(d)(6) of the Contract of Purchase (the "Contract of Purchase"), dated [SALE DATE], between Morgan Stanley & Co. LLC, as Senior Managing Underwriter named therein (the "Senior Underwriter"), and the Sacramento Municipal Utility District (the "District") relating to the above-captioned bonds (the "Bonds").

As counsel to the District, I have reviewed (i) Resolution No. 85-11-1, adopted by the Board of Directors of the District on November 7, 1985, as amended and restated pursuant to Resolution No. 01-06-10, adopted by the Board of Directors of the District on June 21, 2001, as amended and supplemented to date, including as amended and supplemented by Resolution No. [RESO NO.], adopted on [RESO DATE] (as so amended and supplemented, the "Subordinate Resolution"); (ii) the Continuing Disclosure Agreement, dated the date hereof (the "Undertaking"), between the District and U.S. Bank Trust Company, National Association, as trustee (in such capacity, the "Trustee"); (iii) the Official Statement of the District, dated [SALE DATE] (the "Official Statement") (iv) the escrow agreement, dated the date hereof (the "Escrow Agreement"), between the District and U.S. Bank Trust Company, National Association, as escrow agent (in such capacity, the "Escrow Agent"), and (v) such other documents, opinions and matters to the extent I deemed necessary to provide the opinions set forth herein.

The opinions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. I have assumed the genuineness of all documents and signatures presented to me (whether as originals or as copies) and the due and legal execution and delivery by, and validity against, any parties other than the District. I have not undertaken to verify independently, and have assumed, the accuracy of the factual matters represented, warranted or certified in the documents referred to in the second paragraph hereof. I have further assumed compliance with all covenants and agreements contained in such documents.

I call attention to the fact that the rights and obligations under the Subordinate Resolution, the Escrow Agreement, the Undertaking, and the Contract of Purchase may be subject to bankruptcy, insolvency, reorganization, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, and to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. I express no opinion with respect to any indemnification, contribution, choice of law, choice of forum or waiver provisions contained therein.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, I am of the opinion that:

1. The District is a political subdivision of the State of California duly organized and validly existing under the Act, as amended, and has full legal right, power and authority to execute and deliver (or adopt, as the case may be), and to perform its obligations under, the Subordinate Resolution, the Escrow Agreement, the Undertaking and the Contract of Purchase.

2. The Contract of Purchase, the Escrow Agreement, and the Undertaking have been duly authorized, executed and delivered by the District, and, assuming due authorization, execution and delivery by each of the parties thereto other than the District, constitute the legal, valid and binding obligations of the District, enforceable against the District in accordance with their respective terms.

3. The District is not in breach of or default under any existing constitutional provision, applicable law or administrative regulation of the State of California or the United States or any applicable judgment or decree or any loan agreement, indenture, bond, note, resolution, agreement or other instrument known to me after reasonable inquiry to which the District is a party or to which the District or any of its property or assets is otherwise subject which would have a material adverse effect on the financial condition or operations of the District, and no event has occurred and is continuing which with the passage of time or the giving of notice, or both, would constitute a default or event of default under any such instrument which would have a material adverse effect on the financial condition or operations of the District; and the execution and delivery of the Bonds, the Escrow Agreement, the Undertaking and the Contract of Purchase and the adoption of the Subordinate Resolution, and compliance with any existing constitutional provision, law, administrative regulation, judgment, decree, loan agreement, indenture, bond, note, resolution, agreement or other instrument known to me after reasonable inquiry to which the District is a party or to which the District or any of its property or assets is otherwise subject will not, as of the date hereof, conflict with or constitute a breach of or default under any such instrument which would have a material adverse effect on the financial condition or operations of the District, nor will any such execution, delivery, adoption or compliance result in the creation or imposition of any lien, charge or other security interest or encumbrance of any nature whatsoever upon any of the property or assets of the District or under the terms of any such law, regulation or instrument, except as expressly provided by the Bonds and the Subordinate Resolution.

4. The statements contained in the Official Statement which purport to describe certain provisions of the Bonds, the Escrow Agreement, the Undertaking, and the Subordinate

Resolution present a fair and accurate summary of such provisions for the purpose of use in the Official Statement.

5. Except as described or referred to in the Preliminary Official Statement and the Official Statement, as of the date hereof, there is no action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, public board or body, pending or, to the best of my knowledge, threatened against the District affecting the corporate existence of the District or the titles of its officers to their respective offices, or affecting or seeking to prohibit, restrain or enjoin the sale, issuance or delivery of the Bonds or the collection of the Revenues (as defined in the Subordinate Resolution) or the Net Subordinated Revenues (as defined in the Subordinate Resolution) pledged or to be pledged to pay the principal of and interest on the Bonds or contesting or affecting as to the District the validity or enforceability of the Act, the Bonds, the Subordinate Resolution, the Escrow Agreement, the Contract of Purchase or the Undertaking, or contesting the tax exempt status of interest on the Bonds, or which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution facilities, or contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or any supplement or amendment thereto, or contesting the powers of the District or any authority for the issuance of the Bonds, the adoption of the Subordinate Resolution, or the execution and delivery by the District of the Contract of Purchase, the Escrow Agreement, or the Undertaking, nor, to the best of my knowledge, is there any basis for any such action, suit, proceeding, inquiry or investigation wherein an unfavorable decision, ruling or finding would materially adversely affect the validity or enforceability of the Act or the authorization, execution, delivery or performance by the District of the Bonds, the Subordinate Resolution, the Escrow Agreement, the Undertaking, or the Contract of Purchase.

6. Based upon my review of the Preliminary Official Statement and the Official Statement as General Counsel to the District and without having undertaken to determine independently the accuracy, completeness or fairness of the statements contained in the Preliminary Official Statement and the Official Statement (except as specifically set forth in paragraph 4 hereof), I have no reason to believe that the statements contained in the Preliminary Official Statement (except for information relating Cede & Co., DTC or the operation of the book-entry system, the Appendices (except Appendix A) to the Preliminary Official Statement, and other financial and statistical data included therein, as to all of which I express no view) as of its date and as of the date of the Contract of Purchase contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading and the Official Statement (except for information relating Cede & Co., DTC or the operation of the book-entry system, the Appendices (except Appendix A) to the Official Statement, and other financial and statistical data included therein, as to all of which I express no view) (A) as of the date of the Official Statement contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading or (B) as of the date hereof contains any untrue statement of a material fact or omits to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading.

For purposes of the opinions expressed herein, I have assumed that an agreement or other document is “material” to the District if it involves amounts in excess of $10,000,000 and that a matter would result in a “material adverse change” to the District if the financial consequences involved would exceed $10,000,000.

I understand that you are relying upon the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel, with respect to the validity of the Bonds and the exclusion of interest on the Bonds from gross income for federal income tax purposes and the Bonds for purposes of State of California income taxation and, accordingly, render no opinion with respect thereto.

Very truly yours,

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Exhibit D to the Contract of Purchase

CERTIFICATE

The Sacramento Municipal Utility District (the "District"), hereby certifies that:

(1) The representations and warranties of the District (excluding those representations and warranties contained in Section 2(e) and Section 2(k) of the hereinafter defined Contract of Purchase) contained in the Contract of Purchase, dated [SALE DATE], between the District and the Underwriters named therein (the "Contract of Purchase") with respect to the sale by the District of $[PAR] aggregate principal amount of its Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "Bonds"), are true and correct on and as of the Closing Date as if made on the Closing Date.

(2) All approvals, consents, authorizations, licenses and permits, elections and orders of or filings or registrations with any governmental authority, legislative body, board, agency or commission having jurisdiction which would constitute a condition precedent to, or the absence of which would materially adversely affect, the due performance by the District of its obligations in connection with the issuance of the Bonds under the Subordinate Resolution, the Escrow Agreement, the Undertaking, and the Contract of Purchase have been duly obtained or made and are in full force and effect, except for such approvals, consents and orders as may be required under the "Blue Sky" or other securities laws of any state in connection with the offering and sale of the Bonds; and, except as disclosed in the Preliminary Official Statement and the Official Statement, all authorizations, approvals, licenses, permits, consents and orders of any governmental authority, board, agency or commission having jurisdiction in the matters which are required for the due authorization of, which would constitute a condition precedent to, or the absence of which would materially adversely affect the due performance by the District of its respective obligations under, the Contract of Purchase, the Escrow Agreement, the Undertaking, the Bonds or the Subordinate Resolution, or which are necessary to permit the District to carry out the transactions contemplated by the Preliminary Official Statement and the Official Statement to acquire, construct, operate, maintain, improve and finance the Electric System have been duly obtained or, where required for future performance, are expected to be obtained.

(3) Except as disclosed in the Preliminary Official Statement and the Official Statement, no litigation, action, suit, proceeding, inquiry or investigation, at law or in equity, before or by any court, government agency, regulatory agency, public board or body, is pending or, to the best of knowledge of the officer of the District executing this Contract of Purchase after due investigation, threatened against the District, in any way affecting the corporate existence of the District or the titles of its officers to their respective offices, or affecting or seeking to prohibit, restrain or enjoin the sale, issuance or delivery of any of the Bonds or the collection of the Revenues (as defined in the Subordinate Resolution) or the Net Subordinated Revenues (as defined in the Subordinate Resolution) pledged or to be pledged to pay the principal of and interest on the Bonds, or in any way contesting or affecting as to the District the validity or enforceability of the

Act, the Bonds, the Subordinate Resolution, the Contract of Purchase, the Escrow Agreement, the Undertaking, or any action of the District contemplated by any of said documents, or contesting the tax exempt status of interest on the Bonds, or which may result in any material adverse change relating to the District, other than routine litigation of the type which normally accompanies its operation of its generation, transmission and distribution system, or contesting the completeness or accuracy of the Preliminary Official Statement or the Official Statement or any supplement or amendment thereto, or contesting the powers of the District or any authority for the issuance of the Bonds, the adoption of the Subordinate Resolution, or the execution and delivery by the District of the Contract of Purchase, or the Undertaking, nor, to the best of my knowledge, is there any basis for any such action, suit, proceeding, inquiry or investigation wherein an unfavorable decision, ruling or finding would materially adversely affect the validity or enforceability of the Act of the authorization, execution, delivery or performance by the District of the Bonds, the Subordinate Resolution, the Escrow Agreement, the Undertaking, or the Contract of Purchase, or any action of the District contemplated by any of said documents, or which would adversely affect the exclusion from gross income for federal income tax purposes of interest paid on the Bonds, nor to the knowledge of the officer of the District executing this Contract of Purchase is there any basis therefor.

(4) No event affecting the District has occurred since the date of the Official Statement which should be disclosed in the Official Statement so that the Official Statement will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, and which has not been disclosed in a supplement or amendment to the Official Statement.

(5) The District has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to the date hereof pursuant to the Contract of Purchase with respect to the issuance of the Bonds.

(6) All capitalized terms employed herein which are not otherwise defined shall have the same meanings as in the Contract of Purchase.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By: ___________________________________
Name:
Title:

Dated: [CLOSING DATE]

Exhibit E to the Contract of Purchase
(Supplemental Opinion of Bond Counsel)

[CLOSING DATE]

Morgan Stanley & Co. LLC
555 California St., Fl. 21,
San Francisco, CA 94104

Sacramento Municipal Utility District
Subordinated Electric Revenue Refunding Bonds, 2022 Series C
(Supplemental Opinion)

Ladies and Gentlemen:

This letter is addressed to you, as Senior Underwriter, pursuant to Section 3(d)(5) of the Contract of Purchase, dated [SALE DATE] (the "Purchase Contract"), between you and the other underwriters named therein and the Sacramento Municipal Utility District ("SMUD"), providing for the purchase of $[PAR] principal amount of Sacramento Municipal Utility District Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "Bonds"). The Bonds are being issued pursuant to Resolution No. 85-11-1, adopted by the Board of Directors of the District on November 7, 1985, as amended and restated pursuant to Resolution No. 01-06-10, adopted by the Board of Directors of the District on June 21, 2001, as amended and supplemented to date, including as amended and supplemented by Resolution No. [RESO NO.], adopted on [RESO DATE] (as so supplemented and amended, the "Subordinate Resolution". Capitalized terms not otherwise defined herein shall have the meanings ascribed thereto in the Subordinate Resolution or, if not defined in the Subordinate Resolution, in the Purchase Contract.

In connection with our role as Bond Counsel to SMUD, we have reviewed the Purchase Contract; the Subordinate Resolution; the Tax Certificate, dated the date hereof (the "Tax Certificate"), executed by SMUD; certain portions of the posted preliminary official statement of SMUD, dated [POS DATE], with respect to the Bonds (the "Preliminary Official Statement") and of the posted official statement of SMUD, dated [SALE DATE], with respect to the Bonds (the "Official Statement"); opinions of counsel to SMUD and the Trustee; certificates of SMUD, the Trustee and others; and such other documents, opinions and matters to the extent we deemed necessary to provide the opinions or conclusions set forth herein.

The opinions and conclusions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. Such opinions or conclusions may be affected by actions taken or omitted or events occurring after the original delivery of the Bonds on the date hereof. We have not undertaken to determine, or to inform any person, whether any such actions are taken or omitted or events do occur or any other matters come to our attention after the original delivery of the Bonds on the date hereof. We have assumed the genuineness of all documents and signatures provided to us and the due and legal execution and delivery thereof by, and validity against, any parties other than SMUD. We have assumed, without undertaking to verify, the accuracy of the factual matters represented, warranted or certified in the documents, and of the legal conclusions contained in the opinions, referred to in the second paragraph hereof. We have further assumed compliance with all covenants and agreements contained in such documents. In addition, we call attention to the fact that the rights and obligations under the Bonds, the Subordinate Resolution, the Tax Certificate and the Purchase Contract and their enforceability may be subject to bankruptcy, insolvency, reorganization, receivership, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. We express no opinion with respect to any indemnification, contribution, liquidated damages, penalty (including any remedy deemed to constitute or having the effect of a penalty), right of set-off, arbitration, judicial reference, choice of law, choice of forum, choice of venue, non-exclusivity of remedies, waiver or severability provisions contained in the foregoing documents, nor do we express any opinions with respect to the state or quality of title to or interest in any of the assets described in or as subject to the lien of the Subordinate Resolution or the accuracy or sufficiency of the description contained therein of, or the remedies available to enforce liens on, any such assets.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, we are of the following opinions or conclusions:

1. The Bonds are not subject to the registration requirements of the Securities Act of 1933, as amended, and the Subordinate Resolution is exempt from qualification pursuant to the Trust Indenture Act of 1939, as amended.

2. The Purchase Contract has been duly executed and delivered by, and is a valid and binding agreement of, SMUD.

3. The statements contained in the Official Statement under the captions "THE 2022 SUBORDINATED BONDS" (excluding information relating to book-entry or The Depository Trust Company), "SECURITY FOR THE SUBORDINATED BONDS" and "TAX MATTERS" and in APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE SUBORDINATE RESOLUTION" and APPENDIX E – ""SUMMARY OF CERTAIN PROVISIONS OF THE SENIOR BOND RESOLUTION" and APPENDIX F – "PROPOSED FORM OF LEGAL OPINION FOR 2022 SUBORDINATED BONDS," excluding any material that may be treated as included under such captions by cross-reference or reference to other documents or sources, insofar as such statements expressly summarize certain provisions of the Subordinate Resolution or set out the form and content of our final legal opinion as Bond Counsel to SMUD concerning the validity of the Bonds and certain other matters, dated the date hereof and addressed to SMUD, are accurate in all material respects.

4. We are not passing upon and do not assume any responsibility for the accuracy, completeness or fairness of any of the statements contained in the Preliminary Official Statement or (except as explicitly stated in paragraph 3 above) in the Official Statement and make no representation that we have independently verified the accuracy, completeness or fairness of any such statements. In our capacity as Bond Counsel to SMUD in connection with issuance of

the Bonds, we participated in conferences with your representatives, your counsel, representatives of SMUD, its counsel, accountants, and others, during which the contents of the Preliminary Official Statement or the Official Statement and related matters were discussed. Based on our participation in the above-mentioned conferences (which, with respect to the Preliminary Official Statement, did not extend beyond the date of the Purchase Contract, and with respect to the Official Statement, did not extend beyond its date), and in reliance thereon, on oral and written statements and representations of SMUD and others and on the records, documents, certificates, opinions and matters herein mentioned, subject to the limitations on our role as Bond Counsel to SMUD, we advise you as a matter of fact and not opinion that (a) no facts had come to the attention of the attorneys in our firm rendering legal services with respect to the Preliminary Official Statement which caused us to believe as of the date of the Purchase Contract, based on the documents, drafts and facts in existence and reviewed as of that date, that the Preliminary Official Statement contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading (except any information marked as preliminary or subject to change, any information permitted to be omitted by Securities and Exchange Commission Rule 15c2-12 or otherwise left blank and any other differences with the information in the Official Statement), and (b) no facts had come to the attention of the attorneys in our firm rendering legal services with respect to the Official Statement which caused us to believe as of the date of the Official Statement and as of the date hereof that the Official Statement contained or contains any untrue statement of a material fact or omitted or omits to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that, we expressly exclude from the scope of this paragraph and express no view or opinion, with respect to both the Preliminary Official Statement and the Official Statement, about any CUSIP numbers, financial, accounting, statistical or economic, engineering or demographic data or forecasts, numbers, charts, tables, graphs, estimates, projections, assumptions or expressions of opinion, any statements about compliance with prior continuing disclosure undertakings, any management discussion and analysis, any information about Cede & Co., The Depository Trust Company or book-entry, ratings, rating agencies, financial advisors, swap advisors, underwriters, underwriting and the information contained in Appendices B and C included or referred to therein or omitted therefrom. No responsibility is undertaken or view expressed with respect to any other disclosure document, materials or activity, or as to any information from another document or source referred to by or incorporated by reference in the Preliminary Official Statement or the Official Statement.

This letter is furnished by us as Bond Counsel to SMUD. No attorney-client relationship has existed or exists between our firm and you in connection with the Bonds or by virtue of this letter. We disclaim any obligation to update this letter. This letter is delivered to you as Senior Underwriter of the Bonds, is solely for your benefit as such Senior Underwriter in connection with the original issuance of the Bonds on the date hereof, and is not to be used, circulated, quoted or otherwise referred to or relied upon for any other purpose or by any other person. This letter is not intended to, and may not, be relied upon by owners of Bonds or by any other party to whom it is not specifically addressed.

Very truly yours,

Exhibit F to the Contract of Purchase

(Form of Issue Price Certificate Of The Senior Underwriter Regarding Offering Prices)

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PAR] Subordinated Electric Revenue Refunding Bonds, 2022 Series C

The undersigned, on behalf of Morgan Stanley & Co. LLC, as representative (the "Representative") of itself, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC (together, the "Underwriting Group"), hereby certifies, on its own behalf and on behalf of the other members of the Underwriting Group on the basis of representations and warranties set forth in the agreement among underwriters, as set forth below with respect to the sale and issuance of the above-captioned obligations (the "Bonds).

1. ***Sale of the [General Rule Maturities][Bonds]***. As of the date of this Certificate, for each Maturity of the [General Rule Maturities][Bonds], the first price at which at least 10% of such Maturity was sold to the Public is the respective price listed in Schedule A.

2. [***Initial Offering Price of the Hold-the-Offering-Price-Maturities***.

(a) The Underwriting Group offered the Hold-the-Offering-Price Maturities to the Public for purchase at the respective initial offering prices listed in Schedule A (the "Initial Offering Prices") on or before the Sale Date. A copy of the pricing wire or equivalent communication for the Bonds is attached to this Certificate as Schedule B.

(b) As set forth in the Bond Purchase Agreement for the Bonds, the Representative has agreed in writing that, (i) for each Maturity of the Hold-the-Offering-Price Maturities, it would neither offer nor sell any of the unsold Bonds of such Maturity to any person at a price that is higher than the Initial Offering Price for such Maturity during the Holding Period for such Maturity (the "hold-the-offering-price rule"), and (ii) unsold Bonds of the Hold-the-Offering-Price Maturities shall be retained by the Representative and not allocated to any of the other Underwriters. Pursuant to such agreement, the Representative has not offered or sold any unsold Bonds of any Maturity of the Hold-the-Offering-Price Maturities at a price that is higher than the respective Initial Offering Price for that Maturity of the Bonds during the Holding Period.]

3. ***Defined Terms***.

(a) [*General Rule Maturities* means those Maturities of the Bonds listed in Schedule A hereto as the "General Rule Maturities."]

(b) [*Hold-the-Offering-Price Maturities* means those Maturities of the Bonds listed in Schedule A hereto as the "Hold-the-Offering-Price Maturities."]

(c) [*Holding Period* means, with respect to a Hold-the-Offering-Price Maturity, the period starting on the Sale Date and ending on the earlier of (i) the close of the fifth business day after the Sale Date, or (ii) the date on which the Underwriters have sold at least 10% of such Hold-the-Offering-Price Maturity to the Public at prices that are no higher than the Initial Offering Price for such Hold-the-Offering-Price Maturity.]

(d) *Issuer* means Sacramento Municipal Utility District.

(e) *Maturity* means Bonds with the same credit and payment terms. Bonds with different maturity dates, or Bonds with the same maturity date but different stated interest rates, are treated as separate maturities.

(f) *Public* means any person (including an individual, trust, estate, partnership, association, company, or corporation) other than an Underwriter or a Related Party (as such terms are defined below) to an Underwriter.

(g) A purchaser of any of the Bonds is a *Related Party* to any Underwriter if the Underwriter and the purchaser are subject, directly or indirectly, to (i) at least 50% common ownership of the voting power or the total value of their stock, if both entities are corporations (including direct ownership by one corporation of another), (ii) more than 50% common ownership of their capital interests or profits interests, if both entities are partnerships (including direct ownership by one partnership of another), or (iii) more than 50% common ownership of the value of the outstanding stock of the corporation or the capital interests or profit interests of the partnership, as applicable, if one entity is a corporation and the other entity is a partnership (including direct ownership of the applicable stock or interests by one entity of the other).

(h) *Sale Date* means the first day on which there is a binding contract in writing for the sale of a Maturity of the Bonds. The Sale Date of the Bonds is [SALE DATE].

(i) *Underwriter* means (i) any person that agrees pursuant to a written contract with the Issuer (or with the lead underwriter to form an underwriting syndicate) to participate in the initial sale of the Bonds to the Public, and (ii) any person that agrees pursuant to a written contract directly or indirectly with a person described in clause (i) of this paragraph to participate in the initial sale of the Bonds to the Public (including a member of a selling group or a party to a retail distribution agreement participating in the initial sale of the Bonds to the Public).

The representations set forth in this certificate are limited to factual matters only, and as it relates to the actions of the other Underwriters, such representations are made to the best of the Representative's knowledge based on the Representative's records. Nothing in this certificate represents the Representative's interpretation of any laws, including specifically Sections 103 and 148 of the Internal Revenue Code of 1986, as amended, and the Treasury Regulations thereunder. The undersigned understands that the foregoing information will be relied upon by the Issuer with respect to certain of the representations set forth in the Tax Certificate and with respect to compliance with the federal income tax rules affecting the Bonds, and by Orrick, Herrington & Sutcliffe LLP, Bond Counsel to the Issuer, in connection with rendering its opinion that the interest on the Bonds is excluded from gross income for federal income tax purposes, the preparation of the Internal Revenue Service Form 8038-G, and other federal income tax advice that it may give to the Issuer from time to time relating to the Bonds.

Dated: [CLOSING DATE

Morgan Stanley & Co. LLC,
as representative of the Underwriting Group

By:______________________________________
Name:_____________________________________

Schedule A

Sale Prices

$[PAR] Subordinated Electric Revenue Refunding Bonds, 2022 Series C

Maturity (August 15)	Principal Amount	Interest Rate	Yield	Price	Hold-the-Price Maturities	General Rule Maturities

Attachment H
to Resolution No. 22-05-11

PRELIMINARY OFFICIAL STATEMENT DATED ________, 2022

NEW ISSUE- FULL BOOK-ENTRY **Ratings: See "RATINGS" herein**

In the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD, based upon an analysis of existing laws, regulations, rulings and court decisions and, assuming, among other matters, the accuracy of certain representations and compliance with certain covenants, interest on the 2022 Subordinated Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 and is exempt from State of California personal income taxes. In the further opinion of Bond Counsel, interest on the 2022 Subordinated Bonds is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel expresses no opinion regarding any other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Subordinated Bonds. See "TAX MATTERS."

$[PRINCIPAL AMOUNT]*
Subordinated Electric Revenue Refunding Bonds
2022 Series C

Dated: Date of Delivery **Due: See "SUMMARY OF THE OFFERING" herein**

The Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022 Subordinated Bonds") will be issued pursuant to Resolution No. 85-11-1 of the Sacramento Municipal Utility District ("SMUD"), adopted November 7, 1985, as amended and restated pursuant to Resolution No. 01-06-10, adopted June 21, 2001, as supplemented and amended, and will be payable from the Net Subordinated Revenues of the Electric System of SMUD, as described herein. The 2022 Subordinated Bonds are being issued to (i) refund certain of SMUD's outstanding Senior Bonds (as defined herein) [and (ii) pay certain costs associated with the issuance of the 2022 Subordinated Bonds]. See "PLAN OF FINANCE."

The 2022 Subordinated Bonds will initially be issued in the Index Mode and will mature on the date[s], bear interest initially at the Index Rate, for the initial Index Rate Period ending on the date and be subject to mandatory purchase on the initial scheduled Mandatory Purchase Date as described in the "SUMMARY OF THE OFFERING" following this cover page. The 2022 Subordinated Bonds may, under certain circumstances, be converted to a Daily Mode, Weekly Mode, Flexible Mode, Index Mode, Direct Purchase Index Mode or Fixed Rate Mode and may be converted from one Index Rate Period to another Index Rate Period. The 2022 Subordinated Bonds are subject to mandatory tender in the event of any such conversion. See "THE 2022 SUBORDINATED BONDS – Conversion Between Modes" and "– Mandatory Purchase on the Mandatory Purchase Date". *This Official Statement provides information as of its date concerning the 2022 Subordinated Bonds while bearing interest in the Index Mode for the initial Index Rate Period only. Owners and prospective purchasers of the 2022 Subordinated Bonds should not rely on this Official Statement for information concerning the 2022 Subordinated Bonds in connection with any conversion of the 2022 Subordinated Bonds to a different Interest Rate Mode or to a new Index Rate Period, but should look solely to the offering document to be used in connection with any such conversion.*

The 2022 Subordinated Bonds are also subject to optional and mandatory redemption and mandatory tender prior to maturity as set forth herein. See "THE 2022 SUBORDINATED BONDS – Mandatory Purchase on the Mandatory Purchase Date," "– Optional Redemption" and "– Mandatory Sinking Fund Redemption" herein.

While in the Index Mode, interest on the 2022 Subordinated Bonds shall be payable on the first Business Day of each month, commencing on [_____], 2022, and on any Mandatory Purchase Date therefor.

The 2022 Subordinated Bonds are being issued in denominations of $100,000 and any integral multiple of $5,000 in excess thereof as fully registered bonds and, when issued, will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("DTC"). DTC will act as securities depository for the 2022 Subordinated Bonds, and individual purchases of the 2022 Subordinated Bonds will be made in book-entry form only. Principal or purchase price of, premium, if any, and interest on the 2022 Subordinated Bonds will be payable by U.S. Bank Trust Company, National Association, as trustee (the "Trustee") to DTC, which is obligated in turn to remit such principal or purchase price, premium, if any, and interest to its DTC Participants for subsequent disbursement to the beneficial owners of the 2022 Subordinated Bonds, as described herein.

The principal of and interest on the 2022 Subordinated Bonds, together with the debt service on other Subordinated Bonds and Parity Subordinated Debt (as defined herein), are payable exclusively from and secured by a

pledge of the Net Subordinated Revenues of the Electric System of SMUD. Neither the credit nor the taxing power of SMUD or the State of California is pledged to the payment of the 2022 Subordinated Bonds. Payment of the principal of and interest on the Subordinated Bonds, including the 2022 Subordinated Bonds, is subordinated to the payment of principal and interest on SMUD's Electric Revenue Bonds and other Parity Bonds (as defined herein).

The information presented on this cover page is for general reference only and is qualified in its entirety by reference to the entire Official Statement and the documents summarized and described herein.

The 2022 Subordinated Bonds are offered when, as and if issued and received by the Underwriters, subject to the approval of the validity of the 2022 Subordinated Bonds and certain other legal matters by Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD. Certain legal matters will be passed on for the Underwriters by their counsel, Nixon Peabody LLP, San Francisco, California. It is expected that the 2022 Subordinated Bonds will be available for delivery through the facilities of DTC on or about _______, 2022.

Morgan Stanley

BofA Securities **Barclays** **Citigroup**

Goldman Sachs & Co. LLC **J.P. Morgan**

________, 2022

[*] Preliminary, subject to change.

SUMMARY OF THE OFFERING

$[PRINCIPAL AMOUNT]*
Subordinated Electric Revenue Refunding Bonds
2022 Series C

Maturity Date[s]:	August 15, 20[__]* August 15, 20[__]* August 15, 20[__]*
Initial Interest Rate Mode:	Index Mode
End of Initial Index Rate Period:	[_______], 20[__]*
Initial Scheduled Mandatory Purchase Date:	[_______], 20[__]*
Index for Initial Index Rate Period:	SIFMA Index
Index Spread[s] for Initial Index Rate Period:	+ ____% for the August 15 20[__]* maturity + ____% for the August 15 20[__]* maturity + ____% for the August 15 20[__]* maturity
Price:	100%
Call Protection Date for Initial Index Rate Period:	[_______], 20[__]*
CUSIP No[s].†:	

* Preliminary, subject to change.
† CUSIP® is a registered trademark of the American Bankers Association. CUSIP® data herein is provided by CUSIP Global Services (CGS), which is managed on behalf of the American Bankers Association by FactSet Research Systems Inc. This data is not intended to create a database and does not serve in any way as a substitute for the CGS database. CUSIP® numbers have been assigned by an independent company not affiliated with SMUD or the Underwriters and are included solely for the convenience of the registered owners of the applicable 2022 Subordinated Bonds. Neither SMUD nor the Underwriters are responsible for the selection or uses of these CUSIP® numbers, and no representation is made as to their correctness on the applicable 2022 Subordinated Bonds or as included herein. The CUSIP® number for a specific maturity is subject to being changed after the execution and delivery of the 2022 Subordinated Bonds as a result of various subsequent actions including, but not limited to, a refunding in whole or in part or as a result of the procurement of secondary market portfolio insurance or other similar enhancement by investors that is applicable to all or a portion of the 2022 Subordinated Bonds.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
Sacramento, California

BOARD OF DIRECTORS

Brandon Rose, President
Heidi Sanborn, Vice President
Nancy Bui-Thompson
Gregg Fishman
Rosanna Herber
Rob Kerth
Dave Tamayo

OFFICERS AND EXECUTIVES

Paul Lau, Chief Executive Officer and General Manager
Brandy Bolden, Chief Customer Officer
Suresh Kotha, Chief Information Officer
Jose Bodipo-Memba, Interim Chief Diversity Officer[1]
Scott Martin, Chief Strategy Officer
Laura Lewis, Chief Legal and Government Affairs Officer and General Counsel
Frankie McDermott, Chief Operating Officer
Lora Anguay, Chief Zero Carbon Officer
Jennifer Davidson, Chief Financial Officer
Farres Everly, Director, Communications, Marketing and Community Relations
Russell Mills, Treasurer
Lisa Limcaco, Controller

SPECIAL SERVICES

ORRICK, HERRINGTON & SUTCLIFFE LLP
Bond Counsel

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
Trustee and Paying Agent

BAKER TILLY VIRCHOW KRAUSE, LLP, Madison, Wisconsin
Independent Accountants

PFM FINANCIAL ADVISORS LLC, Philadelphia, Pennsylvania
Municipal Advisor

[________]
Verification Agent

[1] The previous Chief Diversity Officer, Gary King, retired as of March 31, 2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – INTRODUCTION – Independent Governance – *Chief Diversity Officer*."

No dealer, broker, salesperson or other person has been authorized by SMUD or the Underwriters to give any information or to make any representations with respect to the 2022 Subordinated Bonds other than those contained in this Official Statement and, if given or made, such information or representations must not be relied upon as having been authorized by any of the foregoing. This Official Statement does not constitute an offer to sell nor the solicitation of an offer to buy, nor shall there be any sale of the 2022 Subordinated Bonds by any person in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale. The information set forth herein has been obtained from SMUD and other sources which are believed to be reliable, but it is not guaranteed as to accuracy or completeness by, and is not to be construed as a representation of, the Underwriters. The information and expressions of opinion stated herein are subject to change without notice. The delivery of this Official Statement shall not, under any circumstances, create any implication that there has been no change in the affairs of SMUD since the date hereof. The Underwriters have provided the following sentence for inclusion in this Official Statement: The Underwriters have reviewed the information in this Official Statement in accordance with and as part of their responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but the Underwriters do not guarantee the accuracy or completeness of such information.

The 2022 Subordinated Bonds have not been registered under the Securities Act of 1933, as amended, in reliance upon an exemption from the registration requirements contained in such Act. The 2022 Subordinated Bonds have not been registered or qualified under the securities laws of any state.

IN CONNECTION WITH THE OFFERING OF THE 2022 SUBORDINATED BONDS, THE UNDERWRITERS MAY OVERALLOT OR EFFECT TRANSACTIONS WHICH STABILIZE OR MAINTAIN THE MARKET PRICES OF SUCH BONDS AT LEVELS ABOVE THOSE THAT MIGHT OTHERWISE PREVAIL ON THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME. THE UNDERWRITERS MAY OFFER AND SELL THE 2022 SUBORDINATED BONDS TO CERTAIN DEALERS AND OTHERS AT PRICES LOWER THAN THE PUBLIC OFFERING PRICES SET FORTH ON THE COVER PAGE HEREOF AND SAID PUBLIC OFFERING PRICES MAY BE CHANGED FROM TIME TO TIME BY THE UNDERWRITERS.

CAUTIONARY STATEMENTS REGARDING FORWARD-LOOKING STATEMENTS IN THIS OFFICIAL STATEMENT

Certain statements included or incorporated by reference in this Official Statement constitute "forward-looking statements." Such statements generally are identifiable by the terminology used, such as "plan," "expect," "estimate," "budget" or other similar words.

The achievement of certain results or other expectations contained in such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results, performance or achievements described to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. SMUD does not plan to issue any updates or revisions to those forward-looking statements if or when its expectations or events, conditions or circumstances on which such statements are based occur.

This Official Statement, including any supplement or amendment hereto, is intended to be deposited with the Municipal Securities Rulemaking Board through the Electronic Municipal Market Access website. SMUD maintains a website. However, the information presented therein is not part of this Official Statement and should not be relied upon in making investment decisions with respect to the 2022 Subordinated Bonds. The references to internet websites in this Official Statement are shown for reference and convenience only; unless explicitly stated to the contrary, the information contained within the websites is not incorporated herein by reference and does not constitute part of this Official Statement.

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(continued)

OFFICIAL STATEMENT

Relating to

SACRAMENTO MUNICIPAL UTILITY DISTRICT

$[PRINCIPAL AMOUNT]*
Subordinated Electric Revenue Refunding Bonds
2022 Series C

INTRODUCTION

This Official Statement, including the cover page and Appendices attached hereto, describes the Sacramento Municipal Utility District ("SMUD"), a political subdivision of the State of California (the "State"), and its $[PRINCIPAL AMOUNT]* Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022 Subordinated Bonds"), in connection with the sale by SMUD of the 2022 Subordinated Bonds. The 2022 Subordinated Bonds are being issued to (i) refund certain of SMUD's outstanding Senior Bonds (as defined herein) (the "Refunded Bonds") and (ii) pay certain costs associated with the issuance of the 2022 Subordinated Bonds. See "PLAN OF FINANCE."

The 2022 Subordinated Bonds are being issued pursuant to Resolution No. 85-11-1 of SMUD, adopted November 7, 1985, as amended and restated by Resolution No. 01-06-10 (the "Subordinate Master Resolution"), as supplemented and amended, and pursuant to applicable California law, including the Municipal Utility District Act (Public Utilities Code Sections 12850 to 12860) (the "Act"), the Revenue Bond Law of 1941 (Government Code Section 54300 *et seq.*) and Article 11 of Chapter 3 of Part 1 of Division 2 of Title 5 of the California Government Code (Government Code Section 53580 *et seq.*). The issuance of the 2022 Subordinated Bonds was authorized on May 19, 2022, by a resolution of the Board of Directors of SMUD (the "2022 Supplemental Resolution"). The Subordinate Master Resolution and all supplemental resolutions, including the 2022 Supplemental Resolution, are collectively referred to herein as the Subordinate Resolution. See APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE SUBORDINATE RESOLUTION."

The 2022 Subordinated Bonds and other bonds issued on a parity therewith pursuant to the Subordinate Resolution are collectively referred to herein as the "Subordinated Bonds." As of May 1, 2022, Subordinated Bonds in the aggregate principal amount of $200,000,000 were outstanding under the Subordinate Resolution.

U.S. Bank Trust Company, National Association serves as trustee and paying agent under the Subordinate Resolution (the "Trustee").

The payment of the principal of and interest on the Subordinated Bonds, including the 2022 Subordinated Bonds, is subordinate to the payment of the principal of and interest on SMUD's Electric Revenue Bonds (the "Senior Bonds") and other Parity Bonds. As of May 1, 2022, Senior Bonds in the aggregate principal amount of $1,966,925,000 were outstanding. Immediately following the issuance of the 2022 Subordinated Bonds and the refunding of the Refunded Bonds, Senior Bonds in the aggregate principal amount of $[_______]* will be outstanding. See "PLAN OF FINANCE." The Senior Bonds are issued pursuant to Resolution No. 6649 (the "Senior Bond Resolution") adopted in 1971, as amended and supplemented. See APPENDIX E – "SUMMARY OF CERTAIN PROVISIONS OF THE SENIOR BOND RESOLUTION."

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* Preliminary, subject to change.

SMUD also issues commercial paper notes (the "Notes") from time to time. As of May 1, 2022, no Notes were outstanding. Currently, Notes in the aggregate principal amount of $300,000,000 may be outstanding at any one time, but SMUD reserves the right to increase or decrease the aggregate principal amount of the Notes that may be outstanding at any one time in the future. The Notes are secured by letters of credit issued by commercial banks. The Notes (and SMUD's obligations to repay drawings under the letters of credit) are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Senior Bonds and the Subordinated Bonds (including the 2022 Subordinated Bonds). Drawings under the letters of credit, to the extent not repaid immediately from the proceeds of commercial paper or other available SMUD funds, are repayable with interest over a period of five years. The letters of credit currently expire in February and August of 2025.

SMUD also entered into a revolving credit agreement with a commercial bank and issued its taxable and tax-exempt revolving notes thereunder (collectively, the "Revolving Credit Facility") in February 2022. As of May 1, 2022, no principal was outstanding under the Revolving Credit Facility. Currently, the aggregate principal amount that can be outstanding under the Revolving Credit Facility at any one time is limited to $100,000,000. However, SMUD reserves the right to increase or decrease the aggregate principal amount that can be outstanding at any one time under the Revolving Credit Facility in the future. SMUD's payment obligations under the Revolving Credit Facility are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Senior Bonds and the Subordinated Bonds (including the 2022 Subordinated Bonds). The current term of the Revolving Credit Facility expires in February 2026.

SMUD is responsible for the acquisition, generation, transmission and distribution of electric power to its service area, which includes most of Sacramento County and small portions of Placer and Yolo counties. For the year ended December 31, 2021, SMUD served a population of approximately 1.5 million with a total annual retail load of approximately 10,453 million kilowatt hours ("kWh"). SMUD owns and operates an electric system which, as of March 31, 2022, included generating facilities owned and operated by SMUD with an aggregate generating capacity of approximately 809 megawatts ("MW"), local gas-fired plants owned and operated by a joint powers authority and managed by SMUD with an aggregate generating capacity of approximately 1,081 MW, over which SMUD has exclusive control of dispatch, and purchased power with an aggregate generating capacity of approximately 1,366 MW and transmission and distribution facilities. SMUD's power requirements exceed its generating capacity and thus SMUD has agreements with others (including the Local Gas-Fired Plants as defined in APPENDIX A) for the purchase of a portion of its power requirements. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – POWER SUPPLY AND TRANSMISSION – Power Supply Resources." Continuing development of SMUD's business strategy in response to changing environmental and regulatory requirements has had, and is expected to continue to have, a major effect on SMUD's power supply planning. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – BUSINESS STRATEGY."

Pursuant to a Continuing Disclosure Agreement, dated the date of issuance of the 2022 Subordinated Bonds (the "Continuing Disclosure Agreement") between SMUD and the Trustee, SMUD will covenant for the benefit for the holders of the 2022 Subordinated Bonds and owners of beneficial interest in the 2022 Subordinated Bonds to provide certain financial information and operating data and to provide certain notices. See "CONTINUING DISCLOSURE UNDERTAKING" and APPENDIX G – "FORM OF CONTINUING DISCLOSURE AGREEMENT."

The information presented in this Introduction is qualified in its entirety by reference to this entire Official Statement and the documents summarized or described herein. This Official Statement, including the Appendices, summarizes the terms of the 2022 Subordinated Bonds, the Subordinate

Resolution and certain agreements, contracts and other arrangements, some of which currently exist and others of which may exist in the future. The summaries of and references to all documents, statutes, regulations and other instruments referred to herein do not purport to be complete, comprehensive or definitive, and each such summary and reference is qualified in its entirety by reference to each such document, statute, regulation or instrument.

Capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed thereto in APPENDIX D – "SUMMARY OF CERTAIN PROVISIONS OF THE SUBORDINATE RESOLUTION – Certain Definitions" or in the Subordinate Resolution.

PLAN OF FINANCE

The proceeds of the 2022 Subordinated Bonds will be used to (i) refund the $157,785,000 outstanding principal amount of the Sacramento Municipal Utility District Electric Revenue Refunding Bonds, 2012 Series Y maturing after August 15, 2022 (the "Refunded Bonds") [and (ii) pay certain costs associated with the issuance of the 2022 Subordinated Bonds]. In anticipation of the issuance of the 2022 Subordinated Bonds and the refunding of the Refunded Bonds, SMUD entered into an interest rate swap agreement with Morgan Stanley Capital Services, Inc. in December of 2019 with an effective date of July 20, 2022. See APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Interest Rate Swap Agreements*."

A portion of the proceeds of the 2022 Subordinated Bonds, together with other available funds, will be deposited in trust in an escrow fund (the "Escrow Fund") established under an escrow agreement between SMUD and the Trustee. The moneys so deposited will be invested in direct obligations of the United States of America (the "Federal Securities"), the interest on and principal of which will be sufficient to pay the interest on the Refunded Bonds due on August 15, 2022 (the "Redemption Date") and to redeem the Refunded Bonds on the Redemption Date. Upon deposit, all liability of SMUD with respect to the Refunded Bonds (except for the obligation of SMUD to pay the interest on and redemption price of the Refunded Bonds from moneys on deposit in the Escrow Fund) will cease. The holders of the Refunded Bonds will be entitled to payment from SMUD solely from moneys or Federal Securities on deposit in the Escrow Fund, and the Refunded Bonds will no longer be outstanding under the Senior Bond Resolution. The Federal Securities and moneys in the Escrow Fund will not secure the 2022 Subordinated Bonds and will not be available to pay the principal of or interest on the 2022 Subordinated Bonds.

ESTIMATED SOURCES AND USES OF FUNDS

The estimated sources and uses of funds with respect to the 2022 Subordinated Bonds are as follows:

Sources of Funds:	
Principal Amount of 2022 Subordinated Bonds	$
SMUD Contribution	
Total Sources of Funds	$
Uses of Funds:	
Refunding of Refunded Bonds	$
Costs of Issuance (including Underwriters' Discount)	
Total Uses of Funds	$

4135-2990-7767.3

THE 2022 SUBORDINATED BONDS

The following is a summary of certain provisions of the 2022 Subordinated Bonds. Reference is made to the 2022 Subordinated Bonds for the complete text thereof and to the Subordinate Resolution for a more detailed description of such provisions. The discussion herein is qualified by such reference. *This Official Statement provides information as of its date with respect to 2022 Subordinated Bonds bearing interest in the Index Mode for the initial Index Rate Period only. Owners and prospective purchasers of the 2022 Subordinated Bonds should not rely on this Official Statement for information concerning the 2022 Subordinated Bonds in connection with any conversion of the 2022 Subordinated Bonds to a different Interest Rate Mode or to a new Index Rate Period, but should look solely to the offering document to be used in connection with any such conversion.*

General

The 2022 Subordinated Bonds are being issued in the principal amount shown on the cover of this Official Statement. The 2022 Subordinated Bonds will be issued under a book-entry only system, and will be registered in the name of Cede & Co., as nominee for The Depository Trust Company ("DTC"), New York, New York, which will act as bond depository for the 2022 Subordinated Bonds. Principal or redemption price of, premium, if any, and interest on the 2022 Subordinated Bonds or the purchase price thereof are payable by the Trustee to DTC, which is obligated in turn to remit such principal or redemption price, premium, if any, and interest or purchase price to its DTC Participants for subsequent disbursement to the beneficial owners of the 2022 Subordinated Bonds. See APPENDIX C – "BOOK-ENTRY SYSTEM".

The 2022 Subordinated Bonds will be dated the date of initial delivery. The 2022 Subordinated Bonds will initially be issued in the Index Mode and will mature on the date[s], bear interest initially at the Index Rate for the initial Index Rate Period ending on the date and be subject to mandatory purchase on the initial scheduled Mandatory Purchase Date as described in the "SUMMARY OF THE OFFERING" following the cover page of this Official Statement.

Subject to the provisions discussed in APPENDIX C – "BOOK-ENTRY SYSTEM," the 2022 Subordinated Bonds will be issued initially only as fully registered 2022 Subordinated Bonds in the denominations of $100,000 and any integral multiple of $5,000 in excess thereof (the "Authorized Denominations") while in the Index Mode. Principal or redemption price will be payable upon surrender of the 2022 Subordinated Bonds at the principal corporate trust office of the Trustee. Interest on the 2022 Subordinated Bonds will be paid by wire transfer within the continental United States of immediately available funds from the Trustee to the registered owner, determined as of the close of business on the applicable Record Date, at its address as shown on the registration books maintained by the Trustee.

At the option of SMUD and upon certain conditions provided in the Subordinate Resolution, the 2022 Subordinated Bonds may be converted to the Daily Mode, Weekly Mode, Flexible Mode, Term Rate Mode, Index Mode, Direct Purchase Index Mode, or Fixed Rate Mode or may be converted from one Index Rate Period to another Index Rate Period. See "Conversion Between Modes" herein. While the 2022 Subordinated Bonds may, under certain circumstances, be converted to a Daily Mode, Weekly Mode, Flexible Mode, Index Mode, Direct Purchase Index Mode or Fixed Rate Mode and may be converted from one Index Rate Period to a new Index Rate Period, this Official Statement describes the 2022 Subordinated Bonds only during the period in which they bear interest in the Index Mode for the initial Index Rate Period. The 2022 Subordinated Bonds are subject to mandatory tender in the event of any such conversion related thereto. See "Conversion Between Modes" and "Mandatory Purchase on the Mandatory Purchase Date" herein.

Index Rate

During the initial Index Rate Period, the Index Rate will be the per annum rate of interest equal to the SIFMA Index plus [(i) for the 2022 Subordinated Bonds maturing on August 15, 20[__], [__]%, (ii) for the 2022 Subordinate Bonds maturing on August 15, 20[__], [__]%, and (iii) for the 2022 Subordinated Bonds maturing on August 15, 20[__], [__]%], in each case as determined by the Calculation Agent on Wednesday of each week, or if any Wednesday is not a Business Day, the next succeeding Business Day (each an "Index Rate Determination Date"). During the initial Index Rate Period, each Index Rate will be in effect from (and including) each Thursday through (and including) the following Wednesday. During the initial Index Rate Period, the Calculation Agent will be the Trustee or any other party appointed by SMUD to act as calculation agent for the 2022 Subordinated Bonds. All percentages resulting from the calculation of the Index Rate will be rounded, if necessary, to the nearest ten-thousandth of a percentage point with five hundred thousandths of a percentage point rounded upward. All dollar amounts used in or resulting from the calculation of the Index Rate will be rounded to the nearest cent with one-half cent being rounded upward. If the Index Rate is not determined by the Calculation Agent on the applicable Index Rate Determination Date, the rate of interest born on the 2022 Subordinated Bonds bearing interest at an Index Rate shall be the rate in effect on the immediately preceding Thursday until the Calculation Agent next determines the Index Rate as required under the Subordinate Resolution. Notwithstanding the foregoing, the 2022 Subordinated Bonds shall not bear interest at an interest rate higher than [12]% per annum (the "Maximum Rate").

"SIFMA Index" means, as of any Index Rate Determination Date, the level of the index which is issued weekly and which is compiled from the weekly interest rate resets of tax-exempt variable rate issues included in a database maintained by Municipal Market Data which meet specific criteria established from time to time by SIFMA and issued on Wednesday of each week, or if any Wednesday is not a Business Day, the next succeeding Business Day. If the SIFMA Index is no longer published, then "SIFMA Index" shall mean the S&P Municipal Bond 7 Day High Grade Rate Index. If the S&P Municipal Bond 7 Day High Grade Rate Index is no longer published, then "SIFMA Index" shall mean the prevailing rate determined by the Calculation Agent for tax-exempt state and local government bonds meeting criteria determined in good faith by the Calculation Agent to be comparable under the circumstances to the criteria used by SIFMA to determine the SIFMA Index immediately prior to the date on which SIFMA ceased publication of the SIFMA Index. Notwithstanding the foregoing, if the SIFMA Index as determined as provided above would be less than 0.0%, then the SIFMA Index will be deemed to be 0.0%.

"S&P Municipal Bond 7 Day High Grade Rate Index" means for any Index Rate Determination Date, the level of the "S&P Municipal Bond 7 Day High Grade Rate Index" (formerly known as the J.J. Kenny Index) maintained by Standard and Poor's for a one-week maturity as published each day.

During the initial Index Rate Period, interest on the 2022 Subordinated Bonds shall be payable on the first Business Day of each month, commencing on [_____], 2022, on any Mandatory Purchase Date therefor, [and on their respective Maturity Date] (each an "Interest Payment Date"). Interest on the 2022 Subordinated Bonds shall accrue from (and including) the last Interest Payment Date to which interest has been paid (or, if no interest has been paid, commencing on (and including) the date of original authentication and delivery of the 2022 Subordinated Bonds) to (and excluding) the Interest Payment Date on which interest is to be paid. During the initial Index Rate Period, interest on the 2022 Subordinated Bonds shall be computed on the basis of a 365/366-day year for the actual number of days elapsed.

The Record Date for the payment of interest while a 2022 Subordinated Bond is in the Index Mode is the last Business Day before an Interest Payment Date.

Conversion Between Modes

While the 2022 Subordinated Bonds are in the Index Mode, conversions to any other Interest Rate Mode or from one Index Rate Period to another Index Rate Period may only take place on (i) any day that the 2022 Subordinated Bonds are subject to optional redemption if the conversion did not occur and (ii) the day immediately following the last day of the then-current Index Rate Period, in each case upon not less than ten days' prior written notice from the Trustee to the registered owners of such 2022 Subordinated Bonds.

Upon such conversion, the 2022 Subordinated Bonds will be subject to mandatory purchase on the Mandatory Purchase Date as described herein under "Mandatory Purchase on the Mandatory Purchase Date." Each conversion of the 2022 Subordinated Bonds from one Interest Rate Mode to another Interest Rate Mode or from one Index Rate Period to a new Index Rate Period shall be subject to the conditions set forth in the Subordinate Resolution, including delivery of a Favorable Opinion of Bond Counsel. In addition, SMUD may rescind any election to convert to another Interest Rate Mode or from one Index Rate Period to another Index Rate Period up to 10:00 a.m., New York City time, on the Business Day preceding the proposed conversion date. In the event that the conditions for a proposed conversion to a new Interest Rate Mode or from one Index Rate Period to another Index Rate Period are not met or SMUD rescinds the direction to convert, (i) such new Interest Rate Mode or new Index Rate Period shall not take effect on the proposed conversion date, notwithstanding any prior notice to the registered owners of such conversion, (ii) the 2022 Subordinated Bonds shall remain in the prior Interest Rate Mode or Index Rate Period and (iii) the 2022 Subordinated Bonds shall be subject to mandatory purchase on the Mandatory Purchase Date as described in the Subordinate Resolution if notice has been sent to the registered owners stating that such Series of 2022 Subordinated Bonds would be subject to mandatory purchase on such date. In no event shall the failure of the 2022 Subordinated Bonds to be converted to another Interest Rate Mode or to a new Index Rate Period be deemed to be a default or an Event of Default.

Mandatory Purchase on the Mandatory Purchase Date

While in the Index Mode, the 2022 Subordinated Bonds are subject to mandatory purchase at the Purchase Price (as defined below) on (i) the first Business Day following the last day of then-current Index Rate Period and (ii) any Conversion Date (or the date that otherwise would have been a Conversion Date had one of the conditions precedent to such Conversion Date not failed to occur (each a "Mandatory Purchase Date"). "Purchase Price" means an amount equal to the principal amount of any 2022 Subordinated Bonds purchased on the applicable Mandatory Purchase Date, plus accrued interest to but excluding such Mandatory Purchase Date (unless the applicable Mandatory Purchase Date for any 2022 Subordinated Bond is an Interest Payment Date for such 2022 Subordinated Bond, in which case the Purchase Price thereof shall be the principal amount thereof, and interest on such 2022 Subordinated Bond shall be paid to the Holder of such 2022 Subordinated Bond in the normal course). Notice of mandatory tender shall be given by the Trustee in writing to the registered owners of such 2022 Subordinated Bonds subject to mandatory tender no less than ten days prior to the applicable Mandatory Purchase Date. From and after the Mandatory Purchase Date, no further interest on the 2022 Subordinated Bonds shall be payable to the registered owners thereof, provided that there are sufficient funds available on the Mandatory Purchase Date to pay the Purchase Price.

On each Mandatory Purchase Date for the 2022 Subordinated Bonds, if the Trustee has not received an amount of remarketing proceeds sufficient to pay the Purchase Price of such 2022 Subordinated Bonds by 12:00 noon, New York City time, on such Purchase Date, the Trustee shall request funds from SMUD in an amount equal to the Purchase Price of all 2022 Subordinated Bonds which have not been successfully remarketed.

The Trustee shall purchase 2022 Subordinated Bonds subject to mandatory tender for purchase on each Mandatory Purchase Date pursuant to the Subordinate Resolution ("Tendered Bonds") from the tendering owners at the applicable Purchase Price by wire transfer in immediately available funds. Funds for the payment of such Purchase Price shall be derived solely from the following sources in the order of priority indicated and neither of SMUD or the Trustee shall be obligated to provide funds from any other source:

(i) immediately available funds on deposit in the Remarketing Proceeds Account established for the 2022 Subordinated Bonds under the Subordinate Resolution; and

(ii) moneys of SMUD on deposit in the District Purchase Account established for the 2022 Subordinated Bonds under the Subordinate Resolution.

Under the Subordinate Resolution, SMUD is obligated to deposit amounts into the District Purchase Account established for the 2022 Subordinated Bonds sufficient to pay the Purchase Price of the 2022 Subordinated Bonds to the extent that amounts on deposit in the Remarketing Proceeds Account established for the 2022 Subordinated Bonds are insufficient therefor. [The failure of SMUD to deposit amounts into the District Purchase Account established for the 2022 Subordinated Bonds when SMUD is obligated to deposit such amounts under the Subordinate Resolution will constitute an Event of Default under the Subordinate Resolution.]

If moneys sufficient to pay the Purchase Price of all Tendered Bonds to be purchased on any Mandatory Purchase Date are not available (1) no purchase shall be consummated of Tendered Bonds on such Mandatory Purchase Date; (2) all Tendered Bonds shall be returned to the Holders thereof; and (3) all remarketing proceeds with respect to such 2022 Subordinated Bonds shall be returned to the applicable remarketing agent for return to the persons providing such moneys. All Tendered Bonds shall bear interest at the Delayed Remarketing Period Rate during the period of time from and including the applicable Mandatory Purchase Date to (but not including) the date that all such Tendered Bonds are successfully remarketed, redeemed or paid (the "Delayed Remarketing Period").

"Delayed Remarketing Period Rate" means, during any Delayed Remarketing Period, for each period of days during such Delayed Remarketing Period set forth below, the per annum interest rate set forth below that corresponds to such period of days:

Days During Delayed Remarketing Period	Per Annum Interest Rate
[0-89 days]	[__]%
[90-179 days]	[__]%
[180 days or more]	Maximum Rate

During the Delayed Remarketing Period, SMUD may (1) direct the conversion of Tendered Bonds without complying with the applicable notice requirements for such conversion, and (2) upon five Business Days' notice, redeem Tendered Bonds as a whole or in part on any Business Day at a redemption price equal to the principal amount thereof, together with accrued interest thereon to the date fixed for redemption, without premium, and interest on Tendered Bonds will be paid to the Holders thereof (i) on the first Business Day of each calendar month and (ii) on the last day of such period.

Optional Redemption

The 2022 Subordinated Bonds [maturing on August 15, 20[__],] are subject to redemption at the option of SMUD in whole or in part (provided that no 2022 Subordinated Bonds shall remain Outstanding except in Authorized Denominations) on any date on or after the Call Protection Date, at a Redemption Price equal to the principal amount, or portions thereof, of such 2022 Subordinated Bonds to be redeemed, without premium, plus accrued interest, if any, to the Redemption Date.

The Call Protection Date for the initial Index Rate Period is [_____], 20[__].

Mandatory Sinking Fund Redemption

The 2022 Subordinated Bonds [maturing on August 15, 20[__],] are subject to mandatory redemption in part, by lot, on August 15 in the years shown in the following table, at a Redemption Price equal to the principal amount thereof, plus accrued interest, if any, to the date of redemption in an amount equal to the Sinking Fund Installments for such 2022 Subordinated Bonds for such date:

Years* (August 15)	Sinking Fund Installment*	Years* (August 15)	Sinking Fund Installment*
	$		$
		†	

† Stated Maturity

Selection of Bonds to be Redeemed; Notice of Redemption

Whenever provision is made for the redemption of less than all of the 2022 Subordinated Bonds, the Trustee shall select the 2022 Subordinated Bonds to be redeemed, from the outstanding 2022 Subordinated Bonds not previously called for redemption, by lot in any manner which the Trustee deems fair.

Notice of redemption shall be mailed by first-class mail by the Trustee, not less than twenty nor more than sixty days prior to the redemption date, to the Holder of any 2022 Subordinated Bond called for redemption, but neither failure to receive such notice nor any defect in any notice so mailed shall affect the sufficiency of the proceedings for the redemption of any of the 2022 Subordinated Bonds. Each notice of redemption shall state the redemption date, the place of redemption, the principal amount to be redeemed, and shall also state that the interest on the 2022 Subordinated Bonds in such notice designated for redemption shall cease to accrue from and after such redemption date and that on said date there will become due and payable on each of said 2022 Subordinated Bonds the principal amount thereof to be redeemed, interest accrued thereon to the redemption date and the premium, if any, thereon (such premium to be specified). Each notice of optional redemption shall also state that redemption is conditioned upon receipt by the Trustee of sufficient funds on the applicable redemption date to pay the applicable redemption price of the 2022 Subordinated Bonds to be redeemed.

Any notice of optional redemption may be rescinded by written notice given to the Trustee by SMUD no later than two Business Days prior to the dated specified for redemption.

Notwithstanding the foregoing, notice of redemption shall not be required for 2022 Subordinated Bonds redeemed on a Mandatory Purchase Date.

* Preliminary, subject to change.

DEBT SERVICE SCHEDULE

The following table sets forth the debt service requirements with respect to the 2022 Subordinated Bonds assuming no early redemptions. See also APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Debt Service Requirements*."

Calendar Year	2022 Subordinated Bonds Principal	2022 Subordinated Bonds Interest[1]	Total
	$	$	$
	$	$	$

[1] Based on an assumed interest rate of ___% per annum.

SECURITY FOR THE SUBORDINATED BONDS

Limited Obligations; Pledge of Revenues

The Subordinated Bonds, including the 2022 Subordinated Bonds, are revenue bonds and are not secured by the taxing power of SMUD. The principal of and premium, if any, and interest on the Subordinated Bonds (including the 2022 Subordinated Bonds), together with other Parity Subordinated Debt, are payable exclusively from the Net Subordinated Revenues of the Electric System of SMUD. The Subordinated Bonds and all other Parity Subordinated Debt are secured by a pledge of Revenues, subject to the condition that out of Revenues:

First: There shall be applied all sums required for maintenance and operation costs of the Electric System and all Energy Payments not included in maintenance and operation costs.

Second: There shall be applied all sums required for the payment of the principal of (including any premium thereon) and interest on the Senior Bonds and all other Parity Bonds, together with any sinking fund or reserve fund payments on the Senior Bonds and all other Parity Bonds.

Third: There shall be applied all sums required for the payment of the principal of (including any premium thereon) and interest on the Subordinated Bonds and all other Parity Subordinated Debt, together with any sinking fund or reserve fund payments on the Subordinated Bonds and all other Parity Subordinated Debt.

All remaining Revenues, after making the foregoing allocations, will be available to SMUD for all lawful SMUD purposes.

From time to time, SMUD may deposit in the Rate Stabilization Fund from such remaining Revenues such amounts as SMUD shall determine, provided that deposits in the Rate Stabilization Fund from remaining Revenues in any fiscal year may be made until (but not after) the date 120 days after the end of such fiscal year. SMUD may withdraw amounts from the Rate Stabilization Fund only for inclusion in Revenues for any fiscal year, such withdrawals to be made until (but not after) 120 days after the end of such fiscal year. All interest or other earnings upon deposits in the Rate Stabilization Fund shall be withdrawn therefrom and accounted for as Revenues. No deposit of Revenues to the Rate Stabilization Fund may be made to the extent such Revenues were included in any certificate submitted in connection with the issuance of additional bonds and withdrawal of the Revenues from the Revenues employed in rendering said certificate would have caused noncompliance with the additional bond provisions. See APPENDIX A – "RATES AND CUSTOMER BASE – Rates and Charges" for a description of the balance in the Rate Stabilization Fund.

Neither the credit nor the taxing power of SMUD is pledged to the payment of the Subordinated Bonds and the general fund of SMUD is not liable for the payment thereof. The owners of the Subordinated Bonds cannot compel the exercise of any taxing power of SMUD or the forfeiture of any of its property. The Subordinated Bonds are not a legal or equitable pledge, charge, lien or encumbrance upon any of SMUD's property (including the Electric System) or upon any of its income, receipts or revenues except the Net Subordinated Revenues of the Electric System to the extent of the pledge thereof contained in the Subordinate Resolution.

Subordinate Pledge

The Subordinated Bonds are subordinate in right of payment to the Senior Bonds and other Parity Bonds. As of May 1, 2022, Senior Bonds in the aggregate principal amount of $1,966,925,000 were outstanding. Immediately following the issuance of the 2022 Subordinated Bonds and the refunding of the Refunded Bonds, Senior Bonds in the aggregate principal amount of $[______]* will be outstanding. The Senior Bonds are issued pursuant to the Senior Bond Resolution. See APPENDIX E – "SUMMARY OF CERTAIN PROVISIONS OF THE SENIOR BOND RESOLUTION" for a description of certain provisions of the Senior Bond Resolution.

No Reserve Fund

No reserve fund will be established or funded for the benefit of the 2022 Subordinated Bonds.

* Preliminary, subject to change.

Rates and Charges

SMUD has covenanted in the Subordinate Resolution to establish and at all times maintain and collect rates and charges for the sale or use of electric energy generated, transmitted, distributed or furnished by SMUD which, together with certain items of other income permitted under the Subordinate Resolution, will yield Revenues at least sufficient, with respect to the ensuing 12 months, to pay and provide for (1) all sums required for Maintenance and Operation Costs and Energy Payments not included in Maintenance and Operation Costs, (2) all payments with respect to Parity Bonds, and (3) the total amount required for the payment of principal and interest, together with any sinking fund or reserve fund payments, on the Subordinated Bonds and all Parity Subordinated Debt, in each case during such 12 months.

For purposes of the calculations of payments to be made pursuant to the Subordinate Resolution, the interest rates on Parity Bonds and Parity Subordinated Debt which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Parity Bonds and Parity Subordinated Debt bear a rate or rates of interest for a known period or periods of time, such rate or rates of interest for such period or periods and thereafter, for the portion of the calculation period not covered by such known period or periods, the Assumed Interest Rate.

For purposes of the above calculations of principal of and interest on Parity Bonds or Parity Subordinated Debt, if a Financial Products Agreement has been entered into by SMUD with respect to any Parity Bonds or Parity Subordinated Debt, interest on such Parity Bonds or Parity Subordinated Debt shall be included in the calculation of such principal and interest by including for each fiscal year or period an amount equal to the amount of interest payable on such Parity Bonds or Parity Subordinated Debt in such fiscal year or period at the rate or rates stated in such Parity Bonds or Parity Subordinated Debt plus any Financial Product Payments payable in such fiscal year or period minus any Financial Product Receipts receivable in such fiscal year or period; provided that in no event shall any calculation made pursuant to this clause result in a number less than zero being included in the calculation of such principal and interest.

For purposes of the above calculations of principal of and interest on Parity Bonds and Parity Subordinated Debt, Excluded Principal Payments shall be disregarded (but interest on the Parity Bonds and Parity Subordinated Debt to which such Excluded Principal Payments relate shall be included until but not after the stated due date when principal payments on such Parity Bonds and Parity Subordinated Debt are scheduled by their terms to commence) and Assumed Principal Payments and Assumed Interest Payments shall be included.

SMUD has full power to establish rates and charges for all SMUD services, and the levels of such rates are not subject to review or regulation by any other governmental agency, either federal or state.

See Appendix D hereto for the definitions of certain capitalized terms used in this section.

Limitations on Additional Obligations Payable from Net Subordinated Revenues

The Subordinate Resolution provides that SMUD will not, so long as any Subordinated Bonds are outstanding, issue any obligations payable in whole or in part from Net Subordinated Revenues except the following:

(a) Refunding Subordinated Bonds issued to refund all or part of the Parity Bonds or Subordinated Bonds;

(b) Additional Parity Subordinated Debt (including additional Subordinated Bonds under the Subordinate Resolution and additional Parity Subordinated Debt), with an equal lien and charge upon the Net Subordinated Revenues, but only subject to the following conditions:

(1) SMUD shall not then be in default under the Senior Bond Resolution, the Subordinate Resolution or other resolutions authorizing the issuance of Parity Bonds or Parity Subordinated Debt payable out of Revenues; and

(2) SMUD shall certify to the Trustee (i) that Net Revenues, after completion of any improvements proposed to be financed by such additional Parity Subordinated Debt, will be sufficient to pay the principal of and interest (and bond reserve fund requirements, if any) on all Parity Bonds and Parity Subordinated Debt then outstanding and on such additional Parity Subordinated Debt; and (ii) that Net Revenues, for a period of 12 consecutive months during the 24 months immediately preceding the date upon which such Parity Subordinated Debt shall become outstanding, shall have been at least equal to 1.10 times the sum of (i) the annual interest on Parity Bonds and Parity Subordinated Debt, (ii) the principal amount of Parity Bonds and Parity Subordinated Debt falling due, and (iii) the amount of minimum sinking fund payments falling due on Parity Bonds and Parity Subordinated Debt, all as computed for the year in which such sum shall then be a maximum, including both the then outstanding Parity Bonds and Parity Subordinated Debt and the Parity Subordinated Debt then proposed to be issued.

The calculation described above shall be made by taking the following into consideration:

(A) if rates and charges in effect on the date upon which such Parity Subordinated Debt will become outstanding will be greater than those in effect during the entire twelve months elected for the foregoing computation, then the Net Revenues for said period of twelve months may be augmented by the estimated increase in Net Revenues computed to accrue to the Electric System in the first twelve months during which such rates and charges shall be in effect;

(B) if such Parity Subordinated Debt or any portion thereof shall be issued for the purpose of acquiring an existing revenue-producing electric system, the estimated pro forma net revenues of such existing system (calculated on the basis of assumed SMUD ownership and operation during such period but otherwise on the basis of actual gross revenues of such existing system at the rates actually charged therefor) for the preceding twelve months may be added to the actual Net Revenues of the Electric System for the twelve months elected for said computation and treated as if actually received by the Electric System during those twelve months;

(C) for purposes of the above calculations of principal of and interest on Parity Subordinated Debt, Excluded Principal Payments shall be disregarded (but interest on the Parity Subordinated Debt to which such Excluded Principal Payments relate shall be included until but not after the stated due date when principal payments on such Parity Subordinated Debt are scheduled by their terms to commence) and Assumed Principal Payments and Assumed Interest Payments shall be included;

(D) for purposes of the above calculations, the interest rates on Parity Bonds and Parity Subordinated Debt which bear a variable rate of interest or a rate subject to periodic adjustment or to being fixed at some date after issuance shall be, if such Parity Bonds and Parity Subordinated Debt bear a rate or rates of interest for a known period or periods of time, such interest rate or rates for such period or periods, and thereafter, for the portion of the calculation period not covered by such known period or periods, the Assumed Interest Rate; and

(E) For purposes of the above calculations of principal of and interest on Parity Bonds and Parity Subordinated Debt, if a Financial Products Agreement has been or is being entered into by SMUD with respect to any Parity Bonds or Parity Subordinated Debt, interest on such Parity Bonds or Parity Subordinated Debt shall be included in the calculation of such principal and interest by including for each fiscal year or period an amount equal to the amount of interest payable on such Parity Bonds or Parity Subordinated Debt in such fiscal year or period at the rate or rates stated in such Parity Bonds or Parity Subordinated Debt plus any Financial Product Payments payable in such fiscal year or period minus any Financial Product Receipts receivable in such fiscal year or period; provided that in no event shall any calculation made pursuant to this clause result in a number less than zero being included in the calculation of such principal and interest.

(c) Revenue bonds which are junior and subordinate to the payment of the principal, premium, interest and reserve fund requirements for the Subordinated Bonds and all Parity Subordinated Debt and which subordinated revenue bonds are payable as to principal, premium, and interest, and also reserve fund requirements, if any, only out of Net Subordinated Revenues after the prior payment of all amounts required to be paid under the Subordinate Resolution from Net Subordinated Revenues for principal, premium, interest and reserve fund requirements for the Subordinated Bonds and all Parity Subordinated Debt, as the same become due and payable.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

SMUD owns and operates an electric system that has provided retail electric service since 1946. SMUD's current service area is approximately 900 square miles, and includes the principal parts of Sacramento County and small portions of Placer and Yolo counties. For a full description of SMUD, its history, organization, operations, and financial performance, certain developments in the energy markets, certain factors affecting the electric utility industry and certain regulatory and other matters, see APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT."

ABSENCE OF LITIGATION REGARDING THE 2022 SUBORDINATED BONDS

SMUD is not aware of any action, suit or proceeding, threatened or pending, to restrain or enjoin the issuance, sale or delivery of the 2022 Subordinated Bonds, or in any way contesting or affecting the validity of the 2022 Subordinated Bonds or any of the proceedings of SMUD taken with respect to the 2022 Subordinated Bonds. SMUD is not aware of any action, suit or proceeding, threatened or pending, questioning the corporate existence of SMUD, or the title of the officers of SMUD to their respective offices, or the power and authority of SMUD to execute and deliver the 2022 Subordinated Bonds. For a description of certain litigation in which SMUD is involved, see APPENDIX A – "INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT – LEGAL PROCEEDINGS."

UNDERWRITING

Morgan Stanley & Co. LLC, BofA Securities, Inc., Barclays Capital Inc., Citigroup Global Markets, Inc., Goldman Sachs & Co. LLC, and J.P. Morgan Securities LLC ("JPMS") (each an "Underwriter" and, collectively, the "Underwriters") have jointly and severally agreed, subject to certain customary conditions to closing, to purchase the 2022 Subordinated Bonds from SMUD at an aggregate purchase price of $_________ (being the aggregate principal amount of the 2022 Subordinated Bonds, [less Underwriters' discount of $______]). The Underwriters will be obligated to purchase all 2022 Subordinated Bonds if any 2022 Subordinated Bonds are purchased. The Underwriters have agreed to make a public offering of the 2022 Subordinated Bonds at the initial offering price set forth on the inside cover page hereof. The 2022 Subordinated Bonds may be offered and sold to certain dealers (including underwriters and other dealers depositing such bonds into investment trusts) at prices lower than such public offering price, and such public offering price may be changed, from time to time, by the Underwriters.

Morgan Stanley & Co. LLC., an Underwriter of the 2022 Subordinated Bonds, has entered into a retail distribution arrangement with its affiliate Morgan Stanley Smith Barney LLC. As part of the distribution arrangement, Morgan Stanley & Co. LLC may distribute municipal securities to retail investors through the financial advisor network of Morgan Stanley Smith Barney LLC. As part of this arrangement, Morgan Stanley & Co. LLC may compensate Morgan Stanley Smith Barney LLC for its selling efforts with respect to the 2022 Subordinated Bonds.

[BofA Securities, Inc., an Underwriter of the 2022 Subordinated Bonds, has entered into a distribution agreement with its affiliate Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S"). As part of this arrangement, BofA Securities, Inc. may distribute securities to MLPF&S, which may in turn distribute such securities to investors through the financial advisor network of MLPF&S. As part of this arrangement, BofA Securities, Inc. may compensate MLPF&S as a dealer for their selling efforts with respect to the 2022 Subordinated Bonds.]

[Citigroup Global Markets Inc., an Underwriter of the 2022 Subordinated Bonds, has entered into a retail distribution agreement with Fidelity Capital Markets, a division of National Financial Services LLC (together with its affiliates, "Fidelity"). Under this distribution agreement, Citigroup Global Markets Inc. may distribute municipal securities to retail investors at the original issue price through Fidelity. As part of this arrangement, Citigroup Global Markets Inc. will compensate Fidelity for its selling efforts.]

[JPMS, one of the Underwriters of the Bonds, has entered into negotiated dealer agreements (each, a "Dealer Agreement") with each of Charles Schwab & Co., Inc. ("CS&Co.") and LPL Financial LLC ("LPL") for the retail distribution of certain securities offerings at the original issue prices. Pursuant to each Dealer Agreement, each of CS&Co. and LPL may purchase 2022 Subordinated Bonds from JPMS at the original issue price less a negotiated portion of the selling concession applicable to any 2022 Subordinated Bonds that such firm sells.]

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, principal investment, hedging, financing and brokerage activities. Certain of the Underwriters and their respective affiliates have, from time to time, performed, and may in the future perform, various investment banking services for SMUD for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the Underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (which may include bank loans and/or credit default swaps) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve securities and instruments of, or issued for the benefit of, SMUD.

MUNICIPAL ADVISOR

SMUD has retained PFM Financial Advisors LLC, as Municipal Advisor in connection with various matters relating to the delivery of the 2022 Subordinated Bonds. The Municipal Advisor assumes no responsibility for the accuracy, completeness or fairness of the information contained in this Official Statement. The Municipal Advisor is an independent advisory firm and is not engaged in underwriting or distribution of securities. The Municipal Advisor will receive compensation that is contingent upon the sale, issuance and delivery of the 2022 Subordinated Bonds.

APPROVAL OF LEGAL PROCEEDINGS

The validity of the 2022 Subordinated Bonds and certain other legal matters are subject to the approval of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD. The approving opinion of Bond Counsel will be delivered with the 2022 Subordinated Bonds in substantially the form appearing in APPENDIX F. Bond Counsel undertakes no responsibility for the accuracy, completeness or fairness of this Official Statement. Certain legal matters will be passed on for the Underwriters by Nixon Peabody LLP, San Francisco, California, counsel to the Underwriters.

FINANCIAL STATEMENTS

SMUD's audited, consolidated financial statements for the years ended December 31, 2021 and December 31, 2020 are included in APPENDIX B attached to this Official Statement. These financial statements have been audited by Baker Tilly Virchow Krause, LLP, Madison, Wisconsin (the "Auditor"), for the periods indicated and to the extent set forth in their report thereon and should be read in their entirety. SMUD has not requested nor did it obtain permission from the Auditor to include the audited, consolidated financial statements as an appendix to this Official Statement. Accordingly, the Auditor has not performed any procedures to review the financial condition or operations of SMUD subsequent to the date of its report included therein, nor has it reviewed any information contained in this Official Statement.

TAX MATTERS

In the opinion of Orrick, Herrington & Sutcliffe LLP, Bond Counsel to SMUD ("Bond Counsel"), based upon an analysis of existing laws, regulations, rulings and court decisions, and assuming, among other matters, the accuracy of certain representations and compliance with certain covenants, interest on the 2022 Subordinated Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 (the "Code") and is exempt from State of California personal income taxes. Bond Counsel is of the further opinion that interest on the 2022 Subordinated Bonds is not a specific preference item for purposes of the federal alternative minimum tax. Bond Counsel expresses no opinion regarding any other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Subordinated Bonds. A complete copy of the proposed form of opinion of Bond Counsel is set forth in APPENDIX F hereto.

[To the extent the issue price of any maturity of the 2022 Subordinated Bonds is less than the amount to be paid at maturity of such 2022 Subordinated Bonds (excluding amounts stated to be interest and payable at least annually over the term of such 2022 Subordinated Bonds), the difference constitutes "original issue discount," the accrual of which, to the extent properly allocable to each Beneficial Owner thereof, is treated as interest on the 2022 Subordinated Bonds which is excluded from gross income for federal income tax purposes and exempt from State of California personal income taxes. For this purpose, the issue price of a particular maturity of the 2022 Subordinated Bonds is the first price at which a substantial amount of such maturity of the 2022 Subordinated Bonds is sold to the public (excluding bond houses, brokers, or similar persons or organizations acting in the capacity of underwriters, placement agents or wholesalers). The original issue discount with respect to any maturity of the 2022 Subordinated Bonds accrues daily over the term to maturity of such 2022 Subordinated Bonds on the basis of a constant interest rate compounded semiannually (with straight-line interpolations between compounding dates). The accruing original issue discount is added to the adjusted basis of such 2022 Subordinated Bonds to determine taxable gain or loss upon disposition (including sale, redemption, or payment on maturity) of such 2022 Subordinated Bonds. Beneficial Owners of the 2022 Subordinated

Bonds should consult their own tax advisors with respect to the tax consequences of ownership of 2022 Subordinated Bonds with original issue discount, including the treatment of Beneficial Owners who do not purchase such 2022 Subordinated Bonds in the original offering to the public at the first price at which a substantial amount of such 2022 Subordinated Bonds is sold to the public.]

2022 Subordinated Bonds purchased, whether at original issuance or otherwise, for an amount higher than their principal amount payable at maturity (or, in some cases, at their earlier call date) ("Premium Bonds") will be treated as having amortizable bond premium. No deduction is allowable for the amortizable bond premium in the case of bonds, like the Premium Bonds, the interest on which is excluded from gross income for federal income tax purposes. However, the amount of tax-exempt interest received, and a Beneficial Owner's basis in a Premium Bond, will be reduced by the amount of amortizable bond premium properly allocable to such Beneficial Owner. Beneficial Owners of Premium Bonds should consult their own tax advisors with respect to the proper treatment of amortizable bond premium in their particular circumstances.

The Code imposes various restrictions, conditions and requirements relating to the exclusion from gross income for federal income tax purposes of interest on obligations such as the 2022 Subordinated Bonds. SMUD has made certain representations and covenanted to comply with certain restrictions, conditions and requirements designed to ensure that interest on the 2022 Subordinated Bonds will not be included in federal gross income. Inaccuracy of these representations or failure to comply with these covenants may result in interest on the 2022 Subordinated Bonds being included in gross income for federal income tax purposes, possibly from the date of original issuance of the 2022 Subordinated Bonds. The opinion of Bond Counsel assumes the accuracy of these representations and compliance with these covenants. Bond Counsel has not undertaken to determine (or to inform any person) whether any actions taken (or not taken), or events occurring (or not occurring), or any other matters coming to Bond Counsel's attention after the date of issuance of the 2022 Subordinated Bonds may adversely affect the value of, or the tax status of interest on, the 2022 Subordinated Bonds. Accordingly, the opinion of Bond Counsel is not intended to, and may not, be relied upon in connection with any such actions, events or matters.

Although Bond Counsel is of the opinion that interest on the 2022 Subordinated Bonds is excluded from gross income for federal income tax purposes and is exempt from State of California personal income taxes, the ownership or disposition of, or the accrual or receipt of amounts treated as interest on, the 2022 Subordinated Bonds may otherwise affect a Beneficial Owner's federal, state or local tax liability. The nature and extent of these other tax consequences depends upon the particular tax status of the Beneficial Owner or the Beneficial Owner's other items of income or deduction. Bond Counsel expresses no opinion regarding any such other tax consequences.

Current and future legislative proposals, if enacted into law, clarification of the Code or court decisions may cause interest on the 2022 Subordinated Bonds to be subject, directly or indirectly, in whole or in part, to federal income taxation or to be subject to or exempted from state income taxation, or otherwise prevent Beneficial Owners from realizing the full current benefit of the tax status of such interest. The introduction or enactment of any such legislative proposals or clarification of the Code or court decisions may also affect, perhaps significantly, the market price for, or marketability of, the 2022 Subordinated Bonds. Prospective purchasers of the 2022 Subordinated Bonds should consult their own tax advisors regarding the potential impact of any pending or proposed federal or state tax legislation, regulations or litigation, as to which Bond Counsel expresses no opinion.

The opinion of Bond Counsel is based on current legal authority, covers certain matters not directly addressed by such authorities, and represents Bond Counsel's judgment as to the proper treatment of the 2022 Subordinated Bonds for federal income tax purposes. It is not binding on the Internal Revenue Service ("IRS") or the courts. Furthermore, Bond Counsel cannot give and has not given any opinion or assurance about the future activities of SMUD, or about the effect of future changes in the Code, the applicable regulations, the interpretation thereof or the enforcement thereof by the IRS. SMUD has covenanted, however, to comply with the requirements of the Code.

Bond Counsel's engagement with respect to the 2022 Subordinated Bonds ends with the issuance of the 2022 Subordinated Bonds, and, unless separately engaged, Bond Counsel is not obligated to defend SMUD or the Beneficial Owners regarding the tax-exempt status of the 2022 Subordinated Bonds in the event of an audit examination by the IRS. Under current procedures, Beneficial Owners would have little, if any, right to participate in the audit examination process. Moreover, because achieving judicial review in connection with an audit examination of tax-exempt bonds is difficult, obtaining an independent review of IRS positions with which SMUD legitimately disagrees may not be practicable. Any action of the IRS, including but not limited to selection of the 2022 Subordinated Bonds for audit, or the course or result of such audit, or an audit of bonds presenting similar tax issues may affect the market price for, or the marketability of, the 2022 Subordinated Bonds, and may cause SMUD or the Beneficial Owners to incur significant expense.

Payments on the 2022 Subordinated Bonds generally will be subject to U.S. information reporting and possibly to "backup withholding." Under Section 3406 of the Code and applicable U.S. Treasury Regulations issued thereunder, a non-corporate Beneficial Owner of 2022 Subordinated Bonds may be subject to backup withholding with respect to "reportable payments," which include interest paid on the 2022 Subordinated Bonds and the gross proceeds of a sale, exchange, redemption, retirement or other disposition of the 2022 Subordinated Bonds. The payor will be required to deduct and withhold the prescribed amounts if (i) the payee fails to furnish a U.S. taxpayer identification number ("TIN") to the payor in the manner required, (ii) the IRS notifies the payor that the TIN furnished by the payee is incorrect, (iii) there has been a "notified payee underreporting" described in Section 3406(c) of the Code or (iv) the payee fails to certify under penalty of perjury that the payee is not subject to withholding under Section 3406(a)(1)(C) of the Code. Amounts withheld under the backup withholding rules may be refunded or credited against a Beneficial Owner's federal income tax liability, if any, provided that the required information is timely furnished to the IRS. Certain Beneficial Owners (including among others, corporations and certain tax-exempt organizations) are not subject to backup withholding. The failure to comply with the backup withholding rules may result in the imposition of penalties by the IRS.

CONTINUING DISCLOSURE UNDERTAKING

Pursuant to the Continuing Disclosure Agreement, SMUD will covenant for the benefit of the holders and the "Beneficial Owners" (as defined in the Continuing Disclosure Agreement) of the 2022 Subordinated Bonds to provide certain financial information and operating data relating to SMUD by not later than 180 days after the end of each of SMUD's fiscal years (presently, each December 31), commencing with the report for the year ending December 31, 2022 (the "Annual Report"), and to provide notices of the occurrence of certain listed events with respect to the 2022 Subordinated Bonds. The Annual Report will be filed by or on behalf of SMUD with the Municipal Securities Rulemaking Board (the "MSRB") through its Electronic Municipal Market Access system ("EMMA") and any notices of such listed events will be filed by or on behalf of SMUD with the MSRB through EMMA. The specific nature of the information to be contained in the Annual Report and the notices of listed events are set forth in the form of the Continuing Disclosure Agreement which is included in its entirety in APPENDIX G hereto. SMUD's covenant will be made in order to assist the Underwriters in complying with Securities and Exchange Commission Rule 15c2-12.

[In a limited number of circumstances, certain of the annual reports, audited financial statements or listed event filings required to be made by SMUD during the last five years under its continuing disclosure undertakings were not connected to all of the CUSIP numbers of the bonds subject to the continuing disclosure undertakings. In addition, SMUD entered into two subordinated forward starting interest rate swaps in December 2019 and filed a notice of the interest rate swaps with the MSRB through EMMA in April 2020. A notice of rating upgrade on October 6, 2020, by Moody's Investors Service of the Northern California Gas Authority No. 1 Gas Project Revenue Bonds, Series 2007B, was also not filed until October 28, 2020.]

RATINGS

Fitch Ratings, Inc. ("Fitch") and S&P Global Ratings ("S&P") have assigned ratings of "[AA (stable outlook)]" and "[AA (stable outlook)]," respectively, to the 2022 Subordinated Bonds. Such ratings reflect only the views of such organizations and are not a recommendation to buy, sell or hold the 2022 Subordinated Bonds. Explanations of the significance of such ratings may be obtained only from the respective rating agencies. SMUD has furnished to Fitch and S&P certain information and materials concerning the 2022 Subordinated Bonds and itself. Generally, a rating agency bases its rating on the information and materials furnished to it and on investigations, studies and assumptions of its own. There is no assurance that such ratings will continue for any given period or that they will not be revised downward, suspended or withdrawn entirely by the respective rating agencies, if in the judgment of such rating agency, circumstances so warrant. SMUD has not, other than as described under "CONTINUING DISCLOSURE UNDERTAKING" above, and the Underwriters have not undertaken any responsibility either to bring to the attention of the holders or beneficial owners of the 2022 Subordinated Bonds any proposed revision, suspension or withdrawal of any rating on the 2022 Subordinated Bonds or to oppose any such proposed revision, suspension or withdrawal. Any such downward revision, suspension or withdrawal of such ratings may have an adverse effect on the market price or marketability of the 2022 Subordinated Bonds.

VERIFICATION

Upon delivery of the 2022 Subordinated Bonds, [________] (the "Verification Agent") will verify, from the information provided to it, the mathematical accuracy as of the date of the closing of the 2022 Subordinated Bonds of the computations contained in the provided schedules to determine that the anticipated receipts from the securities and cash deposits listed in the Underwriters' schedules, to be held in escrow, will be sufficient to pay, when due, the interest on and redemption requirements of the Refunded Bonds. The Verification Agent will express no opinion on the assumptions provided to them.

MISCELLANEOUS

This Official Statement includes descriptions of the terms of the 2022 Subordinated Bonds, power purchase agreements with certain other parties, pooling and other agreements, the Subordinate Resolution and certain provisions of the Act. Such descriptions do not purport to be complete, and all such descriptions and references thereto are qualified in their entirety by reference to each such document.

Copies of the Subordinate Resolution, which forms a contract with the Holders of the 2022 Subordinated Bonds, will be made available upon request.

This Official Statement has been duly authorized by the Board of Directors of SMUD.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By:____
Chief Executive Officer and General Manager

APPENDIX A

INFORMATION REGARDING SACRAMENTO MUNICIPAL UTILITY DISTRICT

DRAFT

APPENDIX A

INFORMATION REGARDING
SACRAMENTO MUNICIPAL UTILITY DISTRICT

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SACRAMENTO MUNICIPAL UTILITY DISTRICT
Sacramento, California

BOARD OF DIRECTORS

Brandon Rose, President
Heidi Sanborn, Vice President
Nancy Bui-Thompson
Gregg Fishman
Rosanna Herber
Rob Kerth
Dave Tamayo

OFFICERS AND EXECUTIVES

Paul Lau, Chief Executive Officer and General Manager
Brandy Bolden, Chief Customer Officer
Suresh Kotha, Chief Information Officer
Jose Bodipo-Memba, Interim Chief Diversity Officer[1]
Scott Martin, Chief Strategy Officer
Laura Lewis, Chief Legal and Government Affairs Officer and General Counsel
Frankie McDermott, Chief Operating Officer
Lora Anguay, Chief Zero Carbon Officer
Jennifer Davidson, Chief Financial Officer
Farres Everly, Director, Communications, Marketing & Community Relations
Russell Mills, Treasurer
Lisa Limcaco, Controller

[1] The previous Chief Diversity Officer, Gary King, retired as of March 31, 2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. See "INTRODUCTION – Independent Governance – *Chief Diversity Officer*."

INTRODUCTION

General

The Sacramento Municipal Utility District ("SMUD") owns and operates an electric system that has provided retail electric service since 1946. SMUD's current service area is approximately 900 square miles, and includes the principal parts of Sacramento County and small portions of Placer and Yolo counties. See "THE SERVICE AREA AND ELECTRIC SYSTEM – The Service Area."

Independent Governance

SMUD is an independently run community-owned organization. SMUD is not required by law to transfer any portion of its collections from customers to any local government.

SMUD is governed by a Board of Directors (the "Board"), which consists of seven directors elected by ward for staggered four-year terms. The Board determines policy and appoints the Chief Executive Officer and General Manager, who is responsible for SMUD's overall management and day-to-day operations. The Chief Executive Officer and General Manager is responsible for the hiring and removal of all employees, other than the Chief Legal Officer and General Counsel, the Internal Auditor and the Special Assistant to the Board, who are hired and may be removed only by the Board. The employment status of nearly all SMUD employees is governed by a civil service system administered by the Chief Executive Officer and General Manager.

The Board elects its President and Vice President annually to take office in January. The current members of the Board are as follows:

Name	Occupation	Term Expires
Brandon Rose, President	Air Pollution Specialist, California Environmental Protection Agency	December 31, 2024
Heidi Sanborn, Vice President	Executive Director, National Stewardship Action Council	December 31, 2022
Nancy Bui-Thompson	Chief Information Officer, Wellspace Health	December 31, 2024
Gregg Fishman	Communications Specialist	December 31, 2022
Rosanna Herber	Retired Utility Director	December 31, 2022
Rob Kerth	Business Owner	December 31, 2024
Dave Tamayo	Environmental Specialist IV, County of Sacramento	December 31, 2022

SMUD's senior management consists of the following executives:

Chief Executive Officer & General Manager. Paul Lau was named chief executive officer and general manager ("CEO & GM") of SMUD in October 2020. He reports to the SMUD Board of Directors. As CEO & GM, he leads the sixth largest community-owned electric utility in the nation, serving a population of approximately 1.5 million residents and managing a $1.7 billion budget. Mr. Lau previously served as SMUD's Chief Grid Strategy & Operations Officer and has held several other executive leadership positions during his 40-year career at SMUD. He serves on several national and local boards, including the Large Public Power Council, California Municipal Utilities Association, American Public Power Association, and Smart Electric Power Alliance, and as a Commissioner of the Balancing Authority of Northern California ("BANC"). A registered professional electrical engineer in the State of California (the "State"), Mr. Lau received his bachelor's degree in electrical power engineering from California State University, Sacramento.

Chief Customer Officer. Brandy Bolden reports to the CEO & GM and oversees SMUD's Customer and Community Services business unit. She is responsible customer experience delivery across our residential and commercial customer segments. She provides leadership and oversight of customer operations including customer care and revenue management, business intelligence, strategic account management, customer experience and segmentation strategy, channel management, customer program and service delivery, and special assistance. She is also responsible for commercial development and business attraction and oversees Community Energy Services, which provides services and support for community choice aggregators. Since joining SMUD in 2003, Brandy has demonstrated strong leadership and held a variety of senior leadership roles, including leading the Customer & Community Services project management office and the dual role of director of Customer Care and Revenue Operations. Ms. Bolden led the team responsible for implementing time-of-day rates, streamlining the meter-to-cash processes, delivering key billing and payment experience enhancements and recognizing operational efficiencies that resulted in sustained annual savings for SMUD. Ms. Bolden holds a bachelor's degree in Sociology from University of California, Davis.

Chief Information Officer. Suresh Kotha reports to the CEO & GM and is responsible for SMUD's information technology strategy, operations, infrastructure, IT Project Management Office, enterprise innovation process, and cybersecurity. More recently, Mr. Kotha has been leading many technology efforts that are integral to developing a grid of the future that will help us achieve our zero carbon goal, including our Advanced Distribution Management System, the software platform that supports the full suite of distribution management and optimization, and next-generation network upgrades. Mr. Kotha joined SMUD in 2002 as a principal technical developer, with responsibility for designing and leading implementation and upgrades of multiple technology systems, including the SAP software platform and our meter-to-cash systems. He holds a Master's of Technology in Computer Science from Jawaharlal Nehru Technology University and a Bachelor of Engineering in Electronics & Communications Engineering from Gulbarga University.

Chief Diversity Officer. The Chief Diversity Officer reports to the CEO & GM and is responsible for human resources, workforce diversity and inclusion and SMUD's Sustainable Communities program. The previous Chief Diversity Officer, Gary King, retired as of March 31,2022. The Chief Diversity Officer position is currently being filled on a rotational interim basis. The three current Workforce, Diversity & Inclusion Directors will each serve in the role for a 3-month period, starting with Jose Bodipo-Memba. Jose started in this new role on April 2, 2022. He will be followed by Laurie Rodriguez beginning on July 2, 2022, and Markisha Webster beginning on Oct. 1, 2022, following which the position will be filled from among the three directors.

Chief Strategy Officer. Scott Martin reports to the CEO & GM and is responsible for looking holistically at all strategies across the company and driving prioritization including zero carbon, rates and pricing, enterprise strategic planning and enterprise prioritization. Mr. Martin is a seasoned executive with more than 30 years of experience. Prior to assuming this role, Mr. Martin was a director for resource planning and new business strategy. Previous experience also includes customer strategy planning supervisor. Mr. Martin joined SMUD in 1999 and holds a bachelor of arts degree in economics from the University of California, Berkeley and a master of arts degree in economics from the University of Nevada, Las Vegas.

Chief Legal & Government Affairs Officer and General Counsel. Laura Lewis was named general counsel for SMUD in April 2014. In this position she serves as chief lawyer and manages SMUD's legal office and its staff of eight attorneys. She also serves as the secretary to SMUD's elected board of directors. She reports to the Board and to the CEO & GM and has responsibility for all legal matters in which SMUD is a party to, or has an interest in. Ms. Lewis also oversees SMUD's government affairs and reliability compliance department. In this capacity, she is responsible for management and coordination of all legislative matters and regulatory requirements affecting SMUD at the state and federal level, including the FERC-NERC electric reliability standards. Ms. Lewis joined SMUD in 1997 as a staff attorney, serving in that capacity through 1999, after which she moved to the San Francisco law firm Davis Wright Tremaine. In 2002, she returned to SMUD as a senior attorney. In 2010, she became assistant general counsel and in 2013 was appointed chief assistant general counsel. She holds a juris doctorate from McGeorge School of Law, where she won membership in the Order of the Coif honor society. She holds a bachelor's degree in political science from the University of California, San Diego and is a member of the American Bar Association, the Energy Bar Association, and the State Bar of California.

Chief Operating Officer. Frankie McDermott reports to the CEO & GM and is responsible for providing strategic leadership and tactical oversight related to the safe and reliable transmission and delivery of energy to customers, ensuring efficient planning, construction, operation and maintenance of transmission, and distribution facilities requirements in order to safely and efficiently meet customer demands. This position has primary responsibility for the processes and functions related to system reliability and operations across SMUD. The Chief Operating Officer is also the safety leader for the enterprise, leader of operational efficiency and responsible for all non-IT capital investments. Prior to this role, Mr. McDermott served as Chief Energy Delivery Officer and Chief Customer Officer, responsible for SMUD's overall retail strategy. From 2010 to 2014, he served as customer services director, which included managing relationships with customer segments as SMUD moved forward with smart-grid technologies. Prior to that, he served as manager of enterprise performance and held positions in supply chain and in general services. Before joining SMUD in 2003, Mr. McDermott served in management roles in the semiconductor industry at NEC Electronics in Roseville, California and in Ireland. After engineering school in Ireland, he earned an MBA from Golden Gate University and completed the Advanced Management Program at the Haas School of Business at the University of California Berkeley.

Chief Zero Carbon Officer. Lora Anguay reports to the CEO & GM and is responsible for leadership oversight of SMUD's Energy Supply which includes Energy Trading and Contracts and SMUD's Power Generation Assets. This role is also responsible for the delivery of SMUD's plan to provide 100% carbon free energy resources by 2030. This includes obtaining new grants and partnerships, overseeing research and development, designing distributed energy resource programs, enabling processes to settle distributed energy transactions with SMUD's customers and transitioning SMUD's power generation assets and energy contracts to zero carbon resources. Prior to assuming this role, Ms. Anguay was the director of Distribution Operations & Maintenance and was responsible for the day to day operations of SMUD's electric distribution grid. Before that she was an engineering designer, process control supervisor, project manager for smart meter deployment, a senior project manager for smart grid distribution automation and supervisor in Grid Assets. Before SMUD, she worked for Oracle Corporation as a finance manager and is a veteran who served in the United States Coast Guard. Ms. Anguay joined SMUD in 2004 and holds a Bachelor of Science degree in business administration from California State University, Sacramento.

Chief Financial Officer. Jennifer Davidson was named chief financial officer ("CFO") in 2017. Reporting to the CEO & GM, she oversees corporate accounting, treasury operations and risk management, and planning and budget functions and is also responsible for key corporate services, including facilities, security, image production and postal service, purchasing, warehouse and fleet. Ms. Davidson joined SMUD in 2006 and previously served as director of budget, enterprise performance and risk management. Before joining SMUD, Ms. Davidson held management positions with investor-owned utility Southern

California Edison and software and services provider Amdocs. She holds a bachelor's degree in geography from the University of California, Los Angeles.

Director, Communications, Marketing & Community Relations. Farres Everly reports to the CEO & GM and since 2009 has been responsible for oversight of the SMUD brand, all external and internal strategic marketing and communications activities and campaigns and SMUD's outreach efforts to the community and the State's capital region, including volunteerism, events and sponsorships. He previously served as SMUD's Manager of Advertising and Promotions. Prior to joining SMUD, Mr. Everly held marketing leadership positions at VSP Vision Care, The Money Store and the Sacramento Metropolitan Chamber of Commerce. He holds a bachelor's degree in Journalism from California State University, Chico.

Treasurer. Russell Mills reports to the CFO. He oversees all treasury operations, including debt and cash management, banking, financial planning and forecasting, enterprise and commodity risk management, property and casualty insurance, and is responsible for developing and implementing capital borrowing strategies. Mr. Mills also serves as treasurer for the Transmission Agency of Northern California ("TANC"), the Central Valley Financing Authority ("CVFA"), the Sacramento Cogeneration Authority ("SCA"), the Sacramento Municipal Utility District Financing Authority ("SFA"), the Sacramento Power Authority ("SPA"), the Northern California Gas Authority No. 1 ("NCGA"), the Northern California Energy Authority ("NCEA") and BANC. Before joining SMUD in 2018 as Treasurer, Mr. Mills served as Chief Financial Officer of Southern California Public Power Authority. He also served as the Chief Financial Officer of the Power Supply Program at the California Department of Water Resources. He holds an MBA from Loyola Marymount University, and a bachelor's degree in economics from Towson University in Baltimore, Maryland. Mr. Mills also holds the Energy Risk Professional (ERP) designation and is a CFA level II candidate.

Controller. Lisa Limcaco reports to the CFO and is responsible for accounting and financial reporting at SMUD. Prior to her appointment as controller in 2020, Ms. Limcaco served as an assistant controller, manager of customer value, performance and projects, senior energy commodity specialist and as principal accountant for SMUD's joint powers authorities. Ms. Limcaco also serves as controller for TANC, CVFA, SCA, SFA, SPA, NCGA, NCEA and BANC. Before joining SMUD in 2010 as a senior accountant, Ms. Limcaco had 12-years' experience as the Director of Accounting and controller for a food service provider in Sacramento and over 13-years' experience in public accounting including audit manager at Price Waterhouse LLP. Ms. Limcaco holds a bachelor's degree in accounting from the University of Hawaii, a Master of Business Administration from Sacramento State University and is a Certified Public Accountant in the State.

THE SERVICE AREA AND ELECTRIC SYSTEM

The Service Area

SMUD is the primary distributor of electric power within an area of approximately 900 square miles in central California. The service area includes the State Capital, Sacramento, the populous areas principally to the northeast and south of the City of Sacramento (the "City" or "Sacramento") and the agricultural areas to the north and south. The City is located 85 miles northeast of San Francisco.

SMUD's electric system supplies power to a population of approximately 1.5 million with a total annual retail load of approximately 10,453 million kilowatt-hours ("kWh") for the year ended December 31, 2021. As the capital of the nation's most populous state, Sacramento benefits from the historically stabilizing influence of a large government sector. Sacramento is home to the State government headquarters, the Sacramento County seat, the City government and various special districts that combine to make government the largest single employment sector in the Sacramento area. Information technology, transportation, education and health services, leisure and hospitality, and construction round out the other major sectors of employment and industry in the area.

SMUD's annual peak load has averaged 3,001 Megawatts ("MW") over the last three years, with SMUD's record peak load of 3,299 MW occurring on July 24, 2006. In 2017, SMUD recorded its second highest peak load of 3,157 MW. In 2021, SMUD's peak load was 3,019 MW. SMUD reviews its load forecast, at a minimum, on an annual basis.

The Electric System

SMUD owns and operates an integrated electric system that includes generation, transmission and distribution facilities.

SMUD supplies power to its bulk power substations through a 230 kilovolt ("kV") and 115 kV transmission system. This system transmits power from SMUD's generation plants and interconnects with Pacific Gas & Electric ("PG&E") and the Western Area Power Administration ("WAPA"). Power is distributed throughout Sacramento County via a 69 kV sub-transmission system with the exception of the City's downtown area, which is served from the 115 kV transmission system. The downtown area is served from 115/12 kV and 115/21 kV substations. The distribution system serving the remainder of SMUD's service territory is comprised of 69/12 kV substations with overhead and underground 12 kV distribution circuits.

BUSINESS STRATEGY

General

SMUD's Board of Directors has established the following purpose and vision statements: "SMUD's purpose is to enhance the quality of life for our customers and community by providing reliable and affordable electricity, and leading the transition to a clean energy future. SMUD's vision is to be a trusted and powerful partner in achieving an inclusive, zero carbon economy. SMUD will leverage its relationships to accelerate innovation, ensure energy affordability and reliability, protect the environment, eliminate greenhouse gas emissions, catalyze economic and workforce development, promote environmental justice, and enhance community vitality for all." The Board has adopted a set of Strategic Directions with related metrics, which it considers essential for the success of SMUD and for serving SMUD's customers. These include competitive rates, access to credit markets, reliability, customer relations, environmental leadership, resource planning, enterprise risk management and safety. Some of the general elements in SMUD's business strategy are:

- developing and maintaining a sustainable and reliable power supply to meet demand growth consistent with State mandates and the Board's directions for renewable energy and the reduction of carbon emissions to zero by 2030. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan*";
- working closely with customers to provide the information, tools and incentives to assist them to more efficiently manage energy use, which will contribute to meeting greenhouse gas ("GHG") emission targets and managing needle peak demand requirements (those 40 or so hours of the year with extreme temperatures when customer demand surges by up to 400 additional MW);
- managing price, volumetric and credit risks associated with energy and natural gas procurement;

- attracting, developing and retaining a diverse, skilled and engaged workforce that reflects SMUD's values and is committed to achieving SMUD's mission;
- retaining local decision making authority and operational independence; and
- collaborating regionally to attract new businesses and grow existing business to diversify and strengthen the Sacramento economy.

SMUD's long-range business strategy focuses in part on ensuring financial stability by establishing rates that provide an acceptable fixed charge coverage ratio on a consolidated basis, taking into consideration the impact of capital expenditures and other factors on cash flow. SMUD's Board policy sets a minimum fixed charge coverage ratio of 1.50 times for annual budgets, though it generally plans to meet a minimum fixed charge coverage ratio of 1.70 times. Over the past ten years, the actual fixed charge coverage ratio has averaged 2.14 times on a consolidated basis. SMUD also manages its liquidity position by planning for a minimum of 150 days cash on hand and planning to maintain at least $150 million of available capacity under its commercial paper and line of credit program. As of June 1, 2022, SMUD had all $400 million of the authorized principal amount of its commercial paper and line of credit program available for use. SMUD uses cash on hand and commercial paper and a line of credit to fund capital expenditures, then issues debt to reimburse itself for cash expended for qualified capital expenditures or to pay down the outstanding principal amount of its commercial paper program and line of credit. Over the past ten years, the days cash on hand has averaged 218. The resolutions securing SMUD's Senior Bonds and Subordinated Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below) do not require SMUD to maintain a minimum fixed charge coverage ratio, minimum days cash on hand or minimum available capacity under its commercial paper program and line of credit.

In addition, SMUD's business strategy focuses on servicing its customers in a progressive, forward-looking manner, addressing current regulatory and legislative issues and potential competitive forces.

Serving SMUD's Customers

SMUD continually looks for ways to better serve and partner with its customers to further strengthen customer loyalty, while providing reasonable product pricing. SMUD also has a focused effort to assist and incentivize customers to more efficiently manage energy use, which will contribute to meeting GHG emission targets and managing peak demand requirements as noted below.

Digital Enhancements. Customers are increasingly turning to digital channels such as the new SMUD application, SMUD website, e-mail and social media to interact and do business with SMUD. SMUD has delivered many digital enhancements, including bill pay functionality; online payment arrangements; start/stop/transfer move service; view of energy usage, chat, an enhanced outage map; and the SMUD Energy Store, which is an online marketplace for energy-related products. SMUD plans to continue efforts to provide more personalized digital customer experiences.

Advanced Metering, Infrastructure and Rate Design. As a community-owned organization, SMUD is dedicated to providing the tools and transparency in customer energy usage to enable customers to easily and positively affect energy usage, energy cost, and climate change. In 2012 SMUD installed smart technology, including 617,000 digital communicating smart meters, distribution automation systems and equipment to facilitate load management. The advanced technology has allowed SMUD to deliver tools such as text and e-mail bill alerts and online energy usage comparison charts to help customers manage energy use. SMUD has leveraged smart grid investments to improve reliability, reduce losses, reduce power quality issues and improve customer service through better, more timely information, particularly related to outages.

Time-of-Day Rates. On June 15, 2017, the Board approved time-of-day ("TOD") rates as the standard rate for residential customers. The residential rate transition began in the fourth quarter of 2018 and was completed in the fourth quarter of 2019. Currently, about 98% of residential customers are on TOD rates.

All of SMUD's business customers are also on time-based rates. On June 24, 2019, the Board approved an update to the commercial TOD rates to improve consistency and better align commercial rates with current energy market prices. Due to the impacts of the COVID-19 pandemic on SMUD's operations and priorities, on August 20, 2020, the Board postponed the implementation of the commercial rate restructure for one year. The transition was completed in the first quarter of 2022. See "RATES AND CUSTOMER BASE – Rates and Charges."

Renewable Options. SMUD's customers have been increasingly interested in distributed energy resources, mainly through the installation of solar systems. In 2007, SMUD received 39 applications for customer-owned solar connections. As of January, 2022, approximately 40,400 of SMUD's residential and commercial customers, approximately 6% of retail customers, had installed solar systems, representing approximately 280 MW of solar installations.

As the cost of energy storage continues to decline, SMUD anticipates an increase in behind-the-meter energy storage, mainly through the installation of battery storage systems. As of January 2022, approximately 611 of SMUD's residential and commercial customers, approximately 0.01% of retail customers, had installed storage systems, representing approximately 4.4 MW of storage.

As another option for solar, SMUD's SolarShares® ("SolarShares") pilot program is a cost-effective and convenient way for commercial customers to meet their energy needs from solar power. The SolarShares program offers SMUD commercial customers the opportunity to receive solar power without upfront costs or equipment installation through 5, 10 or 20 year purchase contracts. These customers can receive up to half of their power from a utility-scale solar system. SMUD supplies solar power for the SolarShares program either by building and maintaining utility-scale solar systems or by procuring solar power from third parties through power purchase agreements. The SolarShares generation was approximately 3.0% of retail sales in 2021. As of April 30, 2021, SMUD had completed the SolarShares pilot program and is not entering into new SolarShares contracts.

Since January 2020, the California Building Code has required all newly constructed residential buildings under three stories to be powered by photovoltaic solar systems. A new home satisfies this requirement if it installs on-site solar or participates in an approved community solar or energy storage program. In February 2020, SMUD obtained approval from the California Energy Commission ("CEC") to administer its own community solar program, called Neighborhood SolarShares® ("Neighborhood SolarShares"). SMUD's Neighborhood SolarShares program can be used by developers of new low-rise residential buildings to satisfy the mandatory solar requirement. See also "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Rooftop Solar Mandate*." Starting in 2023, the California Building Code's mandatory solar requirement will extend beyond low-rise residential properties, and other changes to the California Building Code's community solar regulations will take effect. SMUD will revise its program to align with the new regulations and seek approval from the CEC to continue offering its Neighborhood SolarShares compliance option to newly constructed low rise residential homes in its service territory.

In addition to SolarShares and Neighborhood SolarShares, SMUD maintains a voluntary green energy pricing program called Greenergy® ("Greenergy"). The Greenergy program allows customers the opportunity to pay an additional amount per month to ensure that either all or part of their electricity comes from green energy sources. In 2021, the program allocated Renewable Energy Credits ("RECs") equivalent to approximately 6% of retail sales to its participating customers.

Energy Efficiency. To further assist customers in managing energy usage and reducing regional carbon emissions and air pollution, SMUD offers an extensive array of energy efficiency and building electrification programs and services including financial incentives, loans, energy audits and education. In addition, SMUD has partnered with local developers to incorporate energy efficiency and all-electric construction measures into new residential and commercial construction, which helps developers plan and design efficient, cost-effective and low or zero-emission buildings. As part of SMUD's 2019 Integrated Resource Plan ("IRP"), SMUD set a goal for regional carbon emissions through transport and building electrification that aims to reduce carbon emissions in buildings and transport by 64% over the next 20 years. SMUD's focus on electrification is continued in the Zero Carbon Plan (defined and discussed below). SMUD was the first electric utility in the country to set its efficiency goals based on carbon reductions, allowing building electrification and energy efficiency to both count toward meeting SMUD's efficiency goals. This is a significant opportunity, as converting a typical home today to all-electric saves more than three times the carbon emissions compared to doing a major energy efficiency upgrade alone to the same building. See "POWER SUPPLY AND TRANSMISSION – Projected Resources."

Sustainable Power Supply and Transmission

Maintaining a sustainable power supply entails focusing efforts on researching, promoting and implementing new renewable energy technologies and sources to meet SMUD's long-term commitment to reducing carbon emissions and providing a reliable energy supply. SMUD defines a sustainable power supply as one that reduces SMUD's GHG emissions to serve retail customer load to zero by 2030. See "– *2030 Zero Carbon Plan*" below. SMUD is planning to achieve zero GHG emissions to serve retail customer load through investments in energy efficiency, clean distributed energy resources, renewables portfolio standard ("RPS") eligible renewables, energy storage, large hydroelectric generation, clean and emissions free fuels, and new technologies and business models. Additionally, SMUD plans to continue pursuing GHG emissions reductions through vehicle, building and equipment electrification. At the same time, SMUD's plans for maintaining a sustainable power supply include assuring the reliability of SMUD's electric system, minimizing environmental impacts on land, habitat, water and air quality, and maintaining competitive rates relative to other electricity providers in the State.

A number of bills affecting the electric utility industry have been enacted by the State Legislature. In general, these bills regulate GHG emissions and encourage greater investment in energy efficiency and sustainable generation alternatives, principally through more stringent RPS. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings" herein.

2030 Zero Carbon Plan. In July 2020, the Board declared a climate emergency and adopted a resolution calling for SMUD to take significant and consequential actions to reduce its carbon footprint by 2030. On April 28, 2021, the Board approved SMUD's 2030 Zero Carbon Plan (the "Zero Carbon Plan"). The Zero Carbon Plan is intended to be a flexible roadmap for SMUD to eliminate carbon emissions from its electricity production by 2030 while maintaining reliable and affordable service. To achieve these goals the Zero Carbon Plan is focused on four main areas: natural gas generation repurposing, proven clean technologies, new technologies and business models and financial impacts and options. SMUD plans to revisit the Zero Carbon Plan annually.

The natural gas generation repurposing focus of the Zero Carbon Plan calls for exploring the retirement of two of SMUD's five Local Gas-Fired Plants (as defined herein) and the retooling of the other three Local Gas-Fired Plants. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*." Based on SMUD's studies to date, SMUD estimates that SPA

McClellan (as defined herein) can be retired by 2024 and that the SPA Project (as defined herein) can be retired by 2025. Final decisions about the retirement of these two Local Gas-Fired Plants will be based on additional reliability studies and engagement with the community. As part of the Zero Carbon Plan, SMUD is also exploring converting the CVFA Project (as defined herein) and the SCA Project (as defined herein) to standby operations only and investigating the use of alternative fuels like Renewable Natural Gas-biomethane (RNG-biomethane), hydrogen and other biofuels for the CVFA Project, SCA Project, and SFA Project (as defined herein). In addition, SMUD is investigating long duration energy storage strategies for the SFA Project. All final generator configurations are subject to reliability assessments.

The proven clean technologies focus of the Zero Carbon Plan calls for SMUD to procure approximately 1,100 to 1,500 MW of local utility-scale solar photovoltaic ("PV") generating capacity, 700 to 1,100 MW of local utility-scale battery storage, 300 to 500 MW of wind generating capacity, 100 to 220 MW of geothermal generating capacity, and 100 MW of regional utility-scale solar PV generating capacity. The Zero Carbon Plan also estimates that customer installation of approximately 500 to 750 MW of behind-the-meter solar PV generating capacity and approximately 50 to 250 MW of behind-the-meter battery storage will assist SMUD with achieving the Zero Carbon Plan goals.

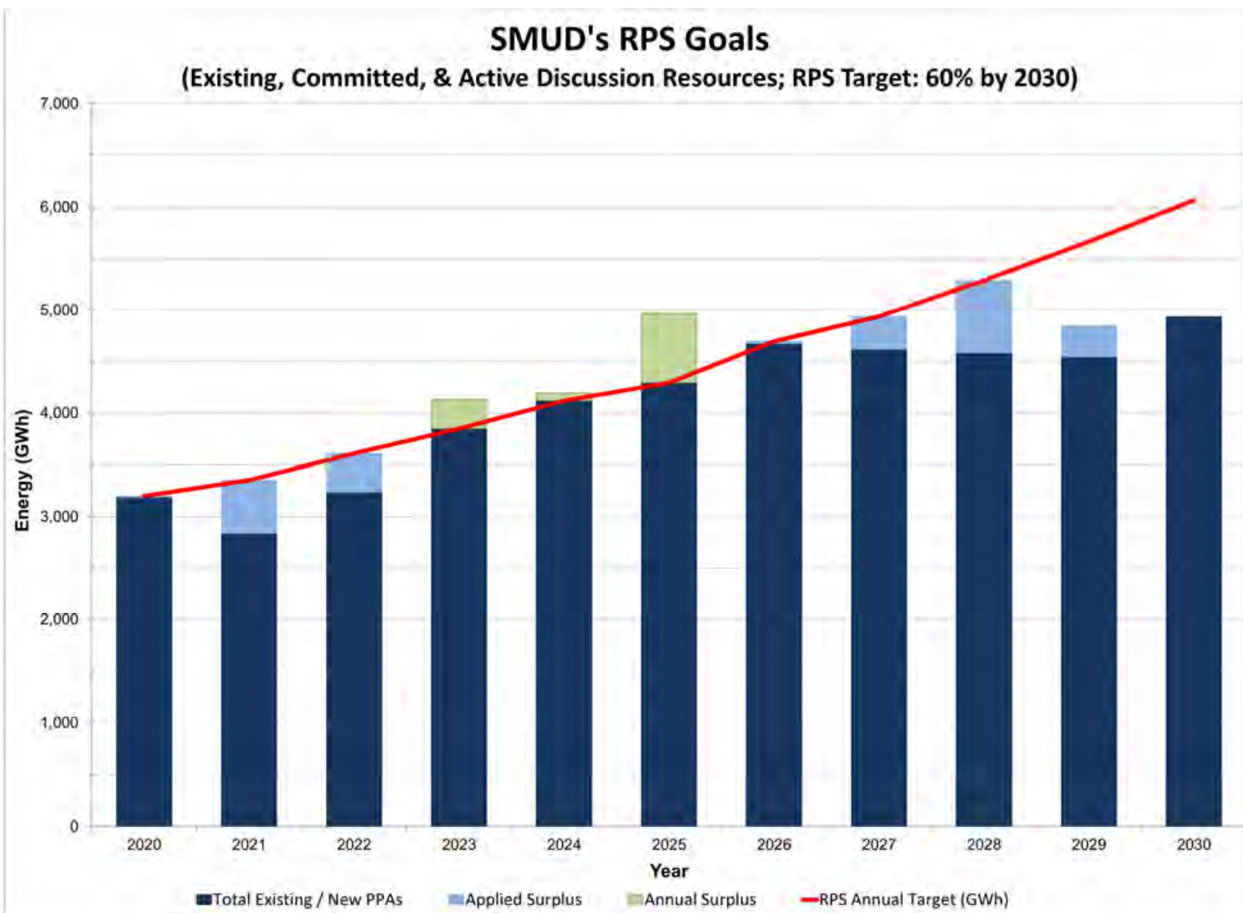
With respect to new technologies and business models, the Zero Carbon Plan focuses on evaluating, prioritizing and scaling the emerging technologies that SMUD expects will have the largest impact on reducing carbon in SMUD's 2030 resource mix. SMUD is currently focused on four main areas of technology: electrification, education and demand flexibility, virtual power plants and vehicle-to-grid technology, and new grid-scale technologies. The Zero Carbon Plan forecasts that customer-owned resources and SMUD customer-focused programs will contribute between 360 and 1,300 MW of capacity to SMUD's grid by 2030.

The financial impacts and options focus of the Zero Carbon Plan aims to keep SMUD rate increases at or below the rate of inflation while achieving SMUD's goal of eliminating carbon emissions from its power supply by 2030. To pay for the expected costs of the Zero Carbon Plan and keep rate increases at or below the rate of inflation, the Zero Carbon Plan estimates the need for SMUD to realize between $50 million and $150 million of sustained annual savings. SMUD currently plans to achieve these sustained annual savings by exploring the implementation of operational savings strategies and pursuing partnership and grant opportunities.

While the ultimate impacts of the Zero Carbon Plan on SMUD's financial results and operations are difficult to predict and are dependent on a variety of factors, such as the relative cost of procuring energy from clean technologies, the availability and relative cost of new technologies, and the adoption and implementation of energy efficiency and other measures by SMUD's customers, such impacts could be material.

Renewable Energy and Climate Change. The California Renewable Energy Resources Act, established by Senate Bill X1-2 ("SBX1-2") and the Clean Energy and Pollution Reduction Act of 2015, enacted by Senate Bill 350 ("SB 350") require that SMUD meets 33% of its retail sales from RPS-eligible renewable resources by 2020 and 50% of its retail sales from RPS-eligible renewable resources by 2030. Senate Bill 100 ("SB 100"), passed by the legislature and approved by then-Governor Brown on September 10, 2018, accelerates the RPS targets and establishes a new 60% target by 2030. The bill also creates a planning goal to meet all of the State's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Renewables Portfolio Standards*" for a discussion of the State RPS requirements.

SMUD's compliance with State RPS requirements is evaluated over 3 or 4-year compliance periods. SMUD met the State RPS requirements for the first compliance period (2011-2013) and second compliance period (2014-2016). The third compliance period (2017-2020) required SMUD to source one-third of its energy from renewable resources, and SMUD had sufficient RECs to meet the third compliance period requirements. SMUD filed its 2020 and third compliance period RPS compliance report with the CEC in the second quarter of 2021 and is awaiting verification of its submission from the CEC which is expected to occur by the end of 2022. As of the end of the third compliance period (2020), SMUD had approximately 1.0 million surplus RECs available to help meet future RPS targets. SMUD expects to file its 2021 RPS compliance report by July 1, 2022, and has sufficient resources purchased in 2021 and surplus RECs to meet the 2021 RPS target (35.75%). In addition to meeting RPS standards, SMUD serves an additional 9% of its customer load with renewable energy through its voluntary SolarShares and Greenergy pricing programs. SMUD estimates that it has sufficient renewable energy deliveries, new power supply contract commitments, new power supply commitments under active discussion, and RPS-eligible surplus carryover to meet its RPS requirements through 2025. Additional solicitations currently under way are expected to provide sufficient RPS-eligible resources to cover SMUD's RPS requirements through 2028. The resources needed to meet SMUD's 2030 Zero Carbon Plan goals are expected to cover SMUD's RPS obligations through at least 2030. The following chart illustrates SMUD's current RPS requirements through 2030 and its existing and committed resources, and its resources under active discussion that are expected to be utilized to meet those requirements.



In addition to procuring new sources, meeting the RPS requirements will require replacement of certain existing renewable contracts which expire in future years. While SMUD anticipates it will meet much of its renewable resource requirements through purchase contracts with third parties, it continues to explore additional options, including wind, solar, biomass, and geothermal developments, partnering with other utilities on future projects, and local development options. SMUD's resource forecast (see "POWER SUPPLY AND TRANSMISSION – Projected Resources") accounts for future renewable resources as a component of "Uncommitted Purchases." To meet SMUD's Zero Carbon Plan goals, SMUD anticipates meeting loads in 2030 with approximately 70-80% renewable resources, in addition to hydro and other new zero carbon technologies. See "*– 2030 Zero Carbon Plan*" above.

Given the intermittent nature of power from renewable resources such as wind and solar, SMUD is exploring and investing in options that provide the flexibility to manage the intermittency of such renewable resources. Potential options include energy storage resources, which SMUD has committed to as part of the 2030 Zero Carbon Plan, and expanding load management resources. Additionally, on April 3, 2019, SMUD, through its membership in BANC, a joint exercise of powers agency formed in 2009, and currently comprised of SMUD, the Modesto Irrigation District ("MID"), the City of Roseville ("Roseville"), the City of Redding ("Redding"), the City of Shasta Lake and the Trinity Public Utilities District has commenced its participation in the California Independent System Operator Corporation ("CAISO") energy imbalance market ("EIM"). Participation in the EIM benefits SMUD by providing it with broader access to balancing resources within the region to help manage its expanding renewable portfolio. In addition, other entities within the BANC Balancing Authority Area began participation in the EIM on March 25, 2021. See "BUSINESS STRATEGY – Serving SMUD's Customers – *Operational Independence and Local Control*" and "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements."

In 2018, SMUD's Board adopted a new IRP through a comprehensive public process and filed the approved IRP with the CEC on April 29, 2019 pursuant to the CEC's IRP guidelines. The approved IRP calls for a reduction in GHG emissions from SMUD's energy supply by more than 60% by 2030 relative to 1990 levels and a goal of net zero emissions by 2040 due, in part, to a significant investment in electrification of the local building and transportation sectors. The IRP was expected to reduce Sacramento's economy-wide GHG emissions by 70% relative to current levels. SMUD's Zero Carbon Plan, adopted in 2021, built upon the 2018 IRP and set a goal of zero carbon emissions by 2030. SMUD is currently working to update its IRP filing with the CEC to incorporate the updated goals set in the 2030 Zero Carbon Plan pursuant to the CEC's IRP guidelines. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan.*"

The State's carbon cap-and-trade market established pursuant to Assembly Bill 32 ("AB 32") began in 2013. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Greenhouse Gas Emissions*" for a discussion of AB 32 and the State's cap-and-trade program. SMUD anticipates that allowances allocated to SMUD will nearly equal SMUD's compliance obligations under normal water year conditions. Under low water year conditions, SMUD may need to purchase additional allowances to cover its compliance obligations, including carbon obligations related to wholesale energy sales from SMUD's natural gas power plants. As SMUD implements its clean power goals, SMUD expects its need for these allowances to decline.

There is scientific consensus that increasing concentrations of GHG have caused and will continue to cause a rise in temperatures in the State and around the world. The change in the earth's average atmospheric temperature, generally referred to as "climate change," is, among other things, expected to result in a wide range of changes in climate patterns, including increases in the frequency and severity of extreme weather events, including droughts and heat waves, more frequent incidences of wildfires, changes in wind patterns, sea level rise and flooding, any of which alone or in combination could materially adversely affect SMUD's financial results or operations. See also "FACTORS AFFECTING THE REGION" and "OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY – Other Factors." As described above, SMUD is actively working to meet its sustainable power supply goals, reduce its own GHG emissions, and assist the local governments in the territory it serves with their desired GHG reductions. In 2016, SMUD introduced the Pilot Natural Refrigerant Incentive Program, its first customer program providing incentives for GHG reduction in addition to kWh savings. SMUD is a founding member and active participant in the Capital Region Climate Readiness Collaborative, a public private partnership formed to better understand and plan for climate impacts expected in the region. SMUD is also an active member of the United States Department of Energy (the "DOE") Partnership for Energy Sector Climate Resilience. SMUD regularly reviews scientific findings related to climate change and in 2016 published its Climate Readiness Assessment and Action Plan.

Energy Storage Systems. Assembly Bill 2514 ("AB 2514") requires the Board to re-evaluate energy storage goals every three years. In compliance with AB 2514, the Board established a target of 9 MW of energy storage procurement by December 31, 2020, which SMUD has procured. See "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Energy Storage Systems*" for further discussion of AB 2514. In September 2020, the Board directed that energy storage forecasts be implemented through SMUD's IRP process going forward. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*" above for a discussion of SMUD's IRP. SMUD is also evaluating how to couple utility-scale solar with utility-scale storage to support future system reliability needs and renewable energy goals.

Meeting Peak Load. A significant consideration for SMUD will be how it addresses its system peak load. SMUD has implemented programs and tools, such as advanced metering, energy efficiency options, and TOD rates for residential customers, to help customers manage their costs while helping SMUD reduce its peak load. Analysis of 2021 data showed a reduction of approximately 125 MW, not weather adjusted, for residential customers during the TOD peak period (5-8 p.m. local time). SMUD staff will continue to monitor the progress and results of the implementation of TOD rates and will use this information to inform future rate actions and load forecasts. See "BUSINESS STRATEGY – Serving SMUD's Customers – *Time-of-Day Rates*."

On September 16, 2021, the Board approved an optional residential Critical Peak Pricing rate (the "Peak Pricing Rate"), which will go into effect June 1, 2022. The Peak Pricing Rate is designed to reduce load by increasing the price of energy when the grid is most impacted, up to 50 hours per summer. In exchange, customers on the rate will receive a per kWh discount on summer Off-Peak and Mid-Peak rates. SMUD is also exploring the use of more distributed energy resources and demand response programs that could further reduce SMUD's system peak.

Operational Independence and Local Control. A key component of SMUD's business strategy is focused on maintaining its independence in operating and maintaining its resources. As such, SMUD has taken a number of actions to mitigate the potential impacts of various federal and state regulatory actions. For example, in 2002 SMUD established itself as an independent control area (now termed "Balancing Authority") within the Western Electricity Coordinating Council ("WECC") region. By removing itself from CAISO's Balancing Authority area, SMUD became responsible for balancing electric supply and demand within its own service territory. This move substantially reduced fees paid to CAISO, preserved operational flexibility and helped to insulate SMUD from the uncertain regulatory environment and tariff structure of CAISO. In addition to decreased financial risks, this independence also reduced SMUD's exposure to the impacts of capacity and energy shortages in the CAISO Balancing Authority area. Further, as an independent Balancing Authority, SMUD continued to support the statewide electric grid in events of electrical emergencies requiring rotating outages, such as loss of major transmission lines or equipment, as provided in the statewide emergency plan. By 2006, the SMUD Balancing Authority footprint expanded north to the California-Oregon border and south to Modesto, to include the service areas of the WAPA, MID, Redding and Roseville, and TANC -owned 340-mile 500-kV California-Oregon Transmission Project ("COTP"). In October 2009, SMUD, with the coordination and cooperation of WAPA, joined the

Northwest Power Pool Reserve Sharing Group, which supports reliability and reduces operating costs. In May 2011, BANC assumed the role of the Balancing Authority, though SMUD continues to oversee operation of the grid on behalf of BANC. BANC members share cost responsibility for balancing authority-related compliance obligations, liabilities, and operations. BANC also serves as an important venue for SMUD and other BANC members to collaborate with respect to operational and market improvements inside the BANC footprint and to preserve their operational independence. See "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements." On April 3, 2019, SMUD, through its participation in BANC, began operating in the CAISO EIM, which will help SMUD better manage the integration of renewable energy resources. The CAISO EIM is a voluntary market, which allows SMUD to maintain its operational independence from the CAISO, while providing SMUD greater access to balancing resources throughout the western region. See "POWER SUPPLY AND TRANSMISSION – Balancing Authority Area Agreements."

FERC Order 1000. In 2011, the Federal Energy Regulatory Commission ("FERC") issued Order 1000, which mandates regional transmission planning and imposes a regional cost allocation methodology for transmission facilities. FERC states that it has the authority to allocate costs to beneficiaries of transmission services even in the absence of a contractual relationship between the owner of the transmission facilities and the beneficiary. Despite appeals challenging FERC's authority on a number of grounds, the D.C. Circuit Court of Appeals upheld Order 1000. See "DEVELOPMENTS IN THE ENERGY MARKETS – Federal Legislation and Regulatory Proceedings – *Federal Regulation of Transmission Access*." Nevertheless, there remains flexibility with respect to SMUD's participation in regional transmission planning. Specifically, SMUD is voluntarily participating as a Coordinating Transmission Owner ("CTO") in the WestConnect transmission planning organization, and will rely on its WestConnect membership to keep it Order 1000 compliant. While SMUD opposes any cost allocation methodology that would obligate SMUD to pay for facilities that it does not use or need to maintain reliable operations or serve its load, the FERC-approved WestConnect planning process does provide a CTO the option to not accept an allocation of costs. WestConnect is composed of utility companies providing transmission of electricity in a portion of the western United States, working collaboratively to assess stakeholder and market needs and develop cost-effective enhancements to the western wholesale electricity market. SMUD is unable to predict at this time the full impact that Order 1000 will have on the operations and finances of SMUD's electric system or the electric industry generally.

Electricity, Natural Gas, and Related Hedging

SMUD continues to utilize a comprehensive and integrated power and fuel supply strategy to acquire a reliable and diversified portfolio of resources to meet existing and future needs. This strategy includes a combination of both physical supply and financial hedging transactions to reduce price risk exposure over a five-year horizon. SMUD's physical supply arrangements include ownership of power generating resources, as well as a diversified portfolio of power and fuel supply purchase contracts that range in duration, with a mixture of fixed and variable pricing terms.

With regard to the power purchase contracts, SMUD has entered into a series of contracts for the purchase of electricity to supply the portion of its resource needs not already provided by owned resources. SMUD also actively manages its exposure on variable rate electricity purchases, and at times may enter into financial contracts to fix prices by using options to reduce price risk, in each case when warranted by economic conditions. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements."

With regard to fuel supply contracts, SMUD utilizes a similar strategy of employing financial contracts of various durations to hedge its variable rate fuel supply contracts. As of March 31, 2022, these contracts are forecasted to have hedged the price exposure on approximately 68%, 70% and 65% of SMUD's anticipated natural gas requirements for 2022, 2023 and 2024, respectively. While the financial effects resulting from the unhedged portions of SMUD's natural gas requirements are difficult to predict, SMUD's financial results could be materially impacted. See "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Supply*."

As provided in SMUD's natural gas contracts, SMUD may be required to post collateral to various counterparties. As of April 15, 2022, SMUD did not have any collateral posting obligations. A decrease in natural gas prices could result in a collateral posting by SMUD. While the posting of collateral is not an expense for SMUD, it does temporarily encumber unrestricted cash balances.

To hedge against hydroelectric production volatility of SMUD-owned hydroelectric facilities, SMUD implemented a pass-through rate component called the Hydro Generation Adjustment (the "HGA"). The HGA and the associated Hydro Rate Stabilization Fund (the "HRSF") help to offset increased power supply or fuel supply costs in years where precipitation levels at SMUD-owned hydroelectric facilities are low. To hedge against variations in the volume of energy received from non-SMUD-owned hydroelectric resources, SMUD uses a rate stabilization fund to help offset increased power supply or fuel supply costs. See "RATES AND CUSTOMER BASE – Rate Stabilization Funds."

Managing Risks

SMUD maintains an Enterprise Risk Management ("ERM") program, a strategic approach to managing enterprise-wide risks as a portfolio, to help reduce the chance of loss, create greater financial stability and protect SMUD resources. It is designed to maintain an early warning system to monitor changes in, and the emergence of, risks that affect the organization's business objectives. Under the purview of the Enterprise Risk Oversight Committee, composed of executive members and chaired by the Chief Financial Officer, ERM conducts ongoing risk identification, assessments, monitoring, mitigation, risk-based budgeting and reporting. To ensure accountability and oversight, each identified risk is assigned to an executive-level risk owner. Risk status and mitigation efforts are reported monthly to the Board.

Competitive Challenges

In the coming decade, utilities like SMUD may face competition from companies in other industries looking to diversify into the energy sector. Examples of developing competitive areas include retail sale of electricity, distributed electric storage resources, renewable distributed generation (mostly solar in Sacramento), customer installation of fuel cells, third-party electric vehicle charging, home or business automation that enables greater customer participation in energy markets, and third-party provision of energy management software and solutions.

SMUD has a wide range of initiatives to monitor and adapt to changing market conditions and new industry participants. Key areas of focus include:

- Enhancing customer experience. Recognizing the importance of meeting customer expectations, SMUD introduced the Customer Experience Strategy in 2016 to provide customers "value for what they pay" and further strengthen customer loyalty. The initiative is focused on ensuring SMUD has the people, systems, technology, programs and services to consistently meet or exceed customers' changing expectations. The customer experience is measured via surveys with the goal of achieving and maintaining at least 70% of customers agreeing that SMUD provides them with value for what they pay by 2024.

- Restructuring electric rates. In 2017, the Board approved TOD rates as the standard rate for residential customers. The residential rate transition began in the fourth quarter of 2018, and the full transition was completed in the fourth quarter of 2019. All of SMUD's business customers are also on time-based rates. In 2019, the Board approved a restructuring of commercial rates to collect a greater portion of fixed costs through fixed charges and to better align time periods and prices with energy markets. The commercial rate restructuring was delayed by one year due to the impacts of the COVID-19 pandemic. The transition was completed in the first quarter of 2022. See "RATES AND CUSTOMER BASE – Rates and Charges" and "FACTORS AFFECTING THE REGION – Impacts from COVID-19 Pandemic."

- Ongoing integrated resource planning. SMUD monitors and updates its integrated resource planning to ensure future sources of energy balance cost, reliability and environmental requirements with the flexibility to meet challenges of changing market and regulatory conditions, customer energy resources, and emerging technologies.

Leveraging Core Competencies

In addition to these initiatives, SMUD is leveraging core competencies to improve industry safety and help communities serve their customers' energy needs.

Sacramento Power Academy. SMUD is leveraging its significant experience in training skilled line-workers with the opening of the SMUD Power Academy regional training center in 2016. The academy currently emphasizes training for public power, customer-owned utility employees. There are currently approximately 2,000 customer-owned utilities in the United States that are similar to SMUD, many of which may not have the resources to adequately train their employees. In addition to line-workers, the center will also train substation and network electricians. Other future plans include training electrical, telecom and meter technicians; engineers and designers; construction management inspectors; equipment operators; cable splicers and locators; and support staff.

Community Choice Aggregation. In 2002, Assembly Bill 117 was passed to establish Community Choice Aggregation in the State. SMUD sees the growth of Community Choice Aggregators ("CCAs") as an opportunity to support organizations with values closely aligned with SMUD's values, while also generating additional revenue for SMUD. CCA programs are proliferating in the State thanks to support for expanding renewable energy use and desire for local control particularly for electricity procurement. There are numerous CCAs operating in the State, and more are anticipated to launch in the future. CCAs are responsible for procuring wholesale power, setting the generation rate, and staffing a call center to handle opt-outs and questions about the power portfolio. The local investor-owned utility ("IOU") continues to deliver electricity from the electric grid, maintain its electric infrastructure, bill customers and collect payments.

In October 2017, SMUD was selected by the governing board of Valley Clean Energy ("VCE") to provide technical, energy and support services, including data management and call center services, wholesale energy services, and business operations support, to VCE for a five-year term. VCE is a joint powers agency formed in 2016 by the City of Woodland, the City of Davis and Yolo County to implement a local CCA program. The service territory expanded to include the City of Winters in 2021. The mission of VCE is to deliver cost-competitive clean electricity, product choice, price stability, energy efficiency, and greenhouse gas emissions reductions to its customers in Yolo County. VCE began electric services to its customers in the summer of 2018, giving Yolo County residents a choice between two electricity providers, VCE and PG&E.

In November 2017, SMUD was selected by the governing board of East Bay Community Energy ("EBCE") to provide call center and data management services for a three-year term beginning in January 2018. EBCE is a joint powers agency formed in 2016 by the cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Oakland, Piedmont, San Leandro and Union City in Alameda County to implement a local CCA program. EBCE expanded its territory to the cities of Pleasanton, Newark, and Tracy in April 2021. SMUD signed a new contract with EBCE in January 2022 for another three years for call center and data management services.

In June 2019, SMUD was selected by the governing board of Silicon Valley Clean Energy ("SVCE") to provide program services to help local SVCE communities reduce carbon pollution while delivering engaging customer experiences. SVCE programs are focused on grid integration, as well as electrifying transportation, buildings and homes. SVCE is a joint powers agency formed in 2016 by the cities of Campbell, Cupertino, Gilroy, Lost Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and Unincorporated Santa Clara County to implement a local CCA program.

While CCAs have had success in the State, they are susceptible to business, regulatory and other risks that could lead to a financial loss and/or result in a cessation of operations for the CCA. These risks could extend to a CCA's counterparties, including SMUD. SMUD has made an effort to identify and mitigate potential counterparty risks to the extent possible in service agreements with the CCA's described above. SMUD may pursue opportunities to provide similar services to additional CCAs in the future. SMUD management does not expect its current arrangements with VCE, EBCE, and SVCE to have a material adverse impact on SMUD's financial position, liquidity or results of operations.

FACTORS AFFECTING THE REGION

Precipitation Variability

SMUD uses a National Weather Service precipitation station located at Pacific House, California to approximate available water supply to SMUD's Upper American River Project (the "UARP") hydropower reservoirs. As of March 31, 2022, precipitation at Pacific House, California totaled 37.14 inches for the October-September hydropower water supply period. This is 89% of the 50-year rolling median of 41.86 inches. Total reservoir storage in the UARP hydropower reservoirs was about 83% of capacity as of April 12, 2022, approximately 15% above historical average for this date. SMUD manages its reservoirs to maximize water storage going into the summer season, which preserves generating capacity during SMUD's high load months and ensures that SMUD meets its UARP FERC license requirements, including requirements for recreational and environmental flows.

Although reservoir levels in the UARP are above historical averages, there remains the potential for wide swings in precipitation from year to year. In years with below average rainfall, SMUD may have to generate or purchase replacement energy at additional cost. To hedge against variations in the volume of energy received from SMUD-owned UARP hydroelectric resources, SMUD uses the HRSF to help offset increased power supply or fuel supply costs. See "RATES AND CUSTOMER BASE – Rate Stabilization Funds."

SMUD is also exposed to precipitation variability through its contract with the WAPA. In an average water year this contract provides roughly 661 gigawatt hours ("GWh") of power, but the actual amount will vary depending on precipitation. Unlike the UARP, SMUD does not monitor precipitation stations to approximate power deliveries under the WAPA contract, and instead relies on a forecast of power deliveries from WAPA. As of March 31, 2022, WAPA has forecasted power deliveries of 348 GWh for 2022. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Western Area Power Administration*."

Wildfires

General. Wildfires in the State have become increasingly common and destructive. Frequent drought conditions and unseasonably warm temperatures have increased, and could further increase, the possibility of wildfires occurring in areas where SMUD maintains generation, transmission and distribution facilities. The number of diseased and dead trees has increased, and could further increase, this possibility. As a result, SMUD faces an increased risk that it may be required to pay for wildfire related property damage or personal injuries, fines and penalties, some of which may not be covered by insurance (including costs in excess of applicable policy limits), or may be disputed by insurers, and could be material. In addition, a significant fire or fires in SMUD's generation, transmission or service area could result in damage or destruction to SMUD's facilities, result in a temporary or permanent loss of customers or otherwise materially increase SMUD's costs or materially adversely affect SMUD's ability to operate its Electric System or generate revenues.

SMUD's service territory is located within Sacramento County, which is located outside the California Public Utilities Commission (the "CPUC") high fire threat areas, established in 2018. However, as described below, SMUD's UARP facilities and certain of SMUD's and TANC's transmission facilities are within CPUC high fire threat areas. In addition, as described below, certain portions of SMUD's service territory are located within the California Department of Forestry and Fire Protection ("Cal Fire") Fire Protection and Resource Assessment Program ("FRAP") Moderate, High and Very High Fire Hazard Severity Zones. SMUD's exposure to liability for damages related to its UARP facilities, which are located within high fire threat areas in El Dorado County, is reduced due to risk mitigation measures adopted by SMUD and the low number of inhabitants and structures near the UARP facilities (See "Wildfire Mitigation" below). SMUD continues to take responsible action to minimize its exposure to liability from wildfires; however, under current State law, utilities can be held liable for damages caused by wildfires sparked by their equipment or other facilities regardless of whether the utility was negligent or otherwise at fault. Therefore, at this time the full extent of SMUD's potential exposure to wildfire risk is unknown.

Distribution (SMUD Service Territory). Portions of SMUD's service territory are located within Cal Fire's FRAP Moderate, High and Very High Fire Hazard Severity Zones. State law requires Cal Fire to classify areas in the State based on the severity of the fire hazard that is expected to prevail there. These areas or "Fire Hazard Severity Zones" are based on factors such as fuel (material that can burn), slope and the expected chance of burning. There are three Fire Hazard Severity Zones (Moderate, High and Very High) based on increasing fire hazard. SMUD has assessed its service territory based on Cal Fire's FRAP map, adopted in 2007; the following table illustrates SMUD's assessment of the approximate extent of its service territory and retail customer base located within the three Fire Hazard Severity Zones.

Fire Hazard Severity Zone	Moderate	High	Very High
Acres of SMUD Service Area	231,816	2,337	1,061
% of Total SMUD Service Area	40.6%	0.4%	0.2%
Number of Retail Customers	40,114	3,688	136
% of Total Retail Customers	6.0%	0.6%	0.0%

Transmission (Outside of SMUD Service Territory). In 2018, the CPUC approved a new statewide fire map that identifies areas of elevated and extreme wildfire risk from utility-associated assets located throughout the State. SMUD directly participated in the development of the CPUC's statewide fire map. In connection with the development of the CPUC's statewide fire map, a peer review and a team of independent nationwide experts led by Cal Fire affirmed that SMUD's electric service area is properly located outside of these elevated ("Tier 2") and extreme ("Tier 3") high fire threat areas; however, SMUD's UARP facilities are located within both Tier 2 and Tier 3 areas. According to the CPUC, Tier 2 fire-threat areas are areas where there is an elevated wildfire risk from utility assets and Tier 3 fire-threat areas are areas where there is an extreme risk from utility assets. As of June 8 2021, approximately 37 right-of-way mile of SMUD's transmission lines are in Tier 2 fire-threat areas and approximately 19 right-of-way miles of SMUD's transmission lines are in Tier 3 fire-threat areas. SMUD is also a member of TANC. As of July, 2021, approximately 116.3 right-of-way miles of TANC's transmission lines are in Tier 2 fire-threat areas and approximately 4.5 right-of-way miles of TANC's transmission lines are in Tier 3 fire-threat areas. In accordance with its FERC license, SMUD adheres to a FERC-approved Fire Prevention and Response Plan for its UARP facilities. On May 17, 2018, in accordance with State law, SMUD's Board of Directors determined that the UARP area may have a "significant risk of catastrophic wildfire" resulting from overhead electric facilities and that SMUD's FERC-approved UARP Fire Prevention and Response Plan meets requirements for presenting wildfire mitigation measures to the Board for its approval.

Wildfire Mitigation. In response to potential wildfire risk, SMUD is implementing a series of measures intended to prevent wildfires from occurring, minimize the spread of any fire that does occur and improve the resiliency of its system. These measures include an increase in the degree of sophistication of fuel reduction inside and adjacent to rights-of-ways; installation of Cal Fire-approved exempt material to reduce the risk of sparking; enhanced inspection and maintenance programs; increased use of ignition-resistant construction, including covered conductors and undergrounding of conductors; increased monitoring of and identified responses to fire conditions, including operational procedures for the de-energization of lines during high fire conditions; and elimination of the use of automatic circuit reclosers on SMUD's transmission lines and on SMUD's distribution lines in certain areas during fire season.

SMUD's proactive approach to vegetation management recently has been expanded to include the use of advanced technologies such as Light Detection and Ranging surveys, ortho and oblique that is used to pinpoint tree health and/or condition that may not yet be visible to the naked eye. In addition, SMUD has installed additional weather stations in transmission corridors and substations for increased situational awareness, and has continued coordination and collaboration with local agencies and first responders as well as vulnerable populations.

State legislation enacted in 2018 and 2019 requires publicly owned utilities ("POUs") to prepare and present Wildfire Mitigation Plans to their governing boards by January 1, 2020, and annually thereafter. SMUD assembled an enterprise-wide team of subject-matter experts to prepare its plan in compliance with this legislation, released a draft of the plan for public comment, contracted for and obtained an independent evaluation of the comprehensiveness of the plan, and presented the plan and the evaluator's report to the Board in the fourth quarter of 2019. The plan was adopted by the Board and submitted to the State Wildfire Safety Advisory Board (the "WSAB") in 2020.

SMUD reviewed and updated its wildfire mitigation plan, released a draft of the updated wildfire mitigation plan for 2021 (the "2021 Wildfire Mitigation Plan") for public comment, contracted for and obtained an independent evaluation of the comprehensiveness of the 2021 Wildfire Mitigation Plan, and presented the 2021 Wildfire Mitigation Plan and the evaluator's report to the Board in the fourth quarter of 2020. Subsequent to this approval the WSAB issued a general set of recommendations for publicly owned electric utility wildfire mitigation plans. SMUD prepared a Supplement to its 2021 Wildfire Mitigation Plan (the "Supplement") to respond to those recommendations and presented the Supplement to the Board in the second quarter 2021. The Supplement was adopted by the Board and SMUD submitted the 2021 Wildfire Mitigation Plan together with the Supplement to the WSAB in June 2021. The WSAB adopted its 2022 Guidance Advisory Opinion for POUs in February 2022 and SMUD has responded to all recommendations regarding SMUD's Wildfire Mitigation Plan in the development of its draft Wildfire Mitigation Plan ("2022 Wildfire Mitigation Plan"). After completion of a noticed public comment process and qualified independent evaluator review, the draft 2022 Wildfire Mitigation Plan will be presented to the Board and once adopted by the Board will be submitted to the WSAB by July 1, 2022. SMUD will continue to annually review and update its wildfire mitigation plan, conducting a comprehensive review at least every third year.

Wildfire Insurance. Wildfires in the State have not only increased potential liability for utilities, but have also adversely impacted the insurance markets, leading to higher costs for coverage; coverages becoming prohibitively expensive; limited or restricted coverage to certain types of risks; or coverage at insufficient levels. SMUD most recently renewed its general and wildfire liability insurance coverage on June 15, 2021. SMUD increased the commercially-insured portion of its $250 million wildfire coverage program from $173 million to $176 million and stayed within budgeted premium amounts. SMUD self-insures certain layers and quota share portions of the insurance tower up to $74 million.

In addition, it is expected that SMUD will have a portion of the $400 million aggregate principal amount of its commercial paper and line of credit program to provide operational flexibility in the event of the occurrence of a wildfire or other operational event. However, SMUD has not covenanted to maintain the availability of the commercial paper program and line of credit program for these purposes and no assurances can be given that the commercial paper and line of credit program will be available at the time of, or during, such an event.

August 2020 Heat Wave

The State experienced a prolonged above average temperature from August 14, 2020 through August 18, 2020. The CAISO was forced to institute rotating electricity outages in the State during this extreme heat wave. SMUD, as a member of BANC, did not have to implement any planned power disruptions. Additionally, SMUD was able to support the CAISO during some hours of the heat wave with both requested emergency assistance and wholesale market sales. SMUD's peak demand between August 14, 2020 and August 18, 2020, varied between 2,874 MW and 3,057 MW, well below SMUD's record peak of 3,299 MW.

Impacts from COVID-19 Pandemic

The COVID-19 pandemic has dramatically altered the behavior of businesses and people in a manner that has had, and continues to have, negative effects on global and local economies. SMUD is still experiencing the impact from COVID-19, but the impact on SMUD has lessened since the height of the pandemic in 2020. Compared to weather adjusted, pre-pandemic load levels, SMUD is currently experiencing an approximately 2%-3% increase in residential customer load and an approximately 3% decrease in commercial customer load, resulting in almost no change in net load. The commercial customers currently experiencing the largest impacts of the pandemic appear to be medium sized commercial customers while the smallest and largest commercial customers appear to have returned to pre-pandemic load levels or are exceeding them. SMUD anticipates that load recovery will continue over the next couple of years resulting in continued movement towards pre-pandemic levels, but not a complete recovery as people continue to work from home long-term.

In addition, as a result of the pandemic, many businesses have closed or reduced operations, unemployment has dramatically increased, many employees have been furloughed and/or shifted to reduced working hours and an increased number of SMUD's customers have been, and could continue to be, unable to pay their electric bills. Part of the governmental response to the economic consequences of the pandemic required utility providers (including SMUD) to provide additional grace periods and flexible payment plans for the payment of utility bills or to refrain from pursuing collection remedies for unpaid bills for a period of time. SMUD had also implemented a no-shutoff policy through January 2022 under which SMUD would not disconnect power to a customer for non-payment of its electric bill. Beginning in February 2022, SMUD resumed its normal payment, late fee, and disconnection process and began disconnections of unpaid accounts in late April 2022. As a result, SMUD has experienced an increase in delinquencies for customer electric accounts versus pre-pandemic levels. In January 2022, SMUD received $41 million from the California Arrearage Payment Program ("CAPP") and the funds were applied to delinquent balances. As of April 9, 2022, the total delinquencies for customer electric accounts were $74.3 million, after the CAPP credit, which is an increase from the February 2020 balance of total delinquencies for customer electric accounts of $16.9 million. SMUD has also paused the recertification process for existing customers in SMUD's low-income discount program. The number of customers participating in the low-income assistance program increased by 14,700, or approximately 14% from February 2020 to March 2022. Although low-income assistance customers increased, program costs decreased by $0.7 million in 2021 compared to 2019 due to a previously approved program restructuring.

SMUD's actual 2021 revenue exceeded the 2021 revenue forecast. Revenue in 2022 and 2023 is expected to increase as customers shift back to pre-pandemic energy usage patterns. On September 16, 2021, the Board also approved a 1.5% rate increase effective March 1, 2022 and a 2.0% rate increase effective January 1, 2023 for all customer classes. See "RATES AND CUSTOMER BASE – Rates and Charges – *2021 Rate Action*."

While the full effects of the pandemic and its related consequences on SMUD's financial results and operations are difficult to predict, SMUD's financial results or operations could be materially adversely affected. If the pandemic and its consequences are prolonged, again become more severe or another similar event occurs, the likelihood of adverse impacts could be increased.

RATES AND CUSTOMER BASE

Rates and Charges

SMUD's Board of Directors has autonomous authority to establish the rates charged for all SMUD services. Unlike IOUs and some other municipal utility systems, retail rate and revenue levels are not subject to review or regulation by any other federal, State or local governmental agencies. Changes to SMUD rates only require formal action by the Board of Directors after two public workshops and a public hearing. SMUD is not required by law to transfer any portion of its collections from customers to any local government. SMUD typically reviews and sets rates on a two-year cycle.

***2019 Rate Action*.**

On June 24, 2019, the Board approved a 3.75% rate increase effective January 1, 2020, a 3.00% rate increase effective October 1, 2020, a 2.50% rate increase effective January 1, 2021, and a 2.00% rate increase effective October 1, 2021, for all customer classes. Additionally, the Board approved a restructuring of the commercial rates, including new time periods and an overall increase in the fixed bill components, such as the System Infrastructure Fixed Charge and demand charges, and a corresponding decrease in energy charges, making the restructuring revenue neutral by rate category. To minimize bill impacts, rate categories will be restructured over an 8-year period. Customers were transitioned to the new rates in the first quarter of 2022. There is currently pending litigation concerning the adoption of the 2020 and 2021 rates. See "LEGAL PROCEEDINGS – Proposition 26 Lawsuit."

Due to the impacts of the COVID-19 pandemic on SMUD's operations and priorities, on August 20, 2020, the Board approved postponing the implementation of the commercial rate restructure for one year.

2021 Rate Action.

On September 16, 2021, the Board approved a 1.5% rate increase effective March 1, 2022 and a 2.0% rate increase effective January 1, 2023 for all customer classes. Additionally, the Board approved the Solar and Storage Rate, the optional residential CPP rate, and updates to certain schedules of SMUD's Open Access Transmission Tariff ("OATT"). The Board also approved a new timeline for the commercial rate restructure transition, and all impacted commercial customers were transitioned to the new rates by the end of the first quarter of 2022.

SMUD also implemented a solar interconnection fee based on the size of solar interconnection and supporting programs such as battery incentives, incentives to enroll in SMUD's Critical Peak Pricing rate, battery incentives for Virtual Power Plants, and a program to bring the benefits of solar to under-resourced multi-family communities. These programs and fees are not subject to Board approval.

Rate Stabilization Funds

The Rate Stabilization Fund (the "RSF") is maintained by SMUD to reduce the need for future rate increases when costs exceed existing rates. At the direction of the Board, amounts may be either transferred into the RSF (which reduces revenues) or transferred out of the RSF (which increases revenues). The Board authorizes RSF transfers on an event driven basis. The RSF includes funds to hedge variations in the volume of energy received from non-SMUD hydroelectric generation, variation in AB 32 revenue and variations in Low Carbon Fuel Credit ("LCFS") revenue. As of March 31, 2022, the balance in the RSF was $137.5 million, approximately 8.8% of retail revenue.

Effective July 2008, SMUD implemented the HGA, which is a pass-through rate component to deal with variations in hydroelectric generation from the UARP (see "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Hydroelectric*"). The HGA is designed to increase revenues in dry years when SMUD must buy power to replace hydroelectric generation and return money to the HRSF in wet years when SMUD has more hydroelectric generation than expected. Each year SMUD determines the impact of precipitation variances on projected hydroelectric generation from the UARP. When the precipitation variance results in a deficiency of hydroelectric generation from the UARP, transfers from the HRSF, which was created as a component of the RSF, to SMUD's available cash, will be made in an amount approximating the cost to SMUD of replacement power (up to 4% of revenues) until the balance in the HRSF is zero. When the precipitation variance results in a projected surplus of hydroelectric generation from the UARP, deposits will be made into the HRSF in an amount approximating the positive impact to SMUD from the surplus hydroelectric generation (up to 4% of revenues) until the balance in the HRSF is equal to 6% of budgeted retail revenue (currently approximately $56 million). If the balance in the HRSF is not sufficient to cover transfers that would otherwise be made in the event of a projected deficiency in UARP hydroelectric generation, a 12-month HGA surcharge will automatically be included on customers' electric bills at a level that generates up to 4% of retail revenue. If the balance in the HRSF is equal to 6% of budgeted retail revenue on any precipitation variance calculation date and the precipitation variance results in a projected UARP hydroelectric generation surplus, the positive impact of the surplus may be used for other purposes at staff's recommendation, with the approval of the Board, including returned to customers through an electric bill discount up to 4% of retail revenue. SMUD calculates HRSF transfers based on an April-March (water year) precipitation period at Pacific House, California. This National Weather Service precipitation station is used to approximate available water supply to SMUD's UARP hydropower reservoirs. As of March 31, 2022, precipitation at Pacific House, California totaled 38.34 inches which is below the 50-year rolling median of 50.52 inches.

As of March 31, 2022, the combined balance in the RSF and HRSF was $193.6 million. SMUD is forecasting a transfer of approximately $25.1 million out of the HRSF to SMUD's available cash in April

2022 due to below average precipitation, which will decrease the balance in the HRSF from $56.1 million to approximately $31.0 million. Although the HRSF and the subaccount of the RSF that hedge variations in the volume of energy received from non-SMUD hydroelectric generation currently have positive balances, continued below average precipitation could deplete the HRSF and RSF balances to zero.

Low Income Discount

As of March 2022, approximately 90,102 customers received the low-income discount offered by SMUD, which represents approximately 16% of all residential customers. SMUD monitors the program to ensure participants continue to be eligible for the discount. In 2021, the total discount was approximately $29.5 million. As a result of the effects of the COVID-19 pandemic and related economic downturn, SMUD experienced an increase in low-income discount applicants. See "FACTORS AFFECTING THE REGION – Impacts from COVID-19 Pandemic."

SMUD expanded its programs and services starting in 2016 to help customers with energy assistance, home improvement packages and education. SMUD is creating tailored solutions to best meet the needs of low-income customers. These solutions include free solar panels and inspecting homes to identify energy saving opportunities. As of March 2022, SMUD has performed 27,000 energy retrofits and, in partnership with Grid Alternatives (a non-profit organization that focuses on implementing solar power and energy efficiency for low-income families), 196 customers have benefited from free solar installations. Forty additional homes received solar and energy efficiency through a partnership with Habitat for Humanity of Greater Sacramento. As part of SMUD's Zero Carbon Plan and the focus on building electrification, SMUD has also been ramping up electrification investments for low-income customers. Since 2019, SMUD has assisted more than 675 households with electrification upgrades.

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Rate Comparisons

SMUD's rates remain significantly below those of PG&E and other large utilities throughout the State. The following table sets forth the average charges per kWh by customer class for both SMUD and PG&E. PG&E's rates reflect their recently approved rate effective March 1, 2022.

AVERAGE CLASS RATES

	SMUD Rates (cents/kWh)[(1)]	**PG&E Rates (cents/kWh)[(2)]**	**Percent SMUD is Below PG&E[(3)]**
Residential – Standard	17.57¢	33.57¢	47.6%
Residential – Low Income	12.18¢	20.91¢	41.7%
All Residential	**16.73¢**	**29.16¢**	**42.6%**
Small Commercial (Less than 20 kW)	17.01¢	32.24¢	47.3%
Small Commercial (21 to 299 kW)	15.76¢	30.69¢	48.6%
Medium Commercial (300 to 499 kW)	14.59¢	29.75¢	50.9%
Medium Commercial (500 to 999 kW)	13.65¢	25.73¢	47.0%
Large Commercial (Greater than 1,000 kW)	11.45¢	20.08¢	43.0%
Lighting – Traffic Signals	13.46¢	31.39¢	57.1%
Lighting – Street Lighting	15.17¢	35.57¢	57.3%
Agriculture	15.10¢	29.19¢	48.3%
System Average	15.26¢	27.76¢	45.0%

(1) Projected 2022 average prices for SMUD with rates effective October 1, 2021 and March 1, 2022.
(2) PG&E average prices in 2022 reflect rates effective March 1, 2022, per Advice Letter 6509-E- dated February 18, 2022.
(3) The rates in the Average Class Rates table are calculated by dividing the total revenue of each class by the total usage of that class in kWh. The actual savings per customer will vary based on their electricity consumption.

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The following table shows a comparison of SMUD's charges for the average residential usage of 750 kWh per month (based on an average of summer and non-summer) and charges of seven similar neighboring or largest utilities in the State.

STATEWIDE COMPARISON–RESIDENTIAL SERVICE

	Monthly Billing Charge 750 kWh[(2)]	**Percent SMUD is (Below)/Above Utility**
Sacramento Municipal Utility District[(1)]	$128.54	
Pacific Gas & Electric Company	$258.62	(50.3%)
Roseville Electric Utility	$116.20	10.6%
Turlock Irrigation District	$120.40	6.8%
Modesto Irrigation District	$134.53	(4.5%)
Southern California Edison Company	$172.74	(25.6%)
Los Angeles Dept. of Water & Power	$217.72	(41.0%)
San Diego Gas and Electric Company	$306.45	(58.1%)

(1) Includes approved March 1, 2022 rates.
(2) Per individual utility's published schedules as of March 1, 2022.

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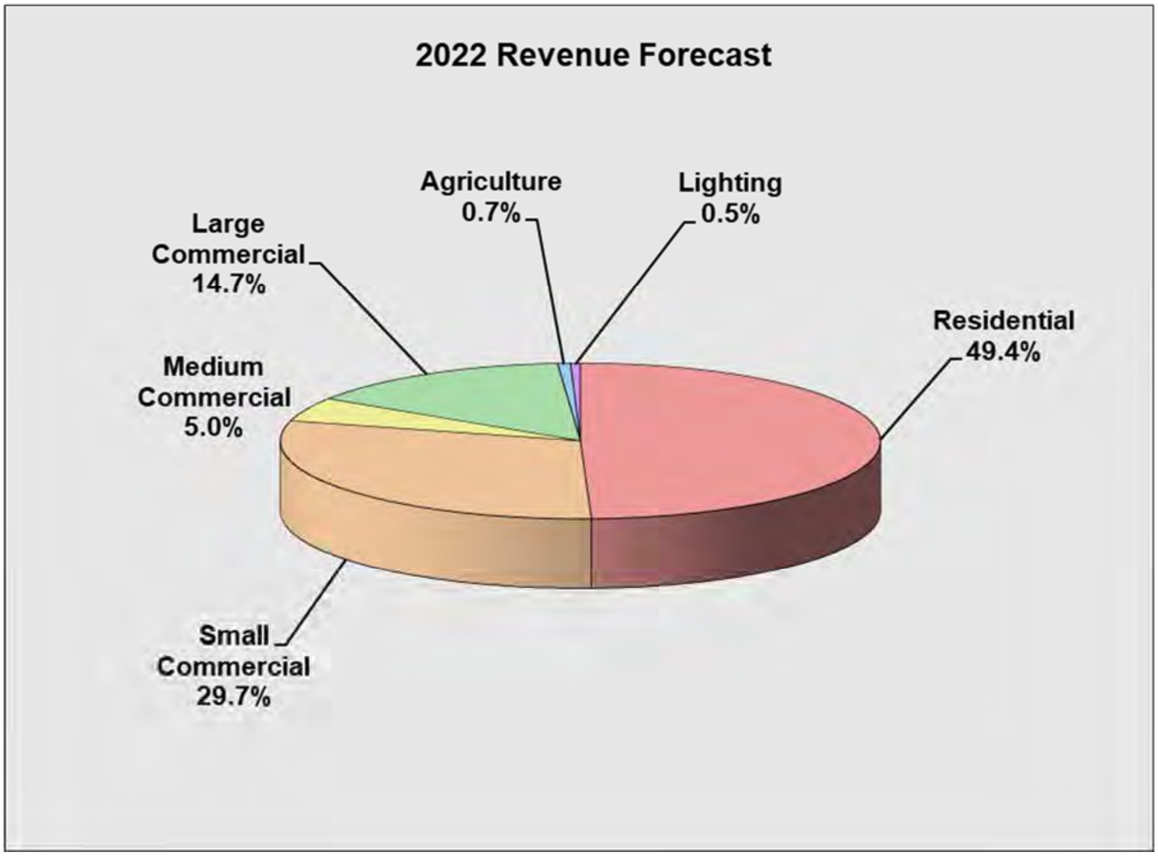
Allocation of Revenue by Customer Class

The following chart sets forth the forecast percentage of SMUD revenues from billed sales associated with each customer class.



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Customer Base; Largest Customers

A stabilizing influence on SMUD's revenues is that a substantial proportion is derived from residential customers (49.6% in 2021). Historically, revenue from commercial and industrial consumption has been more sensitive to economic fluctuation. Furthermore, SMUD has no dominant customers that account for a significant percentage of annual revenues. In 2021, no single customer contributed more than 3% of revenues. The top ten customers generated approximately 11% of revenues and the top 30 generated approximately 17%. The following table presents information on SMUD's top ten customers as of December 31, 2021.

SMUD'S LARGEST CUSTOMERS
(As of December 31, 2021)

Customer Type	Annual Revenue ($ millions)	% of Total Revenue
Technology	$37.46	2.43%
Government	$32.42	2.10%
Government	$30.43	1.98%
Technology	$13.57	0.88%
Government	$13.20	0.86%
Communications	$9.89	0.64%
Industrial Gases	$9.07	0.59%
Grocery	$7.31	0.47%
Government	$7.22	0.47%
Government	$6.73	0.44%
Top 10 Total	**$167.28**	**10.86%**

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POWER SUPPLY AND TRANSMISSION

Power Supply Resources

The following table sets forth information concerning SMUD's power supply resources as of March 31, 2022. Capacity availability reflects expected capacities at SMUD's load center, as well as entitlement, firm allocations and contract amounts in the month of July, which is generally SMUD's peak month.

POWER SUPPLY RESOURCES
(As of March 31, 2022)

Source:	Capacity Available (MW)(1)
Generating Facilities:	
Upper American River Project – Hydroelectric	685
Solano Wind Project – Wind(2)	120
Hedge Battery(2)	4
Sub-total:	**809**
Local Gas-Fired Plants:	
SFA (Cosumnes)	570
CVFA (Carson-Ice)	103
SCA (Procter & Gamble)	166
SPA (McClellan)	72
SPA (Campbell Soup)	170
Sub-total:	**1,081**
Purchased Power:	
Western Area Power Administration (WAPA) (3) (4)	272
Grady – Wind(2)	67
Iberdrola (PPM) – Wind(2)	32
Feed-in-Tariff Photovoltaic – Solar(2)	27
Rancho Seco Solar(2)	73
NTUA Navajo Drew Solar(2)	56
Recurrent – Solar(2)	39
Wildflower Solar(2)	11
CalGeo – Geothermal	26
Patua (Gradient/Vulcan) – Geothermal	12
Other Long-Term Contracts	18
ELCC Portfolio Adjustment(2)	(53)
Firm Contract Reserves(4)	14
Committed Short-Term Purchases (5)	708
Uncommitted Short-Term Purchases	88
Sub-total:	**1,366**
Total	**3,255**

(1) Available capacity is the net capacity available to serve SMUD's system peak load during the month of July.
(2) Capacity values shown are based on resource effective load carrying capability modeling.
(3) Total includes SMUD's Base Resource share and WAPA Customer allocations.
(4) Assumes firm reserves of 5% are included.
(5) Committed Short-Term Purchases are primarily purchased on a year-ahead to season-ahead basis from various sources.

Note: Totals may not add due to rounding.

Power Generation Facilities

Hydroelectric. The UARP consists of three relatively large storage reservoirs (Union Valley, Loon Lake and Ice House) with an aggregate water storage capacity of approximately 400,000 acre-feet and eight small reservoirs. Project facilities also include eight tunnels with a combined length of over 26 miles and eight powerhouses containing 11 turbines. In addition to providing clean hydroelectric power and operating flexibility for SMUD, the UARP area provides habitat for fish and wildlife and a variety of recreational opportunities, including camping, fishing, boating, hiking, horseback riding, mountain biking and cross-country skiing.

The combined capacity of the UARP is approximately 673 MW at SMUD's load center in Sacramento. Under current licensing and mean water conditions, these facilities are expected to generate approximately 1,600 GWh of electric energy annually, which represents approximately 15% of SMUD's current average annual retail energy requirements. In 1957, the Federal Power Commission (predecessor agency to FERC) issued a license to SMUD for the UARP. This 50-year license was subsequently amended to add and upgrade facilities and now includes all segments of SMUD's hydroelectric facilities located on the South Fork of the American River and its tributaries upstream from the Chili Bar Project (described below). Before the original FERC license expired in 2007, SMUD reached a settlement agreement with federal and state regulatory land management agencies, nongovernmental organizations, and other interested stakeholders on proposed terms and conditions to be included in a new FERC license for the UARP. The settlement agreement was filed with the FERC on February 1, 2007.

On October 4, 2013 the California State Water Resources Control Board (the "SWRCB") issued a 401 Water Quality Permit as required by the Clean Water Act, and on July 23, 2014 FERC issued a new 50 year license for the UARP. The new license followed the Settlement Agreement filed in 2007. The new license includes increases in environmental flow releases, and recreational flows at several locations. The estimated loss of generation is approximately 100 GWh per year and an additional $15 million of O&M and capital costs per year.

On June 16, 2021, pursuant to Board authorization, SMUD acquired the Chili Bar Hydroelectric Project which consists of a 7 MW powerhouse, reservoir, dam and spillway, north of Placerville on the South Fork of the American River for approximately $10.4 million (the "Chili Bar Project"). The Chili Bar Project is immediately downstream from the UARP and operates as the regulating reservoir for the UARP's largest powerhouse. Owning the UARP and the Chili Bar Project enables SMUD to operate the two projects with a holistic approach to license compliance and generation efficiency.

Solano Wind Project. SMUD owns and operates a 102 MW wind project, located in Solano County, known as Solano Phases 1 and 2. Solano Phases 1 and 2 consist of 23 wind turbine generators ("WTG") rated at 660 kilowatts ("kW") each, and 29 WTGs rated at 3 MW each, respectively. Energy from the project is collected at 21 kV and transmitted over a dedicated 3-mile overhead system to the SMUD-owned Russell substation. At the Russell facility, the energy is transformed to 230 kV and interconnected to PG&E's Birds Landing Switching Station. Energy deliveries are scheduled through the CAISO.

Solano 3 Project. In 2011 and 2012, SMUD constructed a 128 MW wind project adjacent to Solano Phases 1 and 2, known as Solano 3. The Solano 3 project consists of 55 WTGs rated at 1.8 MW and 3.0 MW, and interconnects at the Russell substation. The Solano 3 project was sold to Solano 3 Wind, LLC, a subsidiary of Citigroup, in December of 2011. The transaction included an option for SMUD to repurchase the Solano 3 project at year six, eight or fifteen. SMUD exercised its repurchase option at year six, and completed this transaction and transfer of ownership in April 2018.

Solano 4 Project. SMUD is developing the Solano 4 Wind Project. The Solano 4 Wind Project currently plans to utilize SMUD-owned land near the Solano 3 project, known as the Collinsville and Roberts properties, to install 10 WTGs rated at 4.5MW, and to remove the Solano Phase 1 turbines and replace them with 9 WTGs rated at 4.5 MW. In 2019, SMUD secured the wind rights on the Roberts property and removed the wind turbines on that property. SMUD received the Cluster II Phase I Study results from the CAISO in January 2019, provided the initial security posting in April 2019, and received the Phase II Study Report in November 2019, furthering the process towards a Large Generator Interconnection Agreement. SMUD has met all of the CAISO requirements and has executed a Large Generator Interconnection Agreement as of June 2021 that will allow for 90.8 MW of capacity at the point of interconnection. WAPA and PG&E identified upgrades needed to interconnect the Solano 4 Wind Project that may not be complete before 2024. The WAPA impacts have been resolved at no cost. PG&E has an approved project and expects to complete the needed upgrades by May of 2025. In April 2021, SMUD submitted an application for advisory review by the Solano County Airport Land Use Commission (the "Solano ALUC") of the Solano 4 Wind Project's consistency with the 2015 Travis Air Force Base Land Use Compatibility Plan (the "Travis Plan"). In May 2021, the Solano ALUC purported to resolve that the Solano 4 Wind Project was inconsistent with the Travis Plan. In August 2021, the Board approved the Project Environmental Impact Report, made findings overriding the Solano ALUC's finding of inconsistency, made findings there was no alternative to the project, and approved the Solano 4 Wind Project. In addition, SMUD applied for and obtained extensions of the Federal Aviation Administration Determinations of No Hazard allowing for construction of the turbines. They remain valid as long as SMUD awards a contract by the end of July 2022. SMUD released the Request for Proposals to construct the Solano 4 Wind Project in May 2021 and has received bids and is working toward a contract award mid-2022. The expected operation date for the project is May 2024. Full project capacity may be delayed into the first quarter of 2025 due to the timeframe established for the PG&E required upgrades. SMUD has developed a mitigation plan for the limited interconnection capacity for the first year of operation, in coordination with CAISO and PG&E, of using all of the existing SMUD Solano Russell substation interconnection capacity combined to dispatch all the projects under. SMUD expects to complete the administrative process to allow for this by late 2022.

Solar Photovoltaic. SMUD owns and operates approximately 2 MW of solar photovoltaic generating facilities. These facilities include installations at the Hedge Substation property, SMUD Headquarters, the East Campus Operations Center, and other smaller photovoltaic systems throughout the service area on parking lots.

Local Gas-Fired Plants. SMUD constructed five local natural gas-fired plants in its service area: the CVFA Project, the SCA Project, the SPA Project, SPA McClellan and the SFA Project (each defined below). These five plants are referred to collectively as the "Local Gas-Fired Plants." These plants are a strategic component of SMUD's resource mix. In addition to providing SMUD a total capacity of approximately 1,139 MW, the Local Gas-Fired Plants provide SMUD with needed voltage support, operational and load following capability, and the reliability inherent in having power resources located close to loads. With the exception of SPA McClellan, these plants were financed through the issuance of project revenue bonds by separate joint powers authorities (collectively, the "Authorities"). In late 2021, ownership of all of the Local Gas-Fired Plants was transferred to one of the Authorities, SFA. SMUD has entered into long-term agreements with SFA providing for the purchase by SMUD of all of the power from each of the Local Gas-Fired Plants. This consolidation created operational and administrative efficiencies without changing any of the functionality of the power plants. Although the Local Gas-Fired Plants are owned by SFA, SMUD has exclusive control of their dispatch and manages their operations as part of its overall power supply strategy.

Payments under the power purchase agreements are payable from the revenues of SMUD's Electric System prior to the payment of the principal of or interest on SMUD's Senior Bonds and Subordinated

Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below), as are other maintenance and operation costs and energy payments. For further discussion of SMUD's obligations to make these payments to SFA, see "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS – Outstanding Indebtedness – *Joint Powers Authorities*."

The following is a brief description of the five Local Gas-Fired Plants:

The Cosumnes Power Plant (the "SFA Project"). The SFA Project is a 612 MW natural gas-fired, combined cycle plant located in the southern portion of Sacramento County adjacent to SMUD's decommissioned Rancho Seco Nuclear Power Plant. Commercial operation of the SFA Project commenced on February 24, 2006. SFA increased the net generating capacity of the facility by 81 MWs via an Advanced Gas Path ("AGP") upgrade. The additional AGP generation was realized after hardware and software upgrades were completed on both units in March of 2019. The SFA Project is owned by SFA, a joint powers authority formed by SMUD and MID. The existing take-or-pay power purchase agreement between SMUD and SFA expires no earlier than when the related bonds have been paid in full (the outstanding related bonds are scheduled to mature on July 1, 2030).

The CVFA Carson Cogeneration Project (the "CVFA Project"). The CVFA Project, a 103 MW natural-gas-fired cogeneration project consisting of separate combined cycle and peaking plants, provides steam to the Sacramento Regional County Sanitation District ("SRCSD") wastewater treatment plant adjacent to the site. The CVFA Project was originally owned by the CVFA, a joint powers authority formed by SMUD and the SRCSD. Construction of the CVFA Project was completed and the plant began commercial operation on October 11, 1995. The CVFA bonds were defeased in September 2019. In late 2021, ownership of the CVFA Project was transferred to SFA. The take-or-pay power purchase agreement between SMUD and SFA relating to the CVFA Project (the "CVFA PPA") will be in effect until terminated by SMUD.

The SCA Procter & Gamble Cogeneration Project (the "SCA Project"). The SCA Project, a 182 MW natural gas-fired cogeneration facility, is located in an established industrial area of Sacramento. The initial combined cycle portion of the plant began commercial operation on March 1, 1997. Construction of the peaking plant portion of the SCA Project commenced during 2000 and the unit achieved commercial status on April 24, 2001. The SCA Project produces steam for use in Procter & Gamble Manufacturing Company's oleochemical manufacturing processes and electricity for sale to SMUD. The SCA Project was originally owned by the SCA, a joint powers authority formed by SMUD and SFA, a separate joint powers authority. The SCA bonds were defeased in September 2019. In late 2021, ownership of the SCA Project was transferred to SFA. The take-or-pay power purchase agreement between SMUD and SFA relating to the SCA Project (the "SCA PPA") will be in effect until terminated by SMUD.

The SPA Campbell Soup Cogeneration Project (the "SPA Project"). The SPA Project, a 170 MW natural gas-fired cogeneration project, was completed and began commercial operations on December 4, 1997. Upgrades were implemented during 2000, which increased the plant's peaking capacity to 180 MW, well above its net demonstrated capacity of 159.8 MW. The plant is located in south Sacramento adjacent to the Capital Commerce Center (formerly the Campbell Soup Company food processing facility). The SPA Project was originally owned by SPA, a joint powers authority formed by SMUD and SFA. The SPA bonds were redeemed in July 2015. In late 2021, ownership of the SPA Project was transferred to SFA. The power purchase agreement between SMUD and SFA relating to the SPA Project (the "SPA PPA") covers both the SPA Project and SPA McClellan and will be in effect until terminated by SMUD. As part of the Zero Carbon Plan, SMUD is exploring retiring the SPA Project in 2025 pending a feasibility assessment. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan.*"

The SPA McClellan Gas Turbine ("SPA McClellan"). SPA McClellan is a 72 MW natural gas-fired simple cycle combustion turbine generating plant at McClellan Business Park in Sacramento. This turbine is connected to SMUD's electric system and is operated to meet SMUD's peak-load requirements. SPA McClellan is aligned for remote starting and operation with both black start and fast start capabilities. SMUD constructed the McClellan unit in 1986 as a 50 MW emergency power source for the McClellan Air Force Base. In 2001, following the Air Force Base closure, McClellan was upgraded to 72 MW and converted for SMUD use. In May 2007, SMUD transferred ownership of the McClellan Gas Turbine to SPA for more efficient operation. SPA did not issue debt related to SPA McClellan. In late 2021, ownership of SPA McClellan was transferred to SFA. SFA passes all costs of operations and maintenance through to SMUD in accordance with the terms of the SPA PPA. In exchange for paying all costs related to SPA McClellan, SMUD receives all of the power generated thereby. As part of the Zero Carbon Plan, SMUD is exploring retiring SPA McClellan in 2024 pending a feasibility assessment. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *2030 Zero Carbon Plan.*"

Fuel Supply

General. SMUD is obligated to arrange for the purchase and delivery of natural gas to the Local Gas-Fired Plants. Management of the natural gas procurement and delivery process is a key focus of SMUD's reliability and risk policies. Although the natural gas consumption of the power plants for SMUD's load can vary significantly depending on the season, precipitation, and the market price of power and natural gas, the plants are forecasted to need, on average in 2022, a total of approximately 96,000 Decatherms per day ("Dth/day") with a daily peak slightly more than 171,000 Dth/day of natural gas. Due to a gradual decline in natural gas consumption, SMUD is forecasting consumption of approximately 75,000 Dth/day in 2024. SMUD has implemented a comprehensive strategy to secure a reliable and diversified fuel supply through a variety of agreements for the supply, transportation, and storage of natural gas.

Supply. SMUD hedges a significant portion of its expected gas needs to meet customer power requirements. This includes gas for the Local Gas-Fired Plants and for the Sutter Energy Center. See "Power Purchase Agreements – *Sutter Energy Center*". This is accomplished through a combination of long-term supply arrangements and an exposure reduction program. The program consists of a primary rolling three-year exposure reduction component, as well as supplemental fixed calendar year components reaching out five calendar years. Long-term arrangements may consist of a combination of physical commodity supply contracts, financial hedges, or options. Natural gas is purchased from a wide variety of producers and marketers at the northern and southern California borders, at Alberta, Canada and from the San Juan and the Rocky Mountain supply basins. SMUD has a number of both fixed-price supply agreements and financial hedging contracts to fix gas costs ranging from one month to several years in duration. Including fixed price biogas contracts as of March 31, 2022, these contracts have hedged the price of approximately 68%, 70% and 65% of SMUD's forecasted natural gas requirements for 2022, 2023 and 2024, respectively. While the financial effects resulting from the unhedged portions of SMUD's natural gas requirements are difficult to predict, SMUD's financial results could be materially impacted.

SMUD has contracted with the Northern California Gas Authority No. 1 ("NCGA") to purchase an approximate average of 8,700Dth/day over the remaining life of a contract expiring May 31, 2027 (the "NCGA Contract"). Under the NCGA contract, SMUD pays a discounted variable price for the fuel and anticipates periodically fixing the effective price under separate hedging contracts. Currently the delivery point for the NCGA Contract is the AECO hub in Alberta. SMUD is using its long-term transport capacity to deliver the fuel to the local area plants. To increase delivery efficiencies, SMUD expects to exchange the gas delivered at the AECO hub under the NCGA Contract with gas delivered at the Malin receipt point beginning in 2023. SMUD has also contracted with the Northern California Energy Authority ("NCEA") to purchase an approximate average of 22,000 Dth/day or to be converted to the approximate value in

MegaWatt-hours ("MWh") of electricity over the remaining life of a contract expiring on May 31, 2049. The gas will be delivered to the SMUD system via the Malin receipt point on the PG&E backbone system. SMUD is using its long-term transport capacity to deliver the fuel to the local area plants. SMUD will pay a discounted variable price for the fuel and anticipates periodically fixing the effective price under separate hedging contracts.

Renewable Natural Gas Supply. As a component of meeting SMUD's RPS goals, SMUD procures renewable natural gas and digester gas as fuels to generate renewable electricity from the SFA Project. Descriptions of the renewable natural gas supply agreements are provided below.

In March 2009, SMUD entered into a 15-year contract (that qualifies as renewable energy) with Shell Energy North America (US), L.P. ("Shell Energy") to purchase up to 6,000 Dth/day of renewable natural gas produced from a landfill project in Texas. SMUD began taking deliveries of this supply in April 2009. In March 2012, SMUD amended the contract with Shell Energy to increase the maximum volumes to 7,300 Dth/day and extended the term by 10 years to March 31, 2034. Currently, the delivery point is PG&E Topock and SMUD is using its long-term transport capacity to deliver it to the SFA Project. In 2016, SMUD entered into a 3-year contract with Shell Energy to sell back the entire volume of renewable natural gas purchased, less 500 Dth/day, to be sold into the vehicle transportation markets. Upon expiration of the initial 3-year contract for the sale of biogas to Shell Energy, SMUD extended the sell back of the entire volume of biogas for an additional 3 years with Element Markets, starting in 2020.

SMUD contracted with Heartland Renewable Energy, LLC ("HRE") in December 2009 for a 20-year supply of up to 7,000 Dth/day of renewable natural gas from a digester facility in Colorado. Deliveries began in March of 2014. Currently, the delivery point is Opal, Wyoming and SMUD uses its long-term transport capacity to deliver it to the SFA Project. HRE has not delivered volumes from the project to SMUD since December 2016 due to current litigation with Weld County, Colorado regarding odor and permit issues. EDF Renewables, the majority owner of HRE, notified SMUD in August of 2017 that it is in discussions with a short list of bidders to sell its interests in the facility. In June of 2020, the project was purchased and SMUD's contract was assigned to the new owner, Platte River Biogas, LLC ("PRB"). SMUD and PRB terminated the contract in the third quarter of 2021.

In September 2011, SMUD and CVFA entered into a "Digester Gas Purchase and Sale Agreement" through which the CVFA Project cleans nearly all of the digester gas received from SRCSD and sells it to SMUD for delivery to the SFA Project. In return, SMUD pays all of the CVFA Project's costs in acquiring, cleaning and making the gas available to SMUD. The Digester Gas Purchase and Sale Agreement expires in September 2025. In late 2021, the Digester Gas Purchase and Sale Agreement, along with the CVFA Project was transferred to SFA. The CVFA Project is currently receiving, processing and selling up to 1,500 Dth/day with provisions for volume increases over time to 2,500 Dth/day. Digester gas, when designated for use in SMUD's power plants, is counted as renewable generation towards SMUD's RPS obligations.

In December 2011, SMUD entered into a 20-year agreement with EIF KC Landfill Gas LLC ("EIF") to purchase up to 7,050 Dth/day of renewable natural gas produced from multiple landfill projects. SMUD began taking deliveries of this supply in January 2014. Currently the delivery point is Kern River – Opal and SMUD uses its long-term transport capacity to deliver it to the SFA Project. Renewable natural gas, when designated for use in SMUD's power plants, is counted as renewable generation towards SMUD's RPS obligations. In April 2022 SMUD entered into a transaction to sell the renewable natural gas purchased into the vehicle transportation markets. The transaction expires in March 2025.

AB 2196 is a law that defines the criteria by which existing and future renewable natural gas contracts will qualify for the State RPS program. The CEC adopted a RPS Eligibility Guidebook on April

30, 2013, which includes detailed rules for implementation of AB 2196. SMUD received an updated certificate of eligibility from the CEC in July 2014 for the SFA Project that included the quantities of renewable natural gas from all four contracts. The CEC adopted a revised RPS Eligibility Guidebook (Ninth Edition) on April 27, 2017. This latest guidebook did not change the RPS eligibility of any of the above SMUD renewable natural gas and digester gas contracts, but did simplify reporting requirements for these contracts. When fully delivering, these contracts represent roughly 30% of SMUD's 2020 RPS requirement.

Gas Transmission

SMUD has satisfied its obligation to deliver natural gas to its power plants by constructing a natural gas pipeline, purchasing an equity interest in two PG&E backbone gas transmission lines, and contracting for capacity on a number of existing interstate natural gas transmission lines.

The Local Pipeline. SMUD constructed and owns a 20-inch, 50-mile natural gas pipeline in the greater Sacramento area (the "Local Pipeline") that transports gas to all of the Local Gas-Fired Plants except SPA McClellan. The Local Pipeline is interconnected with PG&E's major State gas transmission lines 300 and 401. Additionally, it may be interconnected with one or more private gas gathering pipelines located in the area, a gas storage project and/or other FERC approved pipelines that may be built in the local area. In conjunction with the construction of the SFA Project, SMUD extended the Local Pipeline to the plant site. The 26-mile extension was completed in 2004. The extension is 24 inches in diameter and was designed to serve both the SFA Project and an additional second phase, if constructed.

PG&E Backbone Gas Transmission Lines 300 and 401. In 1996, SMUD purchased an equity interest in PG&E's backbone gas transmission lines 300 and 401 (referred to as the PG&E backbone). The total capacity acquired at that time was approximately 85,000 Dth/day and consisted of approximately 43,600 Dth/day of firm gas transport from the California–Oregon border at Malin, Oregon and 44,700 Dth/day from the California–Arizona border at Topock, Arizona, to SMUD's interconnection with the PG&E backbone near Winters, California. SMUD was also entitled to a share of non-firm capacity, which was approximately 4,360 Dth/day; making the total capacity potentially available to SMUD almost 90,000 Dth/day. This purchase made SMUD a co-owner of the PG&E backbone gas transmission lines 300 and 401 and obligated SMUD to pay PG&E to operate the pipelines on its behalf subject to the terms of the purchase agreement and operating protocols. PG&E reduced operating pressures on Line 300 after PG&E suffered a natural gas explosion in San Bruno, CA in September of 2010. As a result of the reduced operating pressures on Line 300 and a related settlement between PG&E and SMUD, SMUD now holds a total capacity of approximately 88,000 Dth/day, consisting of approximately 47,620 Dth/day of firm gas transport from the California–Oregon border at Malin, and 39,233 Dth/day of firm gas transport from the California–Arizona border at Topock, Arizona, to SMUD's interconnection with the PG&E backbone near Winters, California.

SMUD also holds additional backbone capacity under tariff service for 5,000 Dth/day of northern path (Redwood) capacity. This contract expires in June 2023.

Kern River Gas Transmission Company Long Term Agreement. SMUD has an agreement with Kern River Gas Transmission Company for 20,000 Dth/day of firm capacity through April 30, 2028. This capacity gives SMUD access to the Rocky Mountain supply basin at Opal, Wyoming, and connects to PG&E Line 300 (owned in part by SMUD) at Daggett, California.

TransCanada Firm Transmission Service Agreements. SMUD has several agreements with TransCanada Corporation that give SMUD access to Canadian supply from the Alberta basin to Kingsgate, British Columbia and the California-Oregon border at Malin. SMUD has agreements for 22,101 Dth/day at the California-Oregon border at Malin via the Gas Transmission Northwest ("GTN") pipeline that expires in 2023. SMUD has agreements for approximately 12,000 Dth/day from the Alberta ANG/Foothills pipeline, also expiring in 2023. In order to match the Canadian capacity with the takeaway capacity at Malin, SMUD has an agreement with Foothills Pipeline for approximately 10,000 Dth/day that expires on October 31, 2022. Currently, SMUD is not planning to renew GTN, Alberta ANG/Foothills and Foothills Pipeline.

SMUD's diversified portfolio of gas transmission arrangements allow for the purchase of gas from a variety of suppliers and locations, and the opportunity to capitalize on regional price differentials where possible. In addition, its ownership interest in the SMUD/PG&E backbone and Local Pipeline enhances the reliability of SMUD's gas supply.

Gas Storage

SMUD also employs gas storage as part of its overall fuel supply strategy. Gas storage is useful in helping to balance gas supply, mitigate market price volatility, and provide a reliable supply to meet peak day delivery requirements.

SMUD also has a contract with Lodi Gas Storage, LLC, which began in April 2018 and expires in March 2023, for capacity in the Lodi Gas Storage project located near Acampo in northern California. The contract provides SMUD with capacity levels of 1.0 million Dth of storage inventory, 10,000 Dth/day of injection rights and 20,000 Dth/day of withdrawal capacity.

SMUD has a second contract with Lodi Gas Storage, LLC , which began in April 2022 and expires in March 2024, for additional capacity in the Lodi Gas Storage project located near Acampo in northern California. The contract provides SMUD with capacity levels of 1.0 million Dth of storage inventory, 10,000 Dth/day of injection rights and 20,000 Dth/day of withdrawal capacity.

Power Purchase Agreements

SMUD has a number of power purchase agreements to help meet its power requirements. Some of these agreements are described below.

Western Area Power Administration. Effective January 1, 2005, SMUD entered into a 20-year contract with WAPA. SMUD has entered into a replacement agreement extending the term by 30 years for the period of January 1, 2025 through December 31, 2054. Power sold under this contract is generated by the Central Valley Project ("CVP"), a series of federal hydroelectric facilities in northern California operated by the United States Bureau of Reclamation. The contract provides WAPA's CVP Base Resource customers (including SMUD) delivery of a percentage share of project generation in return for reimbursement of an equivalent share of project costs. SMUD's CVP Base Resource share is roughly 25% of project generation and costs. This is expected to be approximately 318 MW of capacity and 661 GWh of energy in an average water year but will vary depending on precipitation. Energy available under the contract is determined by water releases required for water supply and flood control and is then shaped into higher value periods within other CVP operating constraints. More capacity and energy are typically available in spring and summer months and less in fall and winter.

SMUD also has a contract with WAPA expiring December 31, 2024, by which WAPA delivers an additional 200-300 MW per hour from projects located in the Pacific Northwest based on certain contractual parameters. In 2021, SMUD received 1,100 GWh of energy under this contract.

Avangrid (formerly Iberdrola Renewables ("Iberdrola")). SMUD has a contract with Iberdrola that provide SMUD with bundled renewable energy (energy plus RECs). The contract agreement is for 126 GWh of wind power generated in Solano County, California. The SMUD Board approved an extension of the wind contract through June 30, 2025.

Patua Project LLC. In April 2010, SMUD entered into a power purchase agreement with Patua Project LLC ("Patua"), a subsidiary of Gradient Resources, for the delivery of up to 132 MW (expected to be 120 MW nominal power output) of renewable energy from geothermal generation being developed in north central Nevada, from a Gradient Resources project known as the Patua Project. The project was to have been developed in three phases. Since 2010, the agreed upon capacity has been reduced several times. In December 2013, Phase 1 of the project, which had been reduced to 30 MW, finally achieved commercial operation. In 2014, the parties concluded negotiations on the fourth amendment to the power purchase agreement with Patua, which reduced the total capacity down to 40 MW, extended the commercial operation date of Phase 2 to January 1, 2016, and allowed Patua to add up to 13 MW of solar photovoltaics to supplement geothermal production. In addition, this amendment shifted responsibility to Patua for a portion of the long-term transmission service agreements that have been underutilized due to the project not meeting its targets. In November 2015, the Patua Project was acquired by TL Power, LLC, a wholly owned subsidiary of Cyrq Energy, Inc. ("Cyrq"). In December 2015, Cyrq terminated Phase 2. Upon termination of Phase 2, the contractual right for Cyrq to add solar photovoltaics to supplement geothermal production was reduced to 10 MW. As a result of poor performance during the first year of operation, SMUD reduced its obligation to take power from 30 MW to 25 MW. Performance continued to lag in 2015 and 2016 and SMUD further reduced its obligation to take power from 25 MW to 19 MW.

Renewable Energy Feed-In Tariff. In September 2009, SMUD's Board authorized a feed-in tariff program for the purchase of renewable energy from local renewable energy projects connected to SMUD's distribution system. SMUD's Board authorized connection of up to 100 MW under the feed-in tariff which included standard payment rates and standard purchase terms for power. The feed-in tariff program became effective on January 1, 2010. Under the feed-in tariff, SMUD has executed 20-year term power purchase agreements for solar projects totaling 98.5 MW. Construction and start-up was completed on all projects between 2010 and 2012.

CalEnergy LLC. In August 2014, SMUD entered into a 22-year power purchase agreement with CalEnergy LLC for the purchase of 30 MWs per year of renewable energy from its Salton Sea geothermal facilities. As of July 1, 2017, SMUD began receiving up to 10 MWs from the CalEnergy portfolio, which escalated to the full 30 MWs on May 1, 2020.

Rancho Seco Solar. In October 2015, SMUD entered into a 20-year power purchase agreement with Rancho Seco Solar LLC for the purchase of energy from a 10.88 MW solar PV project sited on SMUD's property at the closed Rancho Seco Nuclear Generating Station. Commercial operation was achieved in August of 2016. Rancho Seco Solar LLC leased the property from SMUD under a land lease agreement. The output of this project will directly serve two large commercial customers having executed agreements with SMUD for retail supply of solar power.

In May 2019, SMUD entered into a 30-year power purchase agreement for an additional 160 MW solar PV project with Rancho Seco Solar II, LLC. The project is located on SMUD-owned property at the closed Rancho Seco Nuclear Generating Station, adjacent to the existing 10.88 MW solar PV project. Construction began in 2019, and the project became commercially operable in February 2021.

Grady Wind Energy. In October 2015, SMUD entered into a 25-year power purchase agreement with Grady Wind Energy LLC ("Grady") for the purchase of energy from a 200 MW wind project located in New Mexico (the "Grady Project"). The Grady Project began commercial operations on August 5, 2019.

Energy from the Grady Project is delivered to CAISO. SMUD purchases 100% of the Grady Project output which includes energy, renewable energy credits, and capacity attributes. SMUD and Grady have a short-term (6-month) agreement spanning the winter 2021-spring 2022 season wherein Grady has the option to pay SMUD to curtail up to 100 MW. This agreement does not affect the remaining term of the agreement.

Great Valley Solar 2, LLC. In January 2017, SMUD entered into a 20-year power purchase agreement with Great Valley Solar 2, LLC for the purchase of energy from a 60 MW solar PV project located in Fresno County, California. The project's commercial operation date was December 28, 2017.

ARP-Loyalton Cogen LLC. On September 14, 2016, Senate Bill 859 ("SB 859") was signed into law. Under SB 859, POU must procure its proportionate share of 125 MWs of renewable energy from biomass plants burning high hazard forest fuels, subject to terms of at least five years. Seven POUs (SMUD, MID, Turlock Irrigation District ("TID"), Anaheim Public Utilities, Imperial Irrigation District, Los Angeles Department of Water & Power and Riverside Public Utilities) jointly solicited proposals for up to 29 MW of contract capacity for renewable energy to meet the requirements of SB 859. In January 2018, SMUD entered into a 5-year power purchase agreement with ARP-Loyalton Cogen LLC to fulfill 18 MWs of the required 29 MWs with SMUD's share being just over 23 percent. The contract became effective on April 1, 2018. On February 18, 2020, ARP-Loyalton Cogen LLC filed for Chapter 11 bankruptcy and stopped producing and selling energy from the biomass plant. On May 7, 2020, the bankruptcy court approved the sale of the Loyalton facility to Sierra Valley Enterprises, LLC ("SVE"). SVE is interested in bringing the facility back into service to produce power again and is currently reviewing the terms of the agreement. If SVE is not willing to accept the terms of the agreement, the POU parties will discuss their options, which may include amending the agreement or issuing a new request for proposals for the remainder of the five-year term.

Roseburg Forest Products Co. For the remaining SB 859 biomass obligation of 11 MW, SMUD and the other POUs have entered into a five-year power purchase agreement with Roseburg Forest Products Co. SMUD's share of the contract capacity is 2.5795 MW, and the plant began operating under the contract on February 26, 2021.

Sutter Energy Center. SMUD entered into an initial two-year contract (with a third year exercisable option) with Calpine Energy Services, L.P. ("Calpine") for the ability to schedule up to 258 MWs of energy from Sutter Energy Center. The Sutter Energy Center is a natural gas-fired, combined-cycle facility located in Yuba City, California. The initial contract became effective on April 1, 2018. SMUD exercised its option to extend the contract and it expired November 1, 2020. SMUD entered into a new contract with Calpine for the same 258 MWs of energy that became effective January 1, 2021, and had an original expiration date of January 1, 2024. In December 2021, SMUD extended the Sutter Energy Center contract. The contract currently expires December 31, 2026.

Drew Solar, LLC. In June 2018, SMUD entered into a 30-year power purchase agreement with Drew Solar, LLC for the purchase of energy from a 100 MW solar PV project located in Imperial County, California. The project's commercial operation date was set to be December 31, 2021. The scheduled commercial operation date is delayed to June 2022 due to Force Majeure claims surrounding the COVID pandemic and supply chain constraints caused by changes in Federal regulatory requirements.

Wildflower Solar. In October 2018, SMUD entered into a 25-year power purchase agreement with Wildflower Solar I, LLC, for the purchase of energy, capacity, and RECs from a 13 MW solar PV project located in Rio Linda, California. The project began commercially operating on December 18, 2020.

Coyote Creek (Formerly Sacramento Valley Energy Center, LLC.) In July 2021, SMUD entered into a 30-year power purchase agreement with Sacramento Valley Energy Center, LLC for the purchase of energy from a 200 MW solar PV and 100 MW four-hour Battery Energy Storage System ("BESS") capacity project located in Sacramento County, California. The project's commercial operation date was expected to be December 31, 2023. The scheduled commercial operation date has been delayed to April 2024 as a result of a change in Federal environmental permitting requirements.

SloughHouse Solar, LLC. In September 2021, SMUD entered into a 30-year power purchase agreement with SloughHouse Solar, LLC for the purchase of energy from a 50 MW solar PV project located in Sacramento County, California. The project's commercial operation date is expected to be December 31, 2023.

Country Acres Solar. In December 2021, SMUD issued a Request for Offers ("RFO") seeking qualified Power Purchase Agreement offers for a utility scale PV with BESS project under development which will interconnect to SMUD's North Area transmission system. The project site is located on over 1,000 acres in Placer County near the city of Roseville. SMUD received and is currently evaluating RFO responses. SMUD's early-stage development efforts are underway to support the start of construction mobilization in the first quarter 2023 with an expected commercial operation date in late 2024.

McClellan Solar. In December 2021, SMUD issued a RFO seeking qualified power purchase agreement offers for a utility scale PV with BESS project under development which will interconnect to SMUD's distribution electric system by tapping into SMUD's existing 69 kV distribution line. The project site is located on approximately 170 acres, in McClellan Park in Sacramento County. SMUD received and is currently evaluating RFO responses. SMUD's early-stage development efforts are underway to support the start of construction mobilization in the third quarter of 2023 with an expected commercial operation date in late 2024.

Geysers Power Company, LLC. In March 2021, SMUD executed a 10-year power purchase agreement with Geysers Power Company, LLC for 100 MW of capacity from The Geysers geothermal energy plant located in Lake and Sanoma Counties, California. SMUD will start to receive deliveries on January 1, 2023.

Transmission Service Agreements

TANC California-Oregon Transmission Project. The 340 mile COTP is one part of a three 500-kV line coordinated system known as the California-Oregon Intertie ("COI"). The COTP is allocated one-third of the 4,800 MW capability of the COI system (see related agreements below). TANC is entitled to use 1,390 MW and is obligated to pay approximately 80% of the operating costs of the COTP. SMUD is a member of TANC and a party to Project Agreement No. 3 ("PA3"), under which it is entitled to 378 MW and obligated to pay on an unconditional take-or-pay basis about 27.5% of TANC's COTP debt service and operations costs, subject to a "step-up" obligation of up to 25% of its entitlement share upon the un-remedied default of another TANC member-participant. In 2009, SMUD entered into a long-term layoff agreement with certain members that increased SMUD's entitlement by 35 MW. In 2014, SMUD entered into another long-term layoff agreement with certain other members that increased SMUD's COTP entitlements by 128 MW and amended the 2009 layoff agreement that returned 13 MW to a member. As of December 31, 2018, SMUD was entitled to approximately 528 MW of TANC's transfer capability for imports and 405 MW for exports, and is obligated to pay approximately 38.6% of TANC's COTP debt service and operations costs. SMUD's payments under this contract, like SMUD's payments under its other power purchase and transmission service agreements, are treated as "Maintenance and Operation Costs" or "Energy Payments" under the resolutions securing the Senior Bonds and Subordinated Bonds (each as defined under the caption "CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS" below). SMUD relies on its COTP rights to purchase power, access contingency reserves through the Northwest Power Pool, and obtain renewable resources to supplement its own resources to serve its load.

TANC maintains its own property/casualty insurance program. TANC's budget for COTP costs, support services and advocacy expenses is about $42.2 million for 2022. SMUD's obligation of the TANC budget is about $16.1 million for 2022.

TANC Tesla-Midway Transmission Service. TANC has a long-term contract with PG&E to provide TANC with 300 MW of transmission service between PG&E's Midway Substation and the electric systems of the TANC Members (the "Tesla-Midway Service"). SMUD's share of the Tesla-Midway Service had been 46 MW. As part of the 2009 long-term layoff agreement, SMUD acquired an additional 2 MW of South-of Tesla Principles ("SOTP") transmission rights for 15 years starting February, 2009 from another TANC member, bringing SMUD's share of the Tesla-Midway Service to 48 MW.

Bonneville Power Administration. In 2009, SMUD entered into a transmission service agreement with the Bonneville Power Administration ("BPA") for 60 MW of firm point-to-point transmission service from BPA's Hilltop substation in north eastern California to the Malin substation at the California-Oregon border for the purpose of transmitting power under SMUD's power purchase agreement with Gradient Resources for Phase 1 of the Patua geothermal project over BPA's 230kV transmission lines. In early 2013, in accordance with BPA's transmission tariff, the transmission service was split into two 30 MW services and deferred as appropriate to better fit the timing of expected commercial operation of the Phase 1 30 MW and Phase 2 30 MW of the Patua project. See "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Patua Project LLC*." SMUD submitted another request for the 30 MW of transmission procured for Patua Phase 2 to split the service into a 10 MW and a 20 MW service, with the 10 MW of service deferred to be timed with the expected commercial operation date of Phase 2. With the termination of Phase 2 and SMUD's reduced obligation due to the poor performance of Phase 1, much of the transmission reserved for it will no longer be needed. BPA does not have a provision in its transmission tariff for early termination of transmission service. However, the power purchase agreement with Patua requires Patua to cover unused transmission that SMUD has procured for the Patua purchases. On January 1, 2020, SMUD's transmission rights with BPA were reduced to 19 MW. This now aligns with SMUD's Pacificorp transmission rights of 19 MW described below.

Pacificorp. In 2009, SMUD entered into a transmission service agreement with PacifiCorp for 60 MW of firm point-to-point transmission service across PacifiCorp's high voltage step-up transformer at the Malin substation at the California-Oregon border for the purpose of transmitting power under SMUD's power purchase agreement with Gradient Resources for Phase 1 of the Patua geothermal project. In early 2013, in accordance with PacifiCorp's transmission tariff, the commencement of the 60 MW of transmission service was deferred to fit the timing of first deliveries expected from the 30 MW of Phase 1 of the Patua project. In 2013, SMUD terminated the 60 MW of transmission service and requested two new transmission services of 30 MW each, the start of which is timed to better fit with the expected start dates of phases 1 and 2 of the Patua Project. With the reduction in expected Patua output due to the Patua power purchase agreement fourth amendment, SMUD terminated the second 30 MW transmission agreement, and replaced it with a 10 MW transmission service agreement for Patua Phase 2. With the recent termination of Phase 2 of the Patua Project, SMUD terminated the 10 MW Pacificorp transmission service agreement. As a result of the reduced obligation to take power from the Patua Project, SMUD has reduced its Pacificorp transmission service from 30 MW to 19 MW.

Western Area Power Administration. SMUD does not have a direct interconnection of its power system to the COTP. To receive power deliveries that use its COTP rights, SMUD has a long-term transmission service agreement with WAPA for transmission of 342 MW of power from the COTP line (received at WAPA's Tracy or Olinda substations) to SMUD's system. In May of 2011, WAPA completed the Sacramento Voltage Support Transmission Project. Completion of this project has given SMUD an additional 165 MW of transmission service rights on WAPA's system from the COTP at the Olinda Substation to SMUD's system at the Elverta Substation.

Projected Resources

The following tables titled "Projected Requirements and Resources to Meet Load Requirements Energy Requirements and Resources" (the "Energy Table") and "Capacity Requirements and Resources Net Capacity – Megawatts" (the "Capacity Table") describe SMUD's contracted commitments and owned resources available to meet its forecasted load requirements through the year 2031. Resources are shown on an annualized basis with market purchases netted against surplus sales to arrive at a single net position for each year. Because SMUD's available resources do not exactly match its actual load requirements on an hourly basis, there are times during a year when resources available will either exceed or be insufficient to meet SMUD's needs. Expected actual capacity values are included in the tables. These values may differ from measured net demonstrated capacity values of the Local Area Gas-Fired Plants. The table below also includes the impact energy efficiency has on resource requirements as discussed below under "Demand Side Management Programs." See "BUSINESS STRATEGY" and "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*."

Resources listed in both the Energy Table and the Capacity Table are listed as either renewable or non-renewable. Generally, SMUD follows the CEC guidelines for eligibility requirements. Some of SMUD's renewable resources listed include solar, wind, geothermal, small hydroelectric facilities with a capacity of 30 MW or less, and biomass (representing generation from a fuel comprised of agricultural wastes and residues, landscape and tree trimmings, wood and wood waste).

As in any forecast, assumptions are made. In both the Energy Table and the Capacity Table the WAPA and UARP forecasts assume average water conditions throughout the period. On the capacity table, WAPA and SFA renewable capacity is estimated based on the ratio of renewable energy to total WAPA or SFA energy. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Hydroelectric*."

The Uncommitted Purchases (Sales) on the tables represent either anticipated future needs or surpluses. Future needs are met well in advance of delivery. They also include both renewable and non-renewable resources.

The Transmission Losses represent reductions in the amount of energy or capacity from the location it was purchased to the point of entering SMUD's electrical system. This amount reduces the Total Resources available to meet the Total Projected Energy Requirements of the electrical system.

Demand Side Management Programs

SMUD's demand-side management initiatives represent an integral element of its total resource portfolio, and are organized into two major components: energy efficiency and load management programs. Energy efficiency offerings include a wide variety of programs and services to customers to retrofit or upgrade existing equipment and fixtures and to install new energy efficiency measures in existing and new construction facilities. Load management allows SMUD to reduce the load on the electric system by cycling residential air conditioning, and calling upon commercial/industrial customers to curtail energy usage when energy is constrained during the summer or system emergencies. Load management programs are projected to allow SMUD to shed approximately 60 MW of peak load in an emergency on a hot day, representing about 2% of SMUD's maximum system peak demand.

The customer "smart meter" system with 2-way communication capability provides information regarding customer usage patterns, which is expected to help SMUD tailor rate designs that provide customers with both the information and ability to manage their energy usage around high energy cost periods.

PROJECTED REQUIREMENTS AND RESOURCES TO MEET LOAD REQUIREMENTS[1]
ENERGY REQUIREMENTS AND RESOURCES (GWh)

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Renewable Resources										
District or Joint Powers Authority Owned:										
UARP - Small Hydro[3]	70	89	99	96	103	103	103	104	104	104
Solano Wind	584	597	777	854	836	836	838	836	836	836
SFA – Shell Landfill Gas and Digester Gas[2]	146	811	784	767	767	759	761	760	760	760
Total	**800**	**1,497**	**1,660**	**1,716**	**1,706**	**1,698**	**1,702**	**1,700**	**1,701**	**1,701**
Purchases										
Western (WAPA) – Small Hydro[3]	10	19	20	19	19	19	19	19	19	19
Patua (Gradient/Vulcan) – Geothermal	140	147	147	147	147	147	147	147	147	147
Cal Energy – Geothermal	223	223	224	223	223	223	224	223	223	223
Iberdrola (PPM) – Wind	95	98	98	45	--	--	--	--	--	0
Grady – Wind	883	897	900	897	897	897	900	897	897	897
Recurrent SolarShares	174	171	170	171	171	170	169	168	167	167
Rancho Seco PV2	311	333	332	330	328	327	325	323	322	320
Feed-in-Tariff Photovoltaic – Solar	215	210	209	208	207	206	205	204	203	202
Drew Solar	178	301	301	298	297	295	294	292	291	289
Sloughhouse Solar	--	0	132	131	130	130	129	128	128	127
Calpine Geothermal	--	876	878	876	876	876	876	876	876	876
Wildflower Solar	33	31	31	31	31	30	30	30	30	30
Planned Solar with Storage	--	--	--	761	757	753	749	745	742	738
Coyote Creek Solar	--	--	414	522	507	505	502	500	497	495
Other Long-Term Contracts	189	180	171	160	52	28	28	28	28	28
Future Variable Renewable Projects	--	--	--	--	756	867	1,687	1,959	2,787	2,787
Future Firm Renewable Projects	--	--	--	--	--	--	100	1,040	1,040	1,040
Total	**2,451**	**3,486**	**4,027**	**4,819**	**5,399**	**5,474**	**6,385**	**7,582**	**8,397**	**8,385**
Non-Renewable										
District or Joint Powers Authority Owned:										
UARP – Large Hydro[3]	1,149	1,481	1,599	1,606	1,609	1,609	1,609	1,609	1,609	1,609
SFA – Cosumnes	3,496	3,246	3,136	3,067	3,082	2,439	1,731	1,165	513	513
CVFA – Carson Ice	314	357	319	262	9	2	--	2	3	3
SCA – P&G	726	626	553	524	241	133	40	2	1	1
SPA – McClellan	16	7	2	--	--	--	--	--	--	--
SPA – Campbell Soup	663	389	362	179	--	--	--	--	--	--
Total	**6,363**	**6,106**	**5,970**	**5,639**	**4,941**	**4,183**	**3,380**	**2,778**	**2,125**	**2,125**
Purchases										
Western (WAPA) – Large Hydro[3]	337	613	641	629	629	629	629	629	629	629
Western (WAPA) Customers (wheeling)[3]	20	36	38	38	38	38	38	38	38	38
Calpine Sutter	852	1,300	1,141	1,003	82	--	--	--	--	--
Total	**1,209**	**1,950**	**1,820**	**1,670**	**749**	**667**	**667**	**667**	**667**	**667**
Total Resources	**10,823**	**13,039**	**13,476**	**13,844**	**12,795**	**12,022**	**12,134**	**12,726**	**12,890**	**12,878**
Uncommitted Purchases / (Sales)	(109)	(2,391)	(2,816)	(3,200)	(2,113)	(1,267)	(1,289)	(1,779)	(1,785)	(1,607)
Transmission Losses (COTP/CVP)	(38)	(36)	(29)	(33)	(31)	(29)	(27)	(25)	(23)	(21)
Total Projected Energy Requirements	**10,676**	**10,612**	**10,632**	**10,611**	**10,651**	**10,727**	**10,819**	**10,922**	**11,082**	**11,250**
Energy Efficiency (EE) Board Goals	109	183	254	321	393	448	504	550	581	611
SB1 Photovoltaic Goals	60	121	168	211	763	819	876	931	985	1,036
Expected Electric Vehicle (EV) Charging	(17)	(44)	(77)	(121)	(182)	(247)	(324)	(408)	(499)	(600)
Electric Building (EB)	(9)	(21)	(37)	(58)	(106)	(144)	(190)	(256)	(345)	(437)
Battery Storage (Utility)	--	(1)	(1)	(1)	(129)	(137)	(177)	(209)	(262)	(262)
Battery Storage (BTM)	--	--	--	(1)	(2)	(4)	(7)	(11)	(16)	(20)
Total Gross Energy Requirements before EE, SB1 and EV Charging	**10,819**	**10,852**	**10,939**	**10,962**	**11,388**	**11,462**	**11,501**	**11,520**	**11,526**	**11,577**

(1) Totals may not sum due to rounding.

(2) Includes a biomethane contract counted as renewable (see "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Renewable Natural Gas Supply*").

(3) 2022 based on current precipitation levels as of March 31, 2022. All other years assume average precipitation.

CAPACITY REQUIREMENTS AND RESOURCES[1]
NET CAPACITY – MEGAWATTS

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Load:										
Planned Peak	**2,874**	**2,863**	**2,853**	**2,844**	**2,878**	**2,882**	**2,888**	**2,907**	**2,929**	**2,952**
Transmission Losses	28	28	28	28	28	28	28	28	28	28
Dispatchable Demand Resource	(71)	(71)	(71)	(71)	(146)	(165)	(183)	(202)	(165)	(165)
Adjusted Peak	**2,831**	**2,820**	**2,810**	**2,801**	**2,760**	**2,745**	**2,733**	**2,733**	**2,792**	**2,815**
15% Reserve Margin	425	423	421	420	414	412	410	410	419	422
Adjusted Peak with Reserves	**3,255**	**3,244**	**3,231**	**3,221**	**3,174**	**3,157**	**3,143**	**3,143**	**3,210**	**3,237**
Renewable Resources										
District or Joint Powers Authority Owned:										
UARP – Small Hydro	45	45	45	45	45	45	45	45	45	45
Solano Wind	120	98	117	163	46	39	37	38	34	31
SFA – Shell Landfill Gas and Digester Gas[2]	29	114	114	114	120	120	120	120	120	120
Total	**193**	**256**	**276**	**322**	**211**	**204**	**202**	**202**	**199**	**196**
Purchases										
Western (WAPA) – Small Hydro	8	10	10	9	10	10	10	10	10	10
Iberdrola (PPM) – Wind	32	15	7	--	--	--	--	--	--	--
Grady – Wind	45	32	27	24	54	60	55	55	55	56
Patua (Gradient/Vulcan) – Geothermal	12	12	12	12	12	12	12	12	12	12
CalGeo – Geothermal	26	26	26	26	26	26	26	26	26	26
Geysers – Geothermal	--	95	95	95	95	95	95	95	95	95
Recurrent Solar	39	6	5	3	2	2	3	2	2	2
RanchoSeco – Solar	73	64	25	20	4	3	3	3	3	3
Coyote Creek Solar	--	--	140	124	29	23	17	13	11	13
Sloughhouse Solar	--	--	11	0	2	2	2	1	2	1
NTUA Navajo Drew Solar	56	32	12	14	12	12	10	10	8	8
Feed-in-Tariff Photovoltaic – Solar	27	23	2	3	3	4	3	3	3	3
Planned Solar with Storage	--	--	--	196	64	54	30	21	16	19
Generic Storage	--	--	--	--	362	387	442	444	422	407
Future Variable Renewable Projects	--	--	--	--	51	51	139	144	150	158
Future Firm Renewable Projects	--	--	--	--	--	--	12	125	125	125
Other Long-Term Contracts	28	26	27	29	3	3	3	2	3	2
ELCC Portfolio Benefit	(53)	96	218	(35)	494	484	481	488	540	497
Total	**292**	**436**	**617**	**519**	**1,221**	**1,228**	**1,342**	**1,455**	**1,483**	**1,436**
Non-Renewable										
District or Joint Powers Authority Owned:										
UARP – Large Hydro	640	640	640	640	640	640	640	640	640	640
SFA (Cosumnes)	542	456	456	456	456	456	456	456	456	456
CVFA (Carson-Ice)	103	103	103	103	103	100	100	100	100	100
SCA (Procter & Gamble)	166	166	166	166	166	166	166	100	100	100
SPA (McClellan)	72	72	72	--	--	--	--	--	--	--
SPA (Campbell Soup)	170	170	170	170	--	--	--	--	--	--
Hedge Battery	4	4	4	4	4	4	4	4	4	4
Total	**1,697**	**1,611**	**1,611**	**1,539**	**1,369**	**1,366**	**1,366**	**1,300**	**1,300**	**1,300**
Purchases										
Western (WAPA) – Large Hydro	250	309	309	303	303	303	303	303	303	303
Western (WAPA) Customers (wheeling)	15	18	18	18	18	18	18	18	18	18
Sutter Energy Center	258	258	258	258	258	258	258	258	258	258
Firm Contract Reserves[3]	14	17	17	17	17	17	17	17	17	17
Committed Purchases	450	250	--	--	--	--	--	--	--	--
Total	986	**852**	602	**596**	**596**	596	**596**	**596**	**596**	**596**
Uncommitted Purchases / (Sales)	88	88	126	246	(223)	(237)	(363)	(410)	(367)	(291)
Total Resources	**3,255**	**3,244**	**3,231**	**3,221**	**3,174**	**3,157**	**3,143**	**3,143**	**3,210**	**3,237**

(1) Based on information available as of March 31, 2022. Totals may not sum due to rounding. Capacity values for wind, solar, storage, and future variable renewable projects shown are based on resource effective load carrying capability (ELCC) modeling.

(2) The SFA Project is a 495 MW plant that includes 100 MW capacity attributable to a biogas contract counted as renewable (see "POWER SUPPLY AND TRANSMISSION – Fuel Supply – *Renewable Natural Gas Supply*") and 395 MW capacity from natural gas.

(3) SMUD assumes that for all firm system purchases, the suppliers will be planning 5% reserves.

Balancing Authority Area Agreements

Background. SMUD began operating as an independent control area, later termed a Balancing Authority, on June 18, 2002 within the WECC reliability organization's region. This reduced SMUD's exposure to the costs and reliability risks of the CAISO's markets. SMUD expanded its operational footprint beyond SMUD's service territory to include WAPA's electric system, including the MID, Roseville, and Redding service areas (on January 1, 2005) and the COTP (on December 1, 2005). As described further below, SMUD ceased to be the Balancing Authority on April 30, 2011, as BANC took SMUD's place as the Balancing Authority. SMUD remains the operator of the Balancing Authority through a contract with BANC. SMUD administers the contracts with WAPA and TANC to provide specified Balancing Authority-related and other services, and is compensated by WAPA and TANC for its added labor expense. TANC recovers such Balancing Authority services costs as a part of its annual operating budget from the COTP Participants and WAPA recovers its Balancing Authority services costs through its rates for power and transmission service. The agreement with WAPA, among other terms, establishes operating reserve obligations between the parties. WAPA in turn has agreements with electric systems connected to it to assure that such systems also operate reliably (i.e., MID, Roseville and Redding). As a result of the transition to BANC as the Balancing Authority, SMUD assigned or terminated its interconnection and operations agreements with other interconnecting Balancing Authority areas (i.e., CAISO, BPA and TID). BANC is now the party to these agreements as they primarily address only Balancing Authority matters required for compliance with the reliability standards issued by the North American Electric Reliability Corporation ("NERC"), such as emergency assistance arrangements. See also "OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY – Energy Imbalance Market."

Reliability Standards. The Energy Policy Act of 2005 gave FERC authority to enforce reliability standards for the bulk electric system. In June 2007, these standards became mandatory for SMUD and BANC.

In late 2019, SMUD and BANC underwent a combined NERC/WECC audit to evaluate compliance with applicable reliability standards. These audits occur every three years. At the conclusion of the audit, regulators determined that neither entity had any compliance violations related to the Operations and Planning or Critical Infrastructure Protection Standards. Resolutions to minor recommendations and areas of concern were completed in 2020. SMUD and BANC will undergo another NERC/WECC audit sometime in 2022.

Balancing Authority of Northern California. SMUD, MID, Redding and Roseville executed a Joint Exercise of Powers Agreement (the "BANC JPA Agreement") creating BANC on May 8, 2009. BANC became operational on May 1, 2011 as a Balancing Authority and replaced SMUD as the entity responsible for Balancing Authority-related reliability standards. Since that time, the Trinity Public Utilities District and the City of Shasta Lake have also become members of BANC. As provided in the BANC member agreement, liability for penalties associated with such Balancing Authority-related reliability standards are shared on a pro rata basis among the members of BANC. SMUD is the Balancing Authority operator under contract and performs Balancing Authority operational functions on behalf of BANC, much as it did when it was the Balancing Authority. The BANC JPA Agreement assigns cost responsibility based on member load within the BANC Balancing Authority, with SMUD representing approximately 70% of the total load.

Power Pool and Other Agreements

Northwest Power Pool Agreement. The Northwest Power Pool ("NWPP") is an agreement among over 30 utilities and public agencies in the western United States to coordinate contingency reserve sharing, referred to as the NWPP Reserve Sharing Program ("RSP"). The RSP permits participants to rely on one another in the event that any participant experiences a generating resource outage. While SMUD became an RSP participant in 2009, participation is limited to Balancing Authorities, which SMUD relinquished to BANC in 2011. Under the RSP, BANC and TID (also a NWPP member) share their reserve amounts and when necessary may call upon NWPP reserves using BANC member systems and unused COTP rights. The NWPP RSP permits members to operate more efficiently by reducing the contingency reserves that they would otherwise need to have available if they could not rely on each other.

TANC-SMUD OASIS Administration Agreement. SMUD entered into an agreement with TANC to provide OASIS services (transmission sales and scheduling related services in the BANC BA of TANC members' COTP rights) on September 29, 2005. SMUD is compensated for performing these services. TANC and SMUD entered into a letter agreement dated October 25, 2010 to clarify each party's role for regulatory reliability standards compliance responsibilities and take into account SMUD's increased efforts related to supporting TANC's compliance requirements. TANC includes the costs of this service in its annual budgets and recovers the costs from its members who use the TANC OASIS to make their COTP transmission available to third parties.

Other Agreements with PG&E

Background. SMUD's electric system was originally purchased from PG&E in 1947. SMUD's service area is mostly surrounded by PG&E's service area and the two electric systems are interconnected at SMUD's Rancho Seco and Lake 230-kV substations.

Interconnection Agreement. PG&E and SMUD executed a Replacement Interconnection Agreement ("RIA") which became effective on January 1, 2010. The RIA provides that SMUD and PG&E operate their interconnections reliably, plan their electric systems to meet their load requirements, and avoid or mitigate impacts they cause by certain electric system modifications. The new agreement has a termination date of December 31, 2024, subject to FERC approval.

Generator Interconnection Agreements. SMUD signed a Large Generator Interconnection Agreement with CAISO and PG&E for the Solano 3 Wind Project, effective December 16, 2008, with a 50-year term. The Solano Wind Project Phase 1 has interconnection rights granted through a Small Generator Interconnection Agreement with the CAISO and PG&E and the Solano Wind Project Phase 2 has interconnection rights granted through a Large Generator Interconnection Agreement, also with the CAISO and PG&E. Both agreements became effective in January 2010 and both have terms of 20 years. SMUD entered into a Large Generator Interconnection Agreement with the CAISO and PG&E on June 3, 2021for the planned 90.8 MW Solano 4 Wind project.

Other generator interconnection agreements include a Small Generator Interconnection Agreement with PG&E for Slab Creek with a 22-year term which became effective on January 14, 2010, and a Small Generator Interconnection Agreement with PG&E for the Chili Bar Project with a 10-year term which became effective on June 2, 2021.

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SELECTED OPERATING DATA

Selected operating data of SMUD for the four years ended December 31, 2018 through 2021 are presented in the following table.

SMUD SELECTED OPERATING DATA
CUSTOMERS, SALES, SOURCES OF ENERGY AND REVENUES

	Year Ended December 31,			
	2021	2020	2019	2018
Customers at End of Period:				
Residential	572,786	568,741	565,103	559,907
Commercial and industrial	69,426	68,628	68,203	67,782
Other	7,345	7,354	7,406	7,448
Total	649,557	644,723	640,712	635,137
MWh Sales:				
Residential	4,749,079	4,906,566	4,493,548	4,515,031
Commercial and industrial	5,649,474	5,453,120	5,616,920	5,661,449
Other	54,473	55,590	55,770	57,031
Total	10,453,026	10,415,276	10,166,238	10,233,511
Surplus power/out of area sales	2,774,907	2,259,991	1,878,205	1,516,289
Total	13,227,933	12,675,267	12,044,443	11,749,800
Sources of Energy Sold MWh:				
Generated by SMUD	6,776,244	6,414,380	7,143,944	7,089,430
Purchased or exchanged	6,884,003	6,691,279	5,324,217	5,078,432
Total	13,660,247	13,105,659	12,468,161	12,167,862
Less System losses and SMUD usage	432,314	430,392	423,718	418,062
Total	13,227,933	12,675,267	12,044,443	11,749,800
Gross System peak demand (kW)[1]	3,019,000	3,057,000	2,927,000	2,944,000
Average kWh sales per residential customer[2]	8,316	8,650	7,987	8,101
Average Revenue per kWh Sold:				
Residential[2] (cents)	16.20	15.27	14.90	14.43
Commercial & industrial[2] (cents)	13.95	13.17	12.71	12.57

(1) Peak system MW values are measured at the four SMUD interconnection points and exclude SMUD's generation losses. Historical values include the impacts of dispatchable, non-dispatchable, and energy efficiency program capacity savings.

(2) The average kWh sales per residential customer and the average revenue per kWh sold are calculated based upon billed and unbilled sales.

Source: SMUD

SELECTED FINANCIAL DATA

SMUD Financial Information

The following table presents selected financial data of SMUD. Under generally accepted accounting principles, data with respect to SMUD's component units, such as the Authorities, is included with that of SMUD. The following presents data for SMUD only and not its component units, such as the Authorities. SMUD's audited financial statements for the years ended December 31, 2021, and December 31, 2020, are included in APPENDIX B attached to this Official Statement. The following unaudited data for SMUD (excluding its component units) is drawn from SMUD's financial records that have been subjected to the auditing procedures applied in the audits of SMUD's and its component units' financial statements for the years ended December 31, 2018 through 2021.

SMUD FINANCIAL DATA[1]
(thousands of dollars)

	Year Ended December 31,			
	2021	2020	2019	2018 (restated)
Summary of Income				
Operating Revenues[2]	$ 1,784,313	$1,582,979	$1,553,167	$1,589,612
Operating Expenses	(1,463,138)	(1,397,845)	(1,412,199)	(1,376,987)
Operating Income (Loss)	321,175	185,134	140,968	212,625
Interest and Other Income (Expense)	108,564	63,014	(21,113)	76,966
Interest Expense	(81,692)	(80,699)	(66,185)	(73,021)
Change in Net Position	$ 348,047	$ 167,449	$ 53,670	$ 216,570
Selected Statement of Net Position Information				
Net Plant in Service	$ 3,448,439	$3,234,208	$3,187,135	$2,995,505
Construction Work in Progress	365,478	460,155	351,584	396,794
Electric Utility Plant – Net	$ 3,813,917	$3,694,363	$3,538,719	$3,392,299
Unrestricted Cash	$ 569,001	$ 662,155	$ 451,800	$ 434,103
Rate Stabilization Fund	$ 188,992	$ 168,726	$ 143,669	$ 96,694
Total Assets	$ 6,020,991	$5,826,449	$5,429,137	$5,254,839
Net Position	$ 2,292,640	$1,944,593	$1,777,145	$1,723,476
Long-Term Debt[3]	$ 2,387,686	$2,523,921	$2,166,389	$1,803,840
Debt Service Coverage Ratios				
Parity Debt Service Coverage Ratio	2.59x	2.25x	2.11x	2.37x
Parity and Subordinate Debt Service Coverage Ratio	2.47x	2.14x	2.06x	2.37x

(1) The financial statements of SMUD comprise financial information of SMUD along with its component units, CVFA, SPA, SCA, SFA, NCGA and NCEA. This table includes only financial information of SMUD excluding its component units. Net operating revenues and expenses and Electric Utility Plant and Capitalization of CVFA, SPA, SCA, SFA, NCGA and NCEA are not included in this table, although amounts paid to or received from the Authorities by SMUD are included.

(2) Operating Revenues reflect net transfers to (from) the Rate Stabilization Fund for each full year as follows:
2021 $20.3 million
2020 $25.1 million
2019 $47.0 million
2018 ($3.2 million)
Transfers to the Rate Stabilization Fund reduce operating revenues in the year transferred; transfers from the Rate Stabilization Fund increase operating revenues. Transfers from the HGA balancing account in the Rate Stabilization Fund are automatic based on the amount of precipitation received. See "RATES AND CUSTOMER BASE – Rates and Charges" above.

(3) Long-Term Debt includes Long-Term Debt due within one year and unamortized premiums.

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Financial Information of SMUD and the Authorities

The following table presents a summary of selected financial information for SMUD and the Authorities.

SUMMARY OF FINANCIAL INFORMATION OF SMUD AND THE AUTHORITIES FOR THE YEARS ENDED DECEMBER 31, 2021 AND 2020 (thousands of dollars)

	Year Ended December 31, 2021			Year Ended December 31, 2020		
	SMUD	**Authorities**	**Total[1]**	**SMUD**	**Authorities**	**Total[1]**
Summary of Income						
Operating Revenues[2]	$ 1,784,313	$ 270,694	$ 1,790,568	$1,582,979	$ 267,211	$1,587,905
Operating Expenses	(1,463,138)	(250,952)	(1,449,651)	(1,397,845)	(252,832)	(1,388,392)
Operating Income	321,175	19,742	340,917	185,134	14,379	199,513
Interest and Other Income	108,564	790	107,968	63,014	1,605	63,022
Interest Expense	(81,692)	(27,608)	(109,300)	(80,699)	(28,601)	(109,300)
Change in Net Position	$ 348,047	$ (7,076)	$ 339,585	$ 167,449	$ (12,617)	$ 153,235
Selected Statement of Net Position Information						
Net Plant in Service	$3,448,439	$ 301,773	$3,467,673	$3,234,208	$ 334,011	$3,285,840
Construction Work in Progress	365,478	1,819	367,297	460,155	1,164	461,319
Electric Utility Plant – Net	$3,813,917	$ 303,592	$3,834,970	$3,694,363	$ 335,175	$3,747,159
Unrestricted Cash	$ 569,001	$ 61,375	$ 630,376	$ 662,155	$ 52,261	$ 714,416
Rate Stabilization Fund	$ 188,992	--	$ 188,992	$ 168,726	--	$ 168,726
Total Assets	$6,020,991	$1,173,867	$6,843,061	$5,826,449	$1,220,049	$6,689,080
Net Position	$2,292,640	$ 286,996	$2,297,097	$1,944,593	$ 295,299	$1,957,512
Long-Term Debt[3]	$2,387,686	$ 826,171	$3,213,857	$2,523,921	$ 862,781	$3,386,702

(1) Financial information for SMUD and the SMUD JPAs (CVFA, SPA, SCA, SFA, NCGA and NCEA) include intercompany balances. The financial information reflects balances after the elimination of intercompany accounts including Authorities distributions to SMUD of $1.4 million in 2021 and $1.6 million in 2020.

(2) Operating Revenues reflect net transfers to (from) the Rate Stabilization Fund as follows:
2021: $20.3 million
2020: $25.1 million
Transfers to the Rate Stabilization Fund reduce operating revenues in the year transferred; transfers from the Rate Stabilization Fund increase operating revenues. Transfers from the HGA balancing account in the Rate Stabilization Fund are automatic based on the amount of precipitation received. See "RATES AND CUSTOMER BASE – Rates and Charges" above.

(3) Long-Term Debt includes Long-Term Debt due within one year and unamortized premiums.

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Management's Discussion of SMUD's Operating Results

Year Ended December 31, 2021. For the year ended December 31, 2021, SMUD reported an increase in net position of $348.0 million as compared to an increase of $167.4 million for 2020.

Operating revenues were $201.3 million higher than 2020. This was primarily due to higher sales to customers ($70.1 million), sales of surplus gas ($65.4 million), sales of surplus power ($47.1 million), transfers from the RSF ($18.2 million), AB 32 revenue ($17.9 million) and gain on sale of carbon allowance futures ($3.1 million), partially offset by transfers to the RSF ($13.4 million) and lower public good revenue ($3.5 million).

Operating expenses were $65.3 million higher than 2020. This was primarily due to higher production operating expenses ($89.6 million), purchased power expenses ($71.8 million), and depreciation expenses ($11.9 million), partially offset by lower amortization of pension and OPEB ($84.2 million), public good expenses ($10.7 million), customer accounts expenses ($6.8 million) and transmission and distribution maintenance expenses ($5.5 million).

Non-Operating income increased by $45.5 million primarily due to California Arrearage Payment Program funding ($41.4 million), a settlement related to Rancho Seco damages ($15.0 million), higher investment income ($11.5 million), higher contributions in aid of construction ($4.0 million), offset by dissolution of RBC CSCDA gas prepay contract ($10.9 million), lower insurance proceeds ($8.6 million), lower interest income ($7.3 million), lower unrealized holding gains ($4.0), lower distributions from the JPAs ($2.6 million) and lower legal settlement costs ($2.2 million).

Interest expense increased $1.0 million from 2020.

Year Ended December 31, 2020. For the year ended December 31, 2020, SMUD reported an increase in net position of $167.4 million as compared to an increase of $53.7 million for 2019.

Operating revenues were $29.8 million higher than 2019. This was primarily due to higher sales to customers ($42.8 million), transfers from the RSF ($23.1 million), sales of surplus power ($22.3 million), LCFS credit sales revenue ($5.9 million) and other electric revenue ($3.7 million), partially offset by lower sales of surplus gas ($32.7 million), AB 32 revenue ($26.9 million), miscellaneous service revenue ($5.4 million) and customer late fee revenue ($2.3 million).

Operating expenses were $14.4 million lower than 2019. This was primarily due to lower production operating expenses ($42.5 million), administrative and general expenses ($17.4 million), public good expenses ($6.4 million), depletion expense ($4.1 million), production maintenance expenses ($4.1 million) and transmission and distribution operating expenses ($3.0 million), partially offset by higher purchased power expenses ($21.4 million), transmission and distribution maintenance expenses ($17.7 million), depreciation expenses ($14.8 million) and amortization of regulatory assets ($8.7 million).

Non-Operating income increased by $84.1 million due to no divestment of its interests in the Rosa Unit ($52.1 million), lower write-off of preliminary projects in 2020 ($11.6 million), dissolution of RBC CSCDA gas prepay contract ($10.9 million), higher insurance proceeds ($8.3 million), higher distributions from the JPAs ($4.0 million) and lower CCA costs net of higher revenues ($2.8 million), partially offset by lower contributions in aid of construction ($2.7 million) and lower unrealized holding gains ($2.4 million).

Interest expense increased $14.5 million from 2019.

Regulatory Assets. In accordance with Governmental Accounting Standards Board ("GASB") No. 62, "Regulated Operations," SMUD defers, as regulatory assets, certain types of expenditures. These assets are amortized and collected through future rates.

As of December 31, 2021, SMUD had a total of $703.7 million recorded for regulatory assets. Regulatory assets associated with costs related to implementation of GASB No. 68 which requires SMUD to record a net pension liability was $357.6 million at December 31, 2021. Regulatory assets associated with costs related to implementation of GASB No. 75 which requires SMUD to record a net Other Post Employment Benefit (OPEB) liability was $293.8 million at December 31, 2021. Regulatory assets associated with Rancho Seco decommissioning costs totaled $83.8 million at December 31, 2021. Nuclear fuel storage costs and non-radiological decommissioning costs have been collected in rates since 2009. For a complete description of these regulatory assets, see Note 8 (Regulatory Deferrals) to SMUD's financial statements.

The Board has authorized the deferral of any charges or credits that result from the change in valuation of ineffective hedges that should be reported as Investment Revenue/Expense on the Statements of Revenues, Expenses and changes in net position. The Board's resolution establishes that such charges or credits are not included in rates based on market value changes but are included in rates when the underlying transactions occur. Therefore, under GASB No. 62, "Regulated Operations," any such changes are included in the Statement of Net Position as regulatory assets or liabilities. For a complete description of these derivative financial instruments, see Note 9 (Derivative Financial Instruments) to SMUD's financial statements.

RANCHO SECO DECOMMISSIONING

Overview. The 913 MW Rancho Seco Nuclear Power Plant ("Rancho Seco") began Nuclear Regulatory Commission ("NRC") licensed operations in 1974. In June 1989, the electorate of SMUD voted against allowing SMUD to continue to operate Rancho Seco as a nuclear generating facility, and the plant was shut down. In 1991, SMUD submitted a report (the "Financial Assurance Plan") providing required financial assurance to the NRC that SMUD will have sufficient funds available to pay for the cost of decommissioning. On March 17, 1992, the NRC granted SMUD a change from an operating to a possession-only license for Rancho Seco that relieved SMUD from compliance with a number of NRC regulations applicable to operating nuclear power plants. SMUD also filed a proposed decommissioning plan with the NRC (the "Decommissioning Plan"), which was approved in March 1995.

After the decommissioning efforts began, no suitable disposal option was available to SMUD for the Class B and Class C low level radioactive waste generated during the plant decommissioning. With the used nuclear fuel stored onsite requiring oversight staff, SMUD opted to store the Class B and Class C radioactive waste in an existing interim onsite storage building until a suitable disposal option was available. In November 2007, the possession-only license for Rancho Seco was amended to update the Decommissioning Plan to terminate the possession-only license for the Class B and Class C waste in two phases. Phase I of the decommissioning was completed at the end of 2008. Following verification of the site conditions, SMUD submitted a request to the NRC to reduce the licensed facility from 2,480 acres to the interim onsite storage building and about one acre surrounding it. The request was approved by the NRC in September 2009. Phase II of decommissioning included approximately the two-acre interim storage building containing the Class B and Class C radioactive waste and surrounding area. In September 2013, SMUD entered into a contract with the operator of the low-level radioactive waste disposal facility located in Andrews, Texas. Shipment of the Class B and Class C radioactive waste for disposal was completed in November 2014. SMUD conducted additional clean-up activities and radiological surveys, which were followed by NRC confirmatory surveys. The results of these surveys demonstrated unit dose criteria well below NRC release criteria, and the NRC approved the Phase II area for unrestricted use. On

September 21, 2017, SMUD formally requested the termination of the possession-only license. On August 31, 2018, the NRC officially terminated SMUD's possession-only license for the remaining Class B and Class C waste at Rancho Seco.

As part of the Decommissioning Plan, the nuclear fuel and Greater Than Class C ("GTCC") radioactive waste is being stored in a dry storage facility (the Independent Spent Fuel Storage Installation or "ISFSI") constructed by SMUD, adjacent to the former reactor facility. The NRC has separately licensed this facility. The DOE, under the Nuclear Waste Policy Act of 1982, is responsible for permanent disposal of used nuclear fuel and GTCC radioactive waste. SMUD has a contract with the DOE for the removal and disposal of this waste. The DOE was to have a waste repository operating by 1998, but has experienced significant and ongoing delays. The Nuclear Waste Policy Act designates Yucca Mountain in Nevada as the final and exclusive repository for the nation's used nuclear fuel. The DOE discontinued the Yucca Mountain license review activities in 2010, but after a court ordered the NRC to resume its review in 2013, the NRC published its final safety evaluation report in 2015. The final safety report, and the final environmental impact statement, concluded that the proposed repository would be safe and environmentally sound for one million years.

Nevertheless, seeking alternatives to Yucca Mountain, the Blue Ribbon Commission on America's Nuclear Future delivered its final report in January 2012 with several recommendations. The Department of Energy (the "DOE") responded to the recommendations by issuing a report in January 2013 (Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste). Key to both documents is a focus on used fuel from decommissioned sites including Rancho Seco. The DOE report accepts most of the Blue Ribbon Commission recommendations, and contains timelines for fuel management options which proposed removing the fuel from Rancho Seco as early as 2021. However, any progress on the strategies proposed by the DOE is dependent on legislative action by Congress. With no legislative action taken to date, the 2021 projected date for fuel removal slips year-for-year. Therefore, SMUD cannot determine at this time when the DOE will fulfill its contractual obligations to remove the nuclear fuel and GTCC waste from the Rancho Seco facility. In the meantime, SMUD continues to incur costs of approximately $5 to $6 million per year for storage of used nuclear fuel at the ISFSI. SMUD has filed a series of successful lawsuits against the federal government for recovery of past spent fuel costs, with recoveries to date from the DOE in excess of $104 million. SMUD plans to continue pursuing cost recovery claims to ensure it is reimbursed for all such costs in the future. The ISFSI will be decommissioned and its license terminated after the fuel and GTCC is removed.

Financial Assurance Plan. In accordance with the Financial Assurance Plan, SMUD established and funded an external decommissioning trust fund currently held by Wells Fargo Bank (the "Decommissioning Trust Fund"). Pursuant to the Financial Assurance Plan, SMUD made the final deposit into the Decommissioning Trust Fund in 2008. Additional deposits are not expected but will be made if increased cost estimates or reduced fund interest earnings require it. In 2011, the NRC began requiring that SMUD demonstrate financial assurance for decommissioning the ISFSI as well as the former power facility, increasing the overall cost for decommissioning Rancho Seco. The estimated total cost for decommissioning the ISFSI was approximately $5.7 million at December 31, 2019. The decommissioning cost estimate is required to be updated every three years. As of December 31, 2021, the balance of the Decommissioning Trust Fund was $8.87 million, excluding unrealized gains and losses. Based on the current decommissioning cost estimate and the value of the fund, SMUD's existing Decommissioning Trust Fund provides sufficient funds to complete decommissioning and terminate the ISFSI license.

In addition to these costs, SMUD also estimates that it would cost approximately $13.1 million to restore the site to make it available for other SMUD uses with some major structures remaining intact. Site restoration is not a legal requirement. No site restoration is currently underway.

EMPLOYEE RELATIONS

SMUD has approximately 2,231 employees, most of whom are covered by a civil service system. SMUD is a contracting member of the California Public Employees' Retirement System ("PERS"). Approximately 50% of SMUD's work-force is represented as to wages, hours and other terms and conditions of employment, by one of three recognized employee organizations, the International Brotherhood of Electrical Workers ("IBEW") Local 1245, the Organization of SMUD Employees ("OSE"), and the SMUD Public Safety Officers' Association ("PSOA"). The remaining 50% of SMUD's work-force, which includes managers, professional, administrative, supervisory, confidential and security staff, is unrepresented.

SMUD negotiated four-year Memoranda of Understanding ("MOU") with IBEW and the OSE, effective January 1, 2022, through December 31, 2025. Both contracts contain a no-strike/no-lockout clause effective during the life of the agreements. The PSOA recently obtained recognition status in 2018, and in 2019, SMUD negotiated an MOU with PSOA effective through December 31, 2022. SMUD expects to begin negotiations with PSOA prior to the expiration of the PSOA MOU. SMUD has experienced only one labor interruption, which occurred in January 1980 that lasted four days.

RETIREMENT BENEFITS AND POST-EMPLOYMENT MEDICAL BENEFITS

Pension Plans

SMUD participates in PERS, an agent multiple-employer public employee defined benefit pension plan. PERS provides retirement and disability benefits, annual cost-of-living adjustments, and death benefits to plan members and beneficiaries. PERS acts as a common investment and administrative agent for participating public entities within the State. Benefit provisions and all other requirements are established by State statute and SMUD policies. The pension plan provides retirement benefits, survivor benefits, and death and disability benefits based upon employees' years of credited service, age, and final compensation.

As of June 30, 2020, the last actuarial valuation date for SMUD's plan within PERS, the market value of the SMUD plan assets was $1.94 billion. The plan is 79.1% funded on a market value of assets basis, an increase of 0.7% compared to the June 30, 2019 funded status based on the market value of assets.

As an employer, SMUD is required to contribute a percentage of payroll each year to PERS to fund SMUD's plan based on actuarial valuations performed by PERS. PERS collects the normal cost based on a percentage of payroll and the unfunded liability portion is based on a dollar amount. SMUD also makes partial contributions required of SMUD employees on their behalf and for their account. At the PERS fiscal year ended June 30, 2021, SMUD's required employer contribution rate for normal cost was 9.1% of payroll and the unfunded liability contribution was $33.5 million. During 2021, SMUD contributed $57.6 million to PERS (including SMUD's contributions to cover required employee contributions), and SMUD employees paid $15.4 million for their share of the PERS contribution.

For the fiscal years ending June 30, 2022 and June 30, 2023, SMUD is required to contribute 9.0% and 8.9% of payroll for normal costs and $36.3 million and $22.4 million for the unfunded liability contribution, respectively. Assuming no amendments to the plan and no liability gains or losses (which can have a significant impact), PERS has projected that SMUD will be required to contribute 8.7% of payroll to the plan for normal costs and $23.8 million for the unfunded liability contribution for the fiscal year ending June 30, 2024, not including SMUD contributions to cover required employee contributions. The amount SMUD is required to contribute to PERS is expected to increase in the future. The actual amount of such increases will depend on a variety of factors, including but not limited to investment returns, actuarial methods and assumptions, experience and retirement benefit adjustments.

SMUD has the option to prepay an annual lump sum payment to PERS for the unfunded accrued liability portion only (not including SMUD contributions to cover required employee contributions). SMUD made an annual lump sum prepayment of $31.3 million, and also voluntarily made an additional payment of $175.1 million, for the unfunded accrued liability for the fiscal year ended June 30, 2021. SMUD also made an annual lump sum prepayment of $35.0 million, and voluntarily made an additional payment of $25.0 million for the unfunded accrued liability for the fiscal year ending June 30, 2022.

While SMUD has some ability to adjust the retirement benefits provided to its employees, PERS determines the actuarial methods and assumptions used with respect to assets administered by PERS (including the SMUD plan assets) and makes the investment decisions with respect to such assets. For a description of such actuarial methods and assumptions (including the smoothing conventions used by PERS when setting employer contribution rates) and investments, see the comprehensive annual financial report of PERS (SMUD's plan is part of the Public Employees' Retirement Fund of PERS) available on its website at www.calpers.ca.gov. SMUD cannot guarantee the accuracy of such information and neither the comprehensive annual financial report of PERS nor any other information contained on the PERS website is incorporated by reference in or part of this Official Statement. Actuarial assessments are "forward-looking" information that reflect the judgment of the fiduciaries of the pension plans, and are based upon a variety of assumptions, one or more of which may prove to be inaccurate or be changed in the future. Actuarial assessments will change with the future experience of the pension plans.

GASB issued statement No. 68 "Accounting and Financial Reporting for Pensions – An Amendment of GASB Statement No. 27" ("GASB No. 68"). The primary objective of GASB No. 68 is to improve accounting and financial reporting by state and local governments for pensions. Under GASB No. 68, SMUD is required to report the net pension liability (i.e., the difference between the total pension liability and the pension plan's net position or market value of assets) in its Statement of Net Position. This standard requires shorter amortization periods for recognition of non-investment gains and losses and actuarial assumption changes, as well as for recognition of investment gains and losses. GASB No. 68 separates financial reporting from funding requirements for pension plans. The net pension asset as of December 31, 2021 is $27.7 million and the net pension liability as of December 31, 2020 is $469.8 million.

SMUD provides its employees with two cash deferred compensation plans: one pursuant to Internal Revenue Code ("IRC") Section 401(k) (the "401(k) Plan") and one pursuant to IRC Section 457 (the "457 Plan" and collectively, the "Plans"). The Plans are contributory plans in which SMUD's employees contribute the funds. Each of SMUD's eligible full-time or permanent part-time employees may participate in either or both Plans, and amounts contributed by employees are vested immediately. Such funds are held by a trustee in trust for the employees upon retirement from SMUD service and, accordingly, are not subject to the general claims of SMUD's creditors. SMUD makes annual contributions to the 401(k) Plan on behalf of certain employees pursuant to a memorandum of understanding with both of its collective bargaining units. SMUD matches non-represented employee contributions to the 401(k) Plan up to a set amount. SMUD also makes limited discretionary contributions to non-represented employees hired after January 1, 2013, which contributions fully vest after five years. SMUD made contributions into the 401(k) Plan of $6.1 million in 2021 and $5.8 million in 2020. Prior to 2022, SMUD did not match employee contributions, nor make contributions on behalf of its employees to the 457 Plan. Beginning in 2022, SMUD makes annual contributions to the 457 Plan on behalf of certain employees and matches employee contributions up to a set amount pursuant to a memorandum of understanding with one of its collective bargaining units. Participating employees made contributions into both Plans totaling $30.6 million in 2021 and $28.8 million in 2020.

Other Post-Employment Benefits

SMUD provides post-employment healthcare benefits, in accordance with SMUD policy and negotiated agreements with employee representation groups in a single employer defined benefit plan, to all employees who retire from SMUD, and their dependents. SMUD also provides post-employment healthcare benefits to covered employees who are eligible for disability retirement. SMUD contributes the full cost of coverage for retirees hired before January 1, 1991, and a portion of the cost based on credited years of service for retirees hired after January 1, 1991. SMUD also contributes a portion of the costs of coverage for these retirees' dependents. Retirees are required to contribute the portion that is not paid by SMUD. The benefits, benefit levels, retiree contributions and employer contributions are governed by SMUD and can be amended by SMUD through its personnel manual and union contracts.

SMUD's post-employment health care benefits are funded through the PERS California Employers' Retiree Benefit Trust ("CERBT"), an agent multiple-employer plan. The funding of a plan occurs when the following events take place: the employer makes payments of benefits directly to or on behalf of a retiree or beneficiary; the employer makes premium payments to an insurer; or the employer irrevocably transfers assets to a trust or other third party acting in the role of trustee, where the plan assets are dedicated to the sole purpose of the payments of the plan benefits, and creditors of the government do not have access to those assets.

SMUD has elected to contribute the normal costs to the CERBT but annually receive reimbursement for cash benefit payments from the CERBT. In 2022 and 2021, SMUD decided to forgo making a contribution for the normal costs to the CERBT because there was a net OPEB asset at December 31, 2021 and 2020. In May 2020, SMUD made contributions for the normal costs to the CERBT in the amount of $9.5 million. SMUD can elect to make additional contributions to the trust. During 2021 and 2020, SMUD made healthcare benefit contributions by paying actual medical costs of $24.1 million and $23.8 million, respectively. During 2021 and 2020, SMUD received a $23.3 million and $20.0 million reimbursement for cash benefit payments from the CERBT, respectively.

At June 30, 2021 and 2020, SMUD estimated that the actuarially determined accumulated post-employment benefit obligation was approximately $398.2 and $405.8 million, respectively. At June 30, 2021 and 2020, the plan was 113.1% and 97.9% funded, respectively.

SMUD's actuary uses PERS economic and other assumptions as the basis for the calculation of the post-employment benefit obligation. The actual accumulated post-employment benefit obligation will vary substantially if such PERS assumptions, such as interest rate and life expectancy, among others, prove to be inaccurate or different than SMUD's actual experience. Although SMUD believes that such assumptions and estimates are reasonable, no assurance can be given that any such assumptions will prove to be accurate, or that SMUD's actual accumulated post-employment benefit obligation will not materially exceed its estimates. Additional information is available in Note 15 (Other Postemployment Benefits) and "Required Supplementary Information" to SMUD's consolidated financial statements.

GASB previously issued SGAS No. 75 "Accounting and Financial Reporting for Postemployment Benefits Other than Pensions". The primary objective of GASB No. 75 is to improve accounting and financial reporting by state and local governments for post-employment benefits other than pensions ("OPEB"). Under GASB No. 75, SMUD is required to report the net OPEB asset or net OPEB liability (i.e., the difference between the total OPEB liability and the OPEB plan's net position or market value of assets) in its Statement of Net Position. This standard requires shorter amortization periods for recognition of non-investment gains and losses and actuarial assumption changes, as well as for recognition of investment gains and losses. The net OPEB asset as of December 31, 2021 and December 31, 2020 is $57.5 million and $0.8 million, respectively.

CAPITAL REQUIREMENTS AND OUTSTANDING INDEBTEDNESS

Estimated Capital Requirements

SMUD has a projected capital requirement of approximately $2.124 billion for the period 2022 through 2026 as shown in the table below. Approximately 60% of this requirement is anticipated to be funded with internally generated funds and cash on hand.

Special projects include costs relating to construction of large substations and the potential construction of Solano Phase 4. The Estimated Capital Requirements table below includes $207 million for Solano Phase 4. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – Solano 4 Project."

ESTIMATED CAPITAL REQUIREMENTS

(Dollars in Thousands)

	Service Area and Other System Improvements Including Distribution System	Improvements to Existing Generation Plant	General Plant	Special Projects	Total Capital Requirements
2022	$202,367	$77,635	$80,862	$90,393	$451,258
2023	137,181	50,563	110,371	220,775	518,890
2024	215,652	46,751	73,569	57,373	393,346
2025	215,252	46,751	73,569	57,373	392,946
2026	189,452	46,751	73,569	57,373	367,146

Outstanding Indebtedness

General. SMUD typically finances its capital requirements through the sale of revenue bonds, the sale of commercial paper, from draws on its Revolving Credit Facility (as defined below) and from internally generated funds.

SMUD's Electric Revenue Bonds (the "Senior Bonds") are issued pursuant to Resolution No. 6649 (the "Senior Resolution") adopted in 1971, as amended and supplemented (the "Senior Resolution"). As of May 1, 2022, SMUD had Senior Bonds in the aggregate principal amount of $1,966,925,000 outstanding. Immediately following the issuance of the [2022 Series J Bonds] and the refunding of the Refunded Bonds, as described in the forepart of this Official Statement, Senior Bonds in the aggregate principal amount of $[_________]* will be outstanding under the Senior Resolution. See "PLAN OF FINANCE" in the forepart of this Official Statement. The Senior Bonds are payable solely from the Net Revenues of SMUD's Electric System. The Senior Bonds are subordinate in right of payment to the prior payment of "Maintenance and Operation Costs" and "Energy Payments" as defined in the Master Resolution, including payments by SMUD to TANC under PA3, payments by SMUD under power purchase agreements related to the Authorities and payments by SMUD to NCGA and NCEA under their respective gas supply contracts.

SMUD's Subordinated Electric Revenue Bonds (the "Subordinated Bonds") are issued pursuant to Resolution No. 85-11-1 of SMUD, adopted on November 7, 1985, as amended and supplemented (the

* Preliminary, subject to change.

"Subordinate Resolution"). As of May 1, 2022, SMUD had Subordinated Bonds in the aggregate principal amount of $200,000,000 outstanding. The Subordinated Bonds are payable solely from the Net Subordinated Revenues of SMUD's Electric System. The Subordinated Bonds are subordinate in right of payment to the prior payment of principal of and interest on the Senior Bonds.

SMUD issues commercial paper notes (the "Notes") from time to time. As of May 1, 2022, no Notes were outstanding. Currently, Notes in the aggregate principal amount of $300,000,000 may be outstanding at any one time, but SMUD reserves the right to increase or decrease the aggregate principal amount of the Notes that may be outstanding at any one time in the future. The Notes are secured by letters of credit issued by commercial banks. The Notes (and SMUD's obligations to repay drawings under the letters of credit) are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Senior Bonds and the Subordinated Bonds. Drawings under the letters of credit, to the extent not repaid immediately from the proceeds of commercial paper or other available SMUD funds, are repayable with interest over a period of five years. The letters of credit currently expire in February, and August of 2025.

SMUD also entered into a revolving credit agreement with a commercial bank and issued its taxable and tax-exempt revolving notes thereunder (collectively, the "Revolving Credit Facility") in February 2022. As of May 1, 2022, no principal was outstanding under the Revolving Credit Facility. Currently, the aggregate principal amount that can be outstanding under the Revolving Credit Facility at any one time is limited to $100,000,000. However, SMUD reserves the right to increase or decrease the aggregate principal amount that can be outstanding at any one time under the Revolving Credit Facility in the future. SMUD's payment obligations under the Revolving Credit Facility are payable solely from available revenues of SMUD's Electric System and are subordinate in right of payment to the prior payment of principal of, premium if any, and interest on the Bonds (including the [2022 Series J Bonds]) and the Subordinated Bonds. The current term of the Revolving Credit Facility expires in February 2026.

Joint Powers Authorities. SMUD has entered into long-term power purchase agreements with SFA relating to the Local Gas-Fired Plants. Under such agreements, SMUD has exclusive control of the dispatch of all five of the Local Gas-Fired Plants and takes all of the power produced by the Local Gas-Fired Plants. See "POWER SUPPLY AND TRANSMISSION – Power Generation Facilities – *Local Gas-Fired Plants*." The Authorities are each treated as component units of SMUD for accounting purposes. Only SFA has outstanding debt, which relates solely to the SFA Project and is payable solely from capacity payments made by SMUD under the related power purchase agreement. The SPA bonds were redeemed on July 1, 2015. The CVFA bonds were defeased in September 2019. The SCA bonds were defeased in September 2019. The SFA power purchase agreement relating to the SFA Project is on a take-or-pay basis whereby payments must be made by SMUD regardless of plant performance. As of June 1, 2022, bonds issued by SFA to finance the SFA Project were outstanding in the aggregate principal amount of $101,185,000. SMUD's payments under the power purchase agreements relating to the Local Gas-Fired Plants are payable from revenues of SMUD's Electric System prior to the payment of principal of and interest on the Senior Bonds and Subordinated Bonds as either "Maintenance and Operation Costs" or "Energy Payments" under the Senior Resolution and Subordinate Resolution.

SMUD and Sacramento Municipal Utility District Financing Authority formed a joint powers authority called the Northern California Gas Authority No. 1 ("NCGA"). NCGA is treated as a component unit of SMUD for accounting purposes. NCGA issued $757,055,000 in bonds in May 2007 for the purpose of paying Morgan Stanley Capital Group in advance for natural gas to be delivered to NCGA and then sold to SMUD pursuant to a long-term purchase contract. SMUD's obligation under the purchase contract is limited to payment for gas supplies delivered by NCGA. SMUD's payments under the purchase contract are payable from revenues of SMUD's Electric System prior to the payment of principal and interest on the Senior Bonds and the Subordinated Bonds as either "Maintenance and Operation Costs" or "Energy

Payments” under the Senior Resolution and the Subordinate Resolution. SMUD is not obligated to make any payments in respect of debt service on the NCGA bonds. As of May 1, 2022, related bonds in the aggregate principal amount of $163,485,000 remain outstanding.

SMUD and Sacramento Municipal Utility District Financing Authority formed a joint powers authority called the Northern California Energy Authority (“NCEA”). NCEA is treated as a component unit of SMUD for accounting purposes. NCEA issued $539,615,000 in bonds in December 2018 for the purpose of paying J. Aron & Company LLC in advance for natural gas or electricity to be delivered to NCEA and then sold to SMUD pursuant to a long-term purchase contract. SMUD’s obligation under the purchase contract is limited to payment for gas or electricity supplies delivered by NCEA. SMUD’s payments under the purchase contract are payable from revenues of SMUD’s Electric System prior to the payment of principal and interest on the Senior Bonds and the Subordinated Bonds as either “Maintenance and Operation Costs” or “Energy Payments” under the Senior Resolution and the Subordinate Resolution. SMUD is not obligated to make any payments in respect of debt service on the NCEA bonds. As of May 1, 2022, related bonds in the aggregate principal amount of $539,615,000 remain outstanding.

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Interest Rate Swap Agreements. SMUD has two interest rate swap agreements relating to previously or currently outstanding Subordinated Bonds and three forward starting interest rate swap agreements relating to potential refunding bonds to be issued in the future, as shown in the following table. For more information, see Note 9 (Derivative Financial Instruments) to SMUD's consolidated financial statements.

Effective Date	**Termination Date**	**SMUD Pays**		**SMUD Receives**	**Notional Amount (000's)**	**Counterparty**
7/2/1997	7/1/2024	Floating	SIFMA	5.154%	$55,835	J Aron & Company LLC
7/15/2003	8/15/2028	Fixed	2.894%	63% of 1M LIBOR	74,375	Morgan Stanley Capital Services, Inc.
07/20/2022	08/15/2033	Fixed	1.607%	SIFMA	157,785	Morgan Stanley Capital Services, Inc.
07/12/2023	08/15/2041	Fixed	0.718%	70% of 1M LIBOR	132,020	Barclays Bank
07/12/2023	08/15/2033	Fixed	0.554%	70% of 1M LIBOR	75,680	Barclays Bank

The obligations of SMUD under the swap agreements are not secured by a pledge of revenues of SMUD's electric system or any other property of SMUD. SMUD does not currently have any collateral posting requirements with respect to the interest rate swap agreements but SMUD may be required to post collateral under certain circumstances. [In connection with the refunding of the Refunded Bonds, as described in the forepart of this Official Statement, SMUD expects to terminate the SIFMA swap with Morgan Stanley Capital Services, Inc. that would otherwise be effective on July 20, 2022. See "PLAN OF FINANCE" in the forepart of this Official Statement.]

Build America Bonds Subsidy Payments. SMUD's Electric Revenue Bonds, 2009 Series V (the "2009 Series V Bonds") and Electric Revenue Bonds, 2010 Series W (the "2010 Series W Bonds") were issued as "Build America Bonds" under the provisions of the American Recovery and Reinvestment Act of 2009. At the time the 2009 Series V Bonds and 2010 Series W Bonds were issued, SMUD expected to receive an annual cash subsidy payment from the United States Treasury equal to 35% of the interest payable on the 2009 Series V Bonds and the 2010 Series W Bonds. However, as a result of the federal budget process, many payments from the federal government, including Build America Bonds subsidy payments, have been reduced. Absent the federal budget reductions, the aggregate annual cash subsidy payable to SMUD with respect to the 2009 Series V Bonds and the 2010 Series W Bonds would be approximately $9.8 million. With the current federal budget reductions, SMUD has typically been receiving aggregate annual cash subsidy payments with respect to the 2009 Series V Bonds and the 2010 Series W Bonds of approximately $9.2 million. It is possible that future federal budget actions could further reduce, or eliminate entirely, the annual cash subsidy payments with respect to Build America Bonds, including the annual cash subsidy payments payable to SMUD with respect to the 2009 Series V Bonds and the 2010 Series W Bonds. SMUD cannot predict the likelihood of the further reduction or elimination of the Build America Bonds subsidy payments. A significant reduction or elimination of the cash subsidy payments payable to SMUD with respect to the 2009 Series V Bonds or the 2010 Series W Bonds could be material.

Debt Service Requirements. The following table sets forth SMUD's debt service requirements with respect to SMUD's Senior Bonds and Subordinated Bonds.

[DEBT SERVICE REQUIREMENTS][TO BE UPDATED][1]
(As of [May 1], 2022)

Calendar Year	Senior Bonds Debt Service[2]	Subordinated Bonds Debt Service[3]	Total Debt Service
2021	$ 202,767,394	$ 10,000,000	$ 212,767,394
2022	202,721,025	10,000,000	212,721,025
2023	210,915,894	10,861,111	221,777,005
2024	179,387,306	7,483,333	186,870,639
2025	180,108,381	8,833,333	188,941,714
2026	180,206,231	5,500,000	185,706,231
2027	180,295,231	6,000,000	186,295,231
2028	180,403,513	6,000,000	186,403,513
2029	129,030,387	6,000,000	135,030,387
2030	139,100,391	6,000,000	145,100,391
2031	144,711,032	6,000,000	150,711,032
2032	144,555,595	6,000,000	150,555,595
2033	144,411,102	6,000,000	150,411,102
2034	144,261,606	6,000,000	150,261,606
2035	144,110,773	6,000,000	150,110,773
2036	143,962,001	6,000,000	149,962,001
2037	83,681,613	6,000,000	89,681,613
2038	83,528,863	6,000,000	89,528,863
2039	80,375,800	6,000,000	86,375,800
2040	80,382,550	6,000,000	86,382,550
2041	85,735,800	6,000,000	91,735,800
2042	31,422,350	28,490,000	59,912,350
2043	31,214,150	28,490,300	59,704,450
2044	31,008,750	28,490,350	59,499,100
2045	30,799,950	28,494,550	59,294,500
2046	25,391,750	28,492,150	53,883,900
2047	25,392,000	28,492,700	53,884,700
2048	25,392,500	28,490,450	53,882,950
2049	25,390,750	28,489,800	53,880,550
2050	25,394,250	-	25,394,250
Total	$ 3,316,058,938	$ 370,608,077	$ 3,686,667,015

(1) Does not include outstanding bonds issued by the Authorities for the Local Gas-Fired Plants. Does not include bonds issued by NCGA, NCEA or SMUD's portion of bonds issued by TANC. Payments by SMUD which are used by the Authorities, NCGA, NCEA, and TANC to pay debt service on such bonds constitute either "Maintenance and Operation Costs" or "Energy Payments" under the Senior Resolution and the Subordinate Resolution.

(2) Does not include debt service for the 2022 Series J Bonds or reflect the refunding of the Refunded Bonds. Debt service is not reduced by the amount of any subsidy that SMUD currently expects to receive in connection with the 2009 Series V Bonds and 2010 Series W Bonds.

(3) Based on an assumed interest rate of 3% per annum following (i) the initial scheduled Mandatory Purchase Date of October 17, 2023 for SMUD's Subordinated Electric Revenue Bonds, 2019 Series A and (ii) the initial scheduled Mandatory Purchase Date of October 15, 2025 for SMUD's Subordinated Electric Revenue Bonds, 2019 Series B.

Note: Amounts may not add due to rounding.

INSURANCE

SMUD maintains a comprehensive property/casualty insurance program designed to protect against catastrophic losses that would have an adverse effect on its financial position or operational capabilities. Insurance programs are continuously reviewed and modified when construction, operational exposures, or developments in the insurance industry so warrant. Long term relationships with a variety of insurers minimize SMUD's susceptibility to the effects of market cycles. SMUD budgets reserves to meet potential insurance deductibles and self-insured liability claims.

SMUD safeguards assets with all-risk property and boiler/machinery insurance with limits of $800 million per occurrence for physical damage and business interruption combined. Various coverage sublimits and deductibles apply to losses arising from certain perils, such as business interruption, earthquake, or flood, respectively. Liability insurance is in effect to defend and indemnify SMUD against third party claims, including general, automobile and sudden and accidental pollution claims with policy limits of $140 million, and wildfire coverage with policy limits of $250 million, all of which include a variety of self-insured retentions.

Nuclear property and liability insurance policies are maintained in accordance with the NRC's requirements for decommissioned nuclear plants that maintain dry storage of spent fuel on-site. This includes $100 million in first party property damage and decontamination, $100 million for nuclear liability arising from accidents on-site, $200 million for supplier's and transporter's nuclear liability, and $300 million for nuclear worker liability. SMUD is exposed to possible retrospective assessments for nuclear property events occurring at other nuclear facilities in the United States capped at ten times SMUD's annual nuclear property premium (currently the maximum retrospective assessment is approximately $1,000,000).

Other types of insurance include non-owned aircraft liability, workers' compensation, crime, cyber security, fidelity, fiduciary liability, directors' and officers' liability, professional errors and omissions, transportation and installation, and builder's risk for major facilities under construction.

LEGAL PROCEEDINGS

SMUD is a party to numerous actions arising out of the conduct of its business and affairs, some of which are discussed below. SMUD believes that any losses or adverse financial results it may suffer in these current actions, to the extent not covered by insurance, would not, in the aggregate, have an adverse material impact on SMUD, its business and affairs, the results of its operations, financial position or liquidity.

Environmental Litigation

SMUD was one of many potentially responsible parties that had been named in a number of actions relating to environmental claims and/or complaints. SMUD has resolved these environmental claims and/or complaints and entered into settlement agreements and/or consent orders. These settlement agreements and consent orders have statutory reopener provisions which allow regulatory agencies to seek additional funds for environmental remediation under certain limited circumstances. While SMUD believes it is unlikely that any of the prior settlements or consent orders will be reopened, the possibility exists. If any of the settlements or consent orders were to be reopened, SMUD management does not believe that the outcome will have a material adverse impact on SMUD's financial position, liquidity or results of operations.

Claim for Accidental Death

In February 2020, SMUD received a claim alleging an employee of a gutter company died after he accidentally came into contact with a SMUD electrical line during an installation. The claim is for approximately $43 million. SMUD concluded the electrical lines at the site of the accident exceeded required clearances and there is no basis for the claim against SMUD. SMUD management believes that SMUD has no potential liability in this matter and that any costs ultimately borne by SMUD will not have a material adverse impact on SMUD's financial position, liquidity or results of operations.

Proposition 26 Lawsuit

Two SMUD customers jointly filed a complaint against SMUD in October 2019. The complaint states that SMUD violated Proposition 26 (see "DEVELOPMENTS IN THE ENERGY MARKETS – State Legislation and Regulatory Proceedings – *Proposition 26*" for a description of Proposition 26) when SMUD's Board on June 24, 2019 adopted rate increases for 2020 and 2021. The Plaintiffs contend the rate increases do not reflect SMUD's reasonable cost of service because they include a 9.2% scalar that SMUD applied to its TOD residential rate restructure in the 2017 rate process which SMUD's Board of Directors adopted at that time. Therefore, the plaintiffs contend SMUD's 2020 and 2021 rates should be decreased by this scalar amount because the scalar exceeded SMUD's cost of service, and refunded to SMUD customers. Because SMUD has a strong evidentiary record supporting the Board's rate decisions in 2017 and 2019, and views the lawsuit as having little merit, SMUD anticipates the court will rule in SMUD's favor. The plaintiffs have requested to amend the complaint, which has delayed the court's proceeding until the amended complaint is filed. While SMUD believes the court will rule in its favor, SMUD is unable to predict the outcome of the litigation or, if or to the extent SMUD ultimately is not successful in the litigation, what remedies against SMUD may be available. SMUD management believes that if SMUD is not successful in the litigation, and to the extent the outcome would have a material adverse impact on SMUD's financial position, liquidity, or results of operations, the Board would make appropriate rate modifications based on an evidentiary record consistent with guidance from a judicial decision in the case.

Other Litigation Matters

Currently, SMUD is party to various claims, legal actions and complaints relating to its operations, including but not limited to: property damage and personal injury, contract disputes, torts, and employment matters. SMUD management believes that the ultimate resolution of these matters will not have a material adverse effect on SMUD's financial position, liquidity or results of operation.

FERC Administrative Proceedings

SMUD is involved in a number of FERC administrative proceedings related to the operation of wholesale energy markets, regional transmission planning, gas transportation and the development of NERC reliability standards. While these proceedings are complex and numerous, they generally fall into the following categories: (i) filings initiated by the CAISO (or other market participants) to adopt/modify the CAISO Tariff and/or establish market design and behavior rules; (ii) filings initiated by existing transmission owners (i.e., PG&E and the other IOUs) to pass-through costs to their existing wholesale transmission customers; (iii) filings initiated by FERC on market participants to establish market design and behavior rules or to complain about or investigate market behavior by certain market participants; (iv) filings initiated by transmission owners under their transmission owner tariffs for the purpose of establishing a regional transmission planning process; (v) filings initiated by providers of firm gas transportation services under the Natural Gas Act; and (vi) filings initiated by NERC to develop reliability standards applicable to owners, users, and operators of the bulk electric system. In addition, SMUD is an active participant in other FERC administrative proceedings, including those related to reliability and cybersecurity standards, variable resource integration, and transmission planning and cost allocation. SMUD management believes that the ultimate resolution of these matters will not have a material adverse effect on SMUD's financial position, liquidity or results of operations.

CPUC Administrative Proceedings

In July 2016, the CPUC adopted a final decision on PG&E's triennial gas transmission and storage ("GT&S") rate case. The case affects SMUD through several tariff rates SMUD pays to move natural gas along PG&E's backbone transmission lines. As a result of the 2010 San Bruno pipeline explosion, PG&E has applied for a significant increase in its revenue requirement to pay for enhanced safety measures on its entire gas pipeline system, including the backbone. PG&E proposed to increase the transportation tariff significantly for the period 2015-2017 in order to collect revenues to finance dramatic capital expenditures to implement over 75 remedies to enhance pipeline safety improvements of PG&E's gas transmission pipeline system. The CPUC authorized an 85% increase in PG&E's revenue requirement, which included an even larger rate increase for electric generators who use local transmission to supply their power plants. Some of those affected parties advocated for a single transportation rate that would eliminate the cost-based distinction between the high local rate that they would pay and the low backbone transmission rate that SMUD would pay. SMUD opposed those parties. In the final decision, CPUC ruled in SMUD's favor resulting in a backbone rate that remained essentially unchanged through 2018. While certain parties impacted by the increased local transportation rates sought a rehearing on the final decision and later filed a petition for modification of that decision, the CPUC has not acted on the petition for rehearing and it denied the petition for modification.

PG&E's 2019 GT&S rate case (the "2019 GT&S Case") was filed on October 30, 2017, and seeks to significantly increase the backbone transmission rates SMUD pays. Unlike the prior GT&S case described in the preceding paragraph, in the 2019 GT&S Case, PG&E is also seeking to divest itself of some of its primary gas storage assets, as well as upgrade those which will remain in its portfolio. This is largely in response to increased regulations and needed costly modifications imposed by the Division of Oil, Gas, and Geothermal Resources in the wake of the Aliso Canyon gas storage leak that occurred in 2016. PG&E estimated that these regulatory changes would reduce the capacity of its gas storage assets by nearly forty percent. Moreover, changes in PG&E's resource mix due to State policies favoring carbon-free resources, make this divestiture a key part of its overall resource portfolio strategic plan.

SMUD actively participated in the 2019 GT&S Case and was successful in affirming the application of cost causation principles to prevent excessive and unreasonable costs being shifted to electric generator backbone customers like SMUD, either through proposed changes in PG&E's natural gas storage strategy or through cost shifts within the electric generator customer class. In August 2020, PG&E hosted a workshop on local transmission study parameters and approaches. Several parties presented studies showing varying levels of cost allocation between core and non-core customers.

PG&E filed its 2023 General Rate Case ("GRC") in June 2021 which includes its gas transmission and storage revenue requirements. In September 2021, PG&E filed an application for approval of its Gas Cost Allocation and Rate Design Proposals ("CARD"). SMUD will actively participate in PG&E's GRC and CARD proceedings to ensure that costs are fairly allocated to non-core customers, including electric generator backbone customers. Separately, SMUD continues to participate and monitor a proceeding at the CPUC concerning long-term gas system planning. At this point in these proceedings, SMUD management does not anticipate that the ultimate resolution of such cases will have a material adverse effect on SMUD's financial position, liquidity, or results of operation.

DEVELOPMENTS IN THE ENERGY MARKETS

Background; Electric Market Deregulation

In 1996, the State partially deregulated its electric energy market. CAISO was established, as well as an independent power exchange, the PX. The PX was originally established to permit power generators to sell power on a competitive spot market basis; however, the PX has ceased all power exchange operations and filed for bankruptcy protection.

During 2000 and 2001, the State and many of the other western states experienced significantly higher and more volatile prices for natural gas and wholesale electricity. In reaction to such conditions, SMUD made significant changes to its business strategy to mitigate the impacts of the more volatile and unpredictable energy markets. While the difficult market conditions have moderated substantially, volatility in energy prices in the State are always a potential risk due to a variety of factors which affect both the supply and demand for electricity in the western United States. These factors include, but are not limited to, the implementation of the CAISO market design changes, insufficient generation resources, the increase in intermittent renewable energy resources, natural gas price volatility, fuel costs and availability, weather, transmission constraints and levels of hydroelectric generation within the region. While SMUD has taken a number of steps to mitigate its exposure to price volatility associated with these factors, this price volatility under extreme conditions may contribute to greater volatility in SMUD's net revenues from the sale of electric energy and, therefore, could materially adversely affect the financial condition and liquidity of SMUD. For a discussion of SMUD's current resource planning activities and risk management strategies, see "BUSINESS STRATEGY" above.

Cybersecurity

In 2015, Congress passed the Cybersecurity Information Sharing Act, which facilitated the secure sharing of information about cybersecurity threats between electric utilities and the federal government. SMUD participates in sharing and receiving information about cyber security threats in real time through the Electricity Information Sharing and Analysis Center ("E-ISAC"), the central hub for such data to actively manage risk related to potential cyber intrusion.

SMUD also participates in NERC's development of mandatory, enforceable cyber security standards to address vulnerabilities in electric utility systems. SMUD also adopts voluntary measures suggested as best practices by the National Institute of Standards and Technology ("NIST") in its national framework.

Cyber-security continues to be a top priority for SMUD. SMUD's prudent response to this ever-changing threat requires constant monitoring and frequent updates to implement new regulatory requirements as they are developed. SMUD manages risk related to frequently changing regulatory requirements by participating in the development of standards at NERC and NIST and through active engagement in the cyber security policy dialogue in Congress. The Omnibus Spending Bill for Fiscal Year 2022 signed into law by President Biden on March 15, 2022 included a measure which SMUD and other public power entities opposed as redundant to existing E-ISAC reporting without increasing security, being a requirement that critical infrastructure owners and operators report significant cyber incidents to the Cybersecurity and Infrastructure Security Agency ("CISA") within 72 hours and ransomware payments within 24 hours. Under the measure, CISA is directed to publish a notice of proposed rulemaking to implement the reporting requirements within 24 months.

Notwithstanding regulatory developments, cyberattacks are becoming more sophisticated and certain cyber incidents, such as surveillance, may remain undetected for an extended period. Critical infrastructure sectors such as the electric grid may be specific targets of cybersecurity attacks or threats. Attacks or threats directed at critical electric or energy sector operations could damage or cause the shut-down of generation, transmission or distribution assets that are essential to SMUD's ability to serve its customers, cause operational malfunctions and outages affecting SMUD's electric system, and result in costly recovery and remediation efforts. The costs of security measures or of remedying breaches could be material.

Federal Legislation and Regulatory Proceedings

Energy Policy Act of 2005. On August 8, 2005, the Energy Policy Act of 2005 (the "EPAct of 2005") was signed into law. The law includes a number of energy-related provisions, including among other things limited FERC jurisdiction over interstate transmission assets of municipal utilities, cooperatives and federal utilities to order these entities to provide transmission services on rates and terms comparable to those the entities charge and provide to themselves; the grant of authority to FERC to establish and certify an electric reliability organization to develop and enforce reliability standards for users of the bulk power transmission system; and prohibitions of certain market practices including the provision of false information and related expansion of FERC civil and criminal penalty authority. So far, the most visible impact of the EPAct of 2005 on SMUD has been the development of federal reliability standards.

Federal Regulation of Transmission Access. The Energy Policy Act of 1992 (the "Energy Policy Act") made fundamental changes in the federal regulation of the electric utility industry, particularly in the area of transmission access. The Energy Policy Act provided FERC with the authority to require a transmitting utility to provide transmission services at rates, charges, terms and conditions set by FERC. The purpose of these changes, in part, was to bring about increased competition in the electric utility industry. Under the Energy Policy Act, electric utilities owned by municipalities and other public agencies which own or operate electric power transmission facilities which are used for the sale of electric energy at wholesale are "transmitting utilities" subject to the requirements of the Energy Policy Act.

In April 1996, FERC issued its Order No. 888 to implement the competitive open access to transmission lines authorized by the Energy Policy Act. Order No. 888 requires the provision of open access transmission services on a nondiscriminatory basis by all "jurisdictional utilities" (which, by definition, does not include municipal entities like SMUD) by requiring all such utilities to file OATTs. Order No. 888 also requires "nonjurisdictional utilities" (which, by definition, does include SMUD) that purchase transmission services from a jurisdictional utility under an open access tariff and that owns or controls transmission facilities to provide open access service to the jurisdictional utility under terms that are comparable to the service that the nonjurisdictional utility provides itself. Section 211A of the EPAct of 2005 authorizes, but does not require, FERC to order unregulated transmission utilities to provide transmission services. Specifically, FERC may require an unregulated transmitting utility to provide access to their transmission facilities (1) at rates that are comparable to those that the unregulated transmitting utility charges to itself; and (2) on terms and conditions (not relating to rates) that are comparable to those under which the unregulated transmitting utility provides transmission services to itself that are not unduly discriminatory or preferential.

On February 16, 2007, FERC issued Order 890, which concluded that reform of the pro forma OATT was necessary to reduce the potential for undue discrimination and provide clarity in the obligations of transmission providers and customers. Significantly, in Order 890 FERC stated that it will implement its authority under Section 211A on a case-by-case basis and retain the current reciprocity provisions.

On July 21, 2011, FERC issued Order 1000, which among other things requires public utility (jurisdictional) transmission providers to participate in a regional transmission planning process that produces a regional transmission plan and that incorporates a regional and inter-regional cost allocation methodology. Similar to Order 890, FERC states that it will implement its authority under Section 211A on a case-by-case basis. However, in Order 1000, FERC appears to expand upon the current reciprocity provisions. Further, FERC states that it has the authority to allocate costs to beneficiaries of services provided by specific transmission facilities even in the absence of a contractual relationship between the owner of the transmission facilities and the identified beneficiary.

SMUD, individually, and through the Large Public Power Council ("LPPC"), unsuccessfully sought a rehearing of Order 1000 and subsequently appealed Order 1000 to the D.C. Circuit Court of Appeals. On August 15, 2014, the D.C. Circuit Court of Appeals rejected all of the arguments raised on appeal, upholding the entirety of Order 1000. LPPC filed a request for en banc review solely on FERC's ability to allocate costs in the absence of a contractual relationship. The D.C. Circuit Court of Appeals denied rehearing on October 17, 2014. LPPC did not petition the U.S. Supreme Court for writ of certiorari.

The jurisdictional members of WestConnect filed their proposed regional planning process and cost allocation methodology through a series of compliance filings. FERC accepted binding cost allocation for jurisdictional transmission providers of WestConnect and mandated that non-jurisdictional transmission providers identified as beneficiaries of a project have the ability to not accept the cost allocation. Following FERC's acceptance of the final WestConnect Order 1000 process on May 14, 2015, SMUD executed the WestConnect Order 1000 transmission planning participation agreement with its membership effective January 1, 2016 for the start of the 2016-2017 planning cycle.

However, in response to FERC's WestConnect orders on compliance, El Paso Electric Company ("El Paso"), a jurisdictional transmission provider, petitioned to the Court of Appeals for the 5th Circuit. In its appeal, El Paso contends that FERC's WestConnect orders violate Order 1000's cost causation principle because WestConnect's binding cost allocation applies only to the jurisdictional transmission providers and thus forces jurisdictional transmission providers to subsidize projects benefitting non-jurisdictional transmission providers that opt-out of projects. SMUD and the other non-jurisdictional transmission providers agreed on a settlement to resolve the matters on appeal in the 5th Circuit, and filed the settlement with FERC on February 16, 2022. Importantly, the settlement does not affect the ability of non-jurisdictional transmission providers to not accept cost allocation for a project. If approved by FERC, the jurisdictional transmission providers have agreed to dismiss their 5th Circuit appeal. The court has held the case in abeyance during the settlement discussions while the parties develop the settlement documents for the FERC filings. In the meantime, SMUD continues to participate in the WestConnect process.

In addition to regional planning, Order 1000 includes an interregional transmission planning component. WestConnect and the other two regional planning entities in the western interconnection (CAISO and Northern Grid), have developed a common FERC-approved approach to jointly evaluate transmission projects that interconnect two or more regions. While El Paso did not appeal FERC's orders on WestConnect's interregional planning, the decision of the Court of Appeals for the 5th Circuit described above does implicate the interregional cost allocation process because it defers to WestConnect's regional cost allocation methodology.

SMUD is unable to predict at this time the full impact that Order 1000 will have on the operations and finances of SMUD's electric system or the electric industry generally. However, WestConnect has conducted planning cycles under its Order 1000 planning process and has not identified any project eligible for cost allocation. SMUD will continue to take any action necessary, including withdrawing from a cost allocation determination and engaging in FERC proceedings, to ensure that it is not required to pay for transmission costs in the absence of an agreement or service relationship.

Of note, on July 15, 2021, FERC issued an Advance Notice of Proposed Rulemaking on Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator

Interconnection (the "ANOPR"). The ANOPR asks questions and seeks input on reforms that could impact the Order 1000 planning and cost allocation process. It is still early in the rulemaking proceeding, and FERC has not issued any further proposal. However, SMUD will continue to monitor and be engaged in any developments at FERC that impact the Order 1000 process and its participation in WestConnect.

NERC Reliability Standards. The Energy Policy Act ("EPAct") of 2005 required the FERC to certify an electric reliability organization ("ERO") to develop mandatory and enforceable reliability standards, subject to FERC review and approval. On February 3, 2006, FERC issued Order 672, which certified the NERC as the ERO. Many reliability standards have since been approved by FERC, including those aimed at protecting the bulk electric system from physical and cyber threats.

The ERO or the regional entities, such as the WECC, may enforce the reliability standards, subject to FERC oversight or the FERC may independently enforce reliability standards. Potential monetary sanctions include fines of up to $1,307,164 per violation per day. Order 693 provides the ERO and regional entities with the discretion necessary to assess penalties for such violations, while also having discretion to calculate a penalty without collecting the penalty if circumstances warrant. On March 18, 2010, FERC issued a Policy Statement on Penalty Guidelines, which appeared to envision the option of more serious penalties than would be imposed by NERC. NERC and a significant part of the industry challenged that Policy Statement. On September 17, 2010, FERC issued a Revised Policy Statement on Penalty Guidelines, which clarified and tempered some of its prior statements, although the revised guidelines maintained that it was appropriate to use the United States Criminal Sentencing Guidelines Model as an analytical tool for assessing penalties. FERC further clarified that its Revised Policy Statement on Penalty Guidelines would only be applied to investigations conducted by FERC.

Anti-Market Manipulation Rules. EPAct of 2005 gave the FERC the authority to issue rules to prevent market manipulation in jurisdictional wholesale power and gas markets, and in jurisdictional transmission and transportation services. These anti-market manipulation rules apply to non-jurisdictional entities such as SMUD. Further, EPAct of 2005 provided the FERC civil penalty authority, which the Commission has stated that it will exercise carefully by assuring that its market manipulation rules are clear.

Greenhouse Gas Emissions. The United States Environmental Protection Agency (the "EPA") has taken steps to regulate GHG emissions under existing law. In 2007, the U.S. Supreme Court held that the Clean Air Act ("CAA") directed EPA to regulate GHG emissions from new motor vehicles if it judged that such emissions contribute to climate change. In 2009, the EPA finalized an "Endangerment Finding" under the CAA, declaring that six identified GHGs – carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride – cause global warming, and that global warming endangers public health and welfare. Subsequently, EPA promulgated GHG standards for passenger cars and light-duty trucks (the so-called "Tailpipe Rule").-Although that rulemaking was later withdrawn by a different administration, prompting litigation and re-proposal of the standards that has only recently been finalized, the original promulgation of the Tailpipe Rule required EPA to also address emissions of the same pollutants from other sources, namely, the electric sector.

In 2014, the EPA issued a proposed rule under section 111(d) of the CAA called the Clean Power Plan (the "CPP") that projected power sector emissions reductions of 30% below 2005 levels by 2030. The proposed CPP would have established a rate-based emissions goal for each state, providing states the responsibility to develop a State Implementation Plan ("SIP") describing how each will meet the goal assigned by EPA using the "Best System of Emissions Reduction" ("BSER") established by EPA. The BSER under the CPP featured a suite of emissions reduction measures including fuel switching, emissions trading, and other measures. Significantly for the State and its regulated entities, the proposed CPP included a "state measures" plan that allowed for continued operation of successful state programs that achieve CPP goals. The rule was finalized in October 2015.

In November 2015, 27 states and numerous corporations challenged the CPP in court, alleging that EPA had exceeded its authority under the CAA. The U.S. Supreme Court stayed implementation of the CPP pending disposition of the petitions for review in the D.C. Circuit and any subsequent review by the U.S. Supreme Court. The D.C. Circuit Court of Appeals held oral arguments on the petitioner's claims, but before the court issued a decision, the 2016 presidential election resulted in a change of administration.

The new administration quickly moved for an abeyance (or stay) of the case for as long as the agency needed to review and withdraw the CPP. The court issued a series of 60-day abeyances and ultimately dismissed the case on September 17, 2019. Meanwhile, in August 2018, the EPA proceeded to withdraw the CPP and proposed a different rule under the same provision of the CAA. The new rule, known as the Affordable Clean Energy ("ACE") rule, would establish a BSER that only includes measures that can be undertaken at an individual power plant, rather than the broader suite of measures envisioned under the CPP. The ACE rule would also allow states to decide individually, on a case-by-case basis, the standards to be achieved by the best system of emission reductions, as well as exempt certain upgrades of fossil-fuel power plants from the CAA's New Source Review program, and extend the time to implement SIPs after the ACE rule is finalized. The ACE rule was challenged in court by environmental groups and states alleging that the revised rule inadequately responds to the EPA's responsibility to protect public health and welfare. SMUD joined in this litigation along with other challengers. The D.C. Circuit vacated the ACE rule on Jan. 19, 2021 and remanded it to EPA for review and revision, just days before a new presidential administration took office. Several states led by West Virginia and coal industry members appealed the decision, and the U.S. Supreme Court is expected to issue its ruling in the case later in 2022. The current administration is expected to issue a new rulemaking pending the U.S. Supreme Court's ruling.

Federal Clean Energy Legislation. SMUD expects the 117th Congress may consider substantial legislation related to clean energy and carbon emissions. SMUD actively participates in dialogues at the federal level regarding legislation that would meaningfully alter SMUD's existing GHG reduction strategies or impose new requirements for electric generators, including, but not limited to, discussions about a proposed federal clean energy standard.

SMUD is unable to predict with certainty at this time whether legislation will ultimately be considered or enacted, whether any new EPA rulemakings will be undertaken, and what the full impact of the reduction of fossil-based generation over time will have on the operations and finances of SMUD's electric system or the electric utility industry generally.

State Legislation and Regulatory Proceedings

A number of bills affecting the electric utility industry have been enacted by the State Legislature. In general, these bills provide for reduced GHG emission standards and greater investment in energy efficient and environmentally friendly generation alternatives through more stringent RPS. Additionally, ongoing regulatory proceedings address water flow and quality issues related to the Sacramento – San Joaquin River Delta. The following is a brief summary of these bills and regulatory proceedings.

Greenhouse Gas Emissions. On June 1, 2005, the Governor of the State signed Executive Order S-03-05, which emphasized efforts to reduce GHG emissions by establishing statewide GHG reduction targets. The targets are: (i) a reduction to 2000 emissions levels by 2010; (ii) a reduction to 1990 levels by 2020; and (iii) a reduction to 80% below 1990 levels by 2050. The Executive Order also called for the California Environmental Protection Agency ("Cal/EPA") to lead a multi-agency effort to examine the impacts of climate change on the State and develop strategies and mitigation plans to achieve the targets. On April 25, 2006, the Governor of the State signed Executive Order S-06-06 which directs the State to increase production of biofuels in the State and to meet 20% of its renewable energy goals in 2010 and 2020 using biomass resources.

On September 27, 2006, the Governor of the State signed into law AB 32, the Global Warming Solutions Act of 2006 ("AB 32"). AB 32 requires the California Air Resources Board ("CARB") to adopt enforceable GHG emission limits and emission reduction measures in order to reduce GHG emissions to 1990 levels by 2020. In addition, AB 32 establishes a mandatory reporting program for all IOUs, local, publicly-owned electric utilities and other load-serving entities (electric utilities providing energy to end-use customers) ("LSEs"). The AB 32 reporting program allows CARB to adopt regulations using market-based compliance mechanisms such as a "cap-and-trade" system.

On December 16, 2010, CARB approved a resolution adopting cap-and-trade regulations for the State. The regulations became effective on January 1, 2012. As adopted, the cap-and-trade program covers sources accounting for 85% of the State's GHG emissions, the largest program of its type in the United States.

The cap-and-trade program has been implemented in phases. The first phase of the program (through December 31, 2014) introduced a hard emissions cap on the combined electric utility and large industrial sectors, covering all sources emitting more than 25,000 metric tons of carbon dioxide-equivalent greenhouse gases ("CO2e") per year. In 2015, the program was expanded to cover distributors of transportation, natural gas, and other fossil fuels. The cap declined about 2 percent in 2014, and declined 3 percent annually from 2015 to 2020. The cap-and-trade program requires covered entities to retire compliance instruments (allowances and carbon offsets) for each metric ton of CO2e they emit. Initially, CARB allocated free allowances to LSEs and most industrial facilities at roughly 90% of their average emissions. SMUD was granted a higher amount because of early action taken to reduce GHG emissions. In the case of electric utilities, the value of allowances must be used to benefit ratepayers and achieve GHG emission reductions. As the program matures, some covered entities will be required to buy an increasing portion of their allowances at auction or on the secondary market. The cap-and-trade program will also allow covered entities to use offset credits for compliance purposes (not exceeding 8% of a regulated entity's compliance obligation). Offsets must be obtained from certified projects in sectors that are not regulated under the cap-and-trade program.

In November of 2012, CARB conducted its first allowance auction and auctions now occur on a quarterly schedule. On January 1, 2014, CARB linked the State cap and trade program with a companion program in the Canadian province of Quebec. The first quarterly joint auction for the linked programs occurred in November, 2014. On January 1, 2018, CARB linked the State's cap-and-trade program with Ontario's companion program. Immediately thereafter, an entity in any one of the three jurisdictions was able to purchase allowances on the secondary market in a linked jurisdiction, and as of February 21, 2018 (the date of the first joint auction) could purchase allowances in the joint auction. In June 2018, elections in Ontario changed political parties and the new administration formally withdrew from the Cap and Trade linkage. CARB has limited purchase and use of Ontario allowances in response. The August 2018 Cap and Trade auction did not include Ontario. The Washington state legislature recently passed a Cap and Trade bill, which will interact with the State's markets. Future potential near-term links to the CARB cap-and-trade program also include the states of Oregon and New Mexico.

On October 7, 2015, the Governor of the State signed SB 350 that contained aggressive goals for reducing carbon emissions by 2030, including raising the proportion of renewable energy to 50%, reducing the use of petroleum fuel in cars and trucks by up to 50%, and doubling the energy efficiency of existing buildings. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*" for additional information. In addition, SB 350 established requirements for larger POUs to adopt (by January 1, 2019) and file with the CEC Integrated Resource Plans ("IRPs") by April 2019 that would show planned procurement to achieve the 50% RPS and State GHG goals established by CARB. The CEC developed "guidelines" for these IRPs for POUs in 2017 and updated them in 2018. CARB established specific GHG target ranges for these IRPs in summer 2018, with SMUD's planning target set at 1.1 – 1.9 million metric tons of emissions. SMUD developed and adopted an IRP in 2018 through a comprehensive public process and filed the adopted IRP with the CEC on April 29, 2019. SMUD's adopted IRP plans for a greater than 60% net reduction in GHG emissions by 2030 relative to 1990 levels, which equals approximately 1.3 million metric tons of GHG emissions. See "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Renewable Energy and Climate Change*."

On April 29, 2015, the Governor of the State signed Executive Order B-30-15, establishing a goal for the State to reduce GHG emissions to 40% below 1990 levels by 2030. In 2016, the State Legislature passed Senate Bill 32 ("SB 32"), which codified Governor Brown's goal of reducing the State's GHG emissions to 40% below 1990 levels by 2030. In 2017, the State Supreme Court resolved a final lawsuit, ruling that the Cap and Trade program was not a "fee" or "tax", and hence a two-thirds legislative vote for AB 32 was not required. In 2017, the State Legislature passed Assembly Bill 398 ("AB 398"), explicitly authorizing the continuation of the cap and trade program, with designated changes, through 2030. Subsequently, CARB adopted an initial set of regulatory changes extending the Cap and Trade program, including establishing utility sector allowance allocations through 2030. In 2018, CARB completed a rulemaking to implement the cap and trade program changes designated by AB 398. These changes include development of a hard price ceiling for the cap and trade program and two price-containment points below that ceiling, in an attempt to ensure stable prices in the program. CARB adopted final regulations on December 13, 2018.

In addition, any new projects constructed in the State, including power plants, that may cause a significant adverse impact on the environment must be analyzed under CEQA. Some State agencies have begun using CEQA in novel ways to require mitigation of "significant" GHG emissions caused, either directly or indirectly, by a project. Pursuant to Senate Bill 97 passed in 2007, CARB will assist the Governor's Office of Planning and Research in setting thresholds of significance under CEQA of GHG impacts from new projects. This is an area of State law that is evolving and untested in the courts. However, there is a risk that any project proponent of an electric system infrastructure project might have to mitigate such potential impacts to a level of less than significance.

On December 3, 2012, the Superior Court issued a ruling in Cleveland National Forest Foundation v. San Diego Association of Governments ("SANDAG"), Case No. 2100-00101593, that sided with the State Attorney General and the other petitioners stating that the SANDAG did not follow CEQA when it adopted a $257 billion regional transportation plan in 2011. The ruling expressly invalidated the certification of the Environmental Impact Report ("EIR") on the grounds that the EIR should have analyzed the plan's consistency with the governor's policy goal to reduce GHG emissions by 80% by 2050 as articulated in the 2005 Executive Order S-03-05. On November 24, 2014, the Fourth Appellate District upheld the trial court in a published decision, and SANDAG appealed to the State Supreme Court. On July 13, 2017, the Supreme Court reversed and held that SANDAG's decision not to adopt the 2050 goal was not an abuse of discretion. Nevertheless, the Court articulated three clear principles for agencies to follow in their CEQA review of planning documents: 1) agencies must take seriously the significance of even small increases in GHG emissions; 2) they must consider science-based State policy guidance in their decision-making; and 3) they are required to use the best scientific information available to determine whether their planning decisions are consistent with the State's goals. These principles will apply to SMUD in CEQA reviews of future projects.

On September 29, 2006, the Governor of the State signed into law Senate Bill 1368 ("SB 1368"), the GHG Emissions Performance Standard ("EPS"). SB 1368 limits long-term investments in baseload generation by the State's utilities to power plants that meet an EPS jointly established by the CEC and the CPUC. The agencies have set the EPS at 1,100 pounds CO_2 per MWh, which is roughly half of the CO_2 emissions rate of a conventional coal-fired power plant. CEC regulations to implement the law for POUs were approved by the Office of Administrative Law on October 16, 2007.

SMUD's primary supply and demand-side resource needs to meet customers' electricity usage patterns over the next 10 years are for peaking resources. Currently there is a ban in the State that prohibits the development of nuclear power plants until there is a permanent storage solution for spent fuel rods. With the effective ban on new coal power imports under SB 1368, natural gas-fired, combined cycle power plants would appear to be the primary viable option for fossil fuel based baseload power plant development absent the implementation of new technologies in connection with other resource options. The reliance on a single fuel source will continue to put pressure on the natural gas market in the United States. SMUD has in place a natural gas procurement plan to mitigate natural gas volatility, see "POWER SUPPLY AND TRANSMISSION – Fuel Supply" above.

Energy Efficiency. Senate Bill 1037 ("SB 1037"), signed by Governor Schwarzenegger on September 29, 2005, requires that each municipal electric utility, including SMUD, prior to procuring new energy generation resources, first acquire all available energy efficiency, demand reduction and renewable resources that are cost effective, reliable and feasible. SB 1037 also requires each municipal electric utility to report annually to its customers and to the CEC its investment in energy efficiency and demand reduction programs. Further, State Assembly Bill 2021 ("AB 2021"), signed by the Governor on September 29, 2006 requires that the publicly owned utilities establish energy efficiency and demand reduction targets and report and explain the basis of the targets beginning June 1, 2007 and every three years thereafter for a ten year horizon. Future reporting requirements as set forth in AB 2021 include: (i) the identification of sources of funding for the investment in energy efficiency and demand reduction programs, (ii) the methodologies and input assumptions used to determine cost effectiveness, and (iii) the results of an independent evaluation to measure and verify energy efficiency savings and demand reduction program impacts. The information obtained from local publicly owned utilities will be used by the CEC to present the progress made by the publicly owned utilities on the State's goal of reducing electrical consumption by 10% in ten years and amelioration with the GHG targets presented in Executive Order S-3-05 enacted by the Governor of the State on June 1, 2005.

In response to SB 1037 and AB 2021, SMUD established a specific goal of reducing energy consumption by 15% by 2018 and adopted annual targets for gigawatt hour and megawatt savings. SMUD revisits its energy efficiency goals and programs on a regular basis to ensure compliance with State policies established by SB 1037 and AB 2021 (as modified by SB 350).

SB 350 (passed in 2015) requires the CEC to develop statewide energy efficiency targets for 2030 aimed at doubling the achieved savings, and requires POUs to establish efficiency targets that are "consistent" with those targets. In 2017, the CEC developed a report on the doubling of energy efficiency targets required by SB 350. Both SB 350 and the CEC report contemplate the use of fuel substitution to meet energy efficiency targets and have a strong focus on carbon reduction. In response, SMUD developed a methodology and carbon tool to count fuel substitution, namely switching natural gas end-uses to efficient electric end uses and measuring savings in carbon emissions. SMUD presented its methodology to the joint state agency working group known as the Fuel Substitution Working Group several times in 2019 and adopted a carbon-based metric in early 2020 to guide overall SMUD carbon targets. This goal is expected to facilitate substantial expansion of building electrification and result in more than double the overall amount of energy efficiency being delivered per year, when measured on a carbon reduction basis. The vast majority of this energy efficiency (more than 85%) is expected to be delivered through efficient electrification by 2030.

Also passed in 2015 was AB 802. This bill directed the CEC to develop a State-wide building energy use benchmarking and public disclosure program for those buildings greater than 50,000 square feet. As set forth in regulations adopted by the CEC, building owners are required to report building characteristic information and energy use data each year. The reporting began in 2018 for buildings without residential utility accounts and in 2019 for buildings with 17 or more residential utility accounts. Energy utilities must provide building-level energy use data to building owners upon request.

In order to support the implementation of SB 350 and AB 802, the CEC opened a rulemaking to amend its Title 20 Data Collection regulations, resulting in an expansion of customer data utilities must report to the CEC. The CEC adopted regulations pursuant to the rulemaking in February 2018, and the regulations were approved and went into effect in the Summer of 2018. SMUD has made several data filings under the new regulations. In 2020, the CEC opened a second phase of Data Collection rulemaking to amend regulations necessary to develop the policy reports and analysis as required by statue to assist in the CEC's energy forecasting and assessment activities. The OAL approved the codifying of the regulations from that proceeding on December 30, 2021.

Governor's Zero Emission Vehicle Executive Orders

Executive Order B-48-18, enacted January 2018, ordered all state entities to work with the private sector and all appropriate levels of government to put at least 5 million zero-emission vehicles on California roads by 2030, as well as 250,000 zero-emission vehicle chargers by 2025.

Executive Order N-79020 states the goal of 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035 and 100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045 for all operations feasible.

Increases in zero-emission vehicle adoption and deployment will result in increased customer usage of electricity.

Rooftop Solar Mandate. In February, 2018, the CEC approved updates to the 2019 Title 24, Part 6, Building Energy Efficiency Standards to require installation of rooftop photovoltaic solar systems for residential buildings under three stories constructed starting in 2020, with an option to satisfy the requirement through community solar systems or energy storage There is a "Community Solar" option for compliance with the mandate that permits a utility to provide solar power to the residential customers instead of rooftop solar, and SMUD submitted an application to the CEC for that option. The CEC approved SMUD's Community Solar program, Neighborhood SolarShares, on February 20, 2020. In 2021, the CEC revised the Community Solar option in the 2022 Building Energy Efficiency Standards to include an "opt-out" provision, which will impact the design and implementation of SMUD's Neighborhood SolarShares program. SMUD is updating our Neighborhood SolarShares program to incorporate the 2022 revisions, which take effect in January 2023.. See also "BUSINESS STRATEGY – Serving SMUD's Customers – *Renewable Options*."

Renewables Portfolio Standard. Senate Bill 100 was passed by the Legislature and approved by Governor Brown on September 10, 2018. The bill sets a 50% RPS target for 2026 and sets compliance period targets at 44% by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. The bill also created a statewide planning goal to meet all of the state's retail electricity supply with a mix of RPS-eligible and zero-carbon resources by December 31, 2045. Along with SB 100, Governor Brown signed a new Executive Order that directs the State to achieve carbon neutrality by 2045 and net negative greenhouse gas emissions thereafter. The new goal of carbon neutrality by 2045 would be in addition to existing statewide targets of reducing greenhouse gas emission. By expanding the State's carbon reduction goal, the State will also look to reduce carbon through sequestration in forests, soils and other natural landscapes.

Advanced Clean Fleets Rule. In September 2020, Governor Newsom signed Executive Order N-79-20 to accelerate actions to mitigate and adapt to climate change, and to more quickly move toward a low-carbon, sustainable and resilient future. Executive Order (EO) N-79-20 set a goal that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035; and 100 percent of medium- and heavy-duty vehicles in the State shall be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks. In 2021, CARB released the proposed draft regulation for the Advanced Clean Fleets (the "ACF Rule"). The ACF Rule is part of a comprehensive strategy to achieve the mandates outlined in EO N-79-20 and includes requirements to achieve zero-emission truck and bus fleets significantly earlier for market segments such as public fleets, like SMUD. The ACF Rule introduces zero-emissions vehicle purchasing requirements starting in 2024 that will apply when SMUD adds vehicles to its fleet. This regulation is currently in the pre-rulemaking phase and is scheduled for adoption by the CARB Board in the fall of 2022.

Load Management Standards. Sections 25213, 25218(e) and 25403.5 of the Public Resources Code mandate and authorize the CEC to adopt rules and regulations to reduce the uneconomic and unnecessary consumption of energy and to manage energy loads, or demand, to help maintain electrical grid reliability. The original Load Management Standards ("LMS") regulations were adopted in 1979 and required the implementation of marginal cost pricing industrial time-of-use rates, and residential load control programs. In 2020, the CEC proposed to update the LMS regulations to require the five largest electric utilities in California (including SMUD) to develop retail electricity rates that change at least hourly to reflect locational marginal costs and submit those rates to the utility's governing body for approval. The LMS is currently in the formal rulemaking phase, with the 45-Day Language released in December 2021. The LMS proposes the following: a) voluntary hourly or sub-hourly rates for each customer class or b) a cost-effective program, to be implemented by the utilities by January 2026. The LMS was tentatively scheduled to be presented to the CEC for approval in May 2022, but the LMS presentation to the CEC was postponed and a new date has not been set. The effective date of the LMS regulation is expected to be January 2023, although this could be subject to change.

Energy Storage Systems. In September 2010, the State Legislature enacted, and the Governor signed into law, Assembly Bill 2514 ("AB 2514"). On or before March 1, 2012, the governing board of each POU was required to initiate a process to determine appropriate targets, if any, for the utility to procure viable and cost-effective energy storage systems to be achieved by December 31, 2016, and December 31, 2020. The bill required each POU to report certain information to the CEC. In 2014, SMUD set a 0 MW target for 2017, and in 2017 set a 9 MW target for 2020. In 2018, SMUD identified a potential need for 246 MW of storage by 2030. Following SMUD's 2020 compliance report to the CEC in January 2021, going forward SMUD will evaluate and report energy storage planning as part of its IRP update every five years. The next update will be in 2023. See also "BUSINESS STRATEGY – Sustainable Power Supply and Transmission – *Energy Storage Systems*."

Sacramento-San Joaquin River Bay-Delta Processes. The Sacramento-San Joaquin River Delta is an expansive inland estuary, formed at the western edge of the California Central Valley by the confluence of the Sacramento and San Joaquin rivers ("Delta"). There are two substantial Delta planning processes with the potential to affect (1) energy available for SMUD's purchase from the Central Valley Project ("CVP") and (2) flows within the Upper American River watershed. These processes are called the Bay-Delta Water Quality Control Plan ("Bay-Delta Plan") and the Delta Conveyance Project.

The Bay-Delta Water Quality Control Plan is updated periodically by the State Water Resources Control Board ("SWRCB"), the last time being in 2006. The current Bay-Delta Plan update process is being implemented in four phases. The first phase considered southern Delta water quality, with a significant focus on San Joaquin River tributaries. Phase 2, which is initially being addressed by a document under development by SWRCB staff, will address Sacramento River tributaries and various flow related issues, including the critically important one of those tributaries' contribution to Delta outflow. Phase 3 will concern changes to water rights needed to implement Phase 2. A substantial change in Delta outflow requirements could have a major impact on the timing of hydroelectric energy generation by the CVP. SMUD has a long-term agreement with WAPA to purchase some of this power (see "POWER SUPPLY AND TRANSMISSION – Power Purchase Agreements – *Western Area Power Administration*"). On July 18, 2018, the SWRCB released an updated Framework document signaling its staff's intent to propose Delta outflow requirements of 45–65% unimpaired flows for the Sacramento River tributaries (which includes the American River, the upper portions of which are where the UARP sits), though the report will analyze requirements of 35–75%. If these criteria were implemented, they could cut CVP generation by 50 to 63%. Governor Newsom has urged the SWRCB, other agencies and affected parties to execute voluntary agreements to address species' needs and outflow requirements. Although the negotiations stalled during the last year of the Trump Administration the interested parties are expected to pursue them more vigorously since President Biden assumed office, though there is as yet no certainty that all affected parties will agree on terms. If the agreements do not come to fruition, SMUD plans to fully participate in all regulatory and legal proceedings to argue for consideration and minimization of impacts to hydropower generation. SMUD will assess the potential impacts of proposed modifications to the present outflow objectives on SMUD's operations once the SWRCB makes those available.

On January 15, 2020, the State Department of Water Resources ("DWR") announced it will prepare an Environmental Impact Report ("EIR") to evaluate the potential impacts of carrying out the Delta Conveyance Project. The Project is expected to entail construction of two intakes on the Sacramento River that will carry water to a main tunnel to the California Aqueduct for delivery south of the Delta. The Project may pose the potential to exacerbate impacts to already imperiled aquatic species, and in turn could have indirectly prompted regulatory agencies to require third parties, such as SMUD, to compensate by making changes to their operations. SMUD will be actively involved in reviewing the draft EIR, the schedule for which has not been released, and any regulatory proceedings to ensure any impacts to SMUD interests are minimized.

Proposition 26. Proposition 26 was approved by the electorate on November 2, 2010 and amends Article XIII A and Article XIII C of the State Constitution. Proposition 26 imposes a two-thirds voter approval requirement for the imposition of fees and charges by the State, unless the fees and charges are expressly excluded. It also imposes a majority voter approval requirement on local governments with respect to fees and charges for general purposes, and a two-thirds voter approval requirement with respect to fees and charges for special purposes, unless the fees and charges are expressly excluded. The initiative, according to its supporters, is intended to prevent the circumvention of tax limitations imposed by the voters pursuant to Proposition 13, approved in 1978, and other measures through the use of non-tax fees and charges. Proposition 26 expressly excludes from its scope a charge imposed for a specific local government service or product provided directly to the payor that is not provided to those not charged, and which does not exceed the reasonable cost to the local government of providing the service or product. Proposition 26 is not retroactive as applied to local governments. Although SMUD believes that the initiative was not intended to apply to fees for utility services such as those charged by SMUD and its fees and charges meet the criteria of the exclusion described above, it is possible that Proposition 26 could be interpreted to further limit fees and charges for electric utility services and/or require stricter standards for the allocation of costs among customer classes. SMUD is unable to predict at this time how Proposition 26 will be interpreted by the courts or what its ultimate impact will be. As of the date of this Official Statement, SMUD is unaware of any fees or charges relating to SMUD's service that would have to be reduced or eliminated because of Proposition 26.

Wildfire Legislation. In September 2016, Governor Brown signed into law Senate Bill 1028 ("SB 1028"), which requires POUs (including SMUD), IOUs, and electrical cooperatives to construct, maintain and operate their electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by electrical lines and equipment. SB 1028 also requires the governing board of POU's to make an initial determination whether any portion of that geographical area has a significant risk of catastrophic wildfire resulting from those electrical lines and equipment, based on historical fire data and local conditions, and in consultation with the fire departments or other entities responsible for control of wildfires within the geographical area.

Senate Bill 901 ("SB 901"), signed into law in September 2018 by Governor Brown, further addresses response, mitigation and prevention of wildfires. The bill requires POUs, including SMUD, before January 1, 2020, and annually thereafter, to prepare a wildfire mitigation plan and present it in a public meeting to their governing board. SB 901 requires POU's to accept comments on the wildfire mitigation plan from the public, other local and State agencies, and interested parties, and to verify that the plan complies with all applicable rules, regulations, and standards, as appropriate. The bill requires a qualified independent evaluator to review and assess the comprehensiveness of its wildfire mitigation plan and present its report to the board in a public meeting.

In 2019, Governor Newsom released his comprehensive strategy on wildfires, laying the groundwork for legislative discussions on utility wildfire liability and allocating costs associated with catastrophic wildfires, among other things. While the Governor supported a modification of State's current inverse condemnation doctrine, under which utilities are held liable for wildfire damage without regard to the fault of the utility, no bill was introduced. AB 1054 (Holden) did pass in 2019 that included several provisions for solvent investor owned utilities, including the development of a fund to help pay victim claims for utility ignited wildfires. The bill also created a new Wildfire Safety Division within the CPUC to prioritize wildfire safety throughout the State, and established an appointed Wildfire Safety Advisory Board to advise and make recommendations relating to wildfire safety to this new Division. For POUs, the bill requires submittal of annual wildfire mitigation plans to the Advisory Board for review and advisory opinions.

Senate Bill 247 ("SB 247"), signed by Governor Newsom on October 2, 2019, establishes notification, audit and reporting guidelines for electrical corporations relating to vegetation management requirements in the wildfire mitigation plan. SB 247 also specifies the qualifications for electrical line clearance tree trimmers performing work to comply with the vegetation management requirements in an electrical corporation's wildfire mitigation plan and requires that qualified line clearance tree trimmers be paid no less than a specified prevailing wage rate. POUs are not required to adhere to SB 247, but the market impacts are projected to significantly increase SMUD's annual vegetation management costs.

Nonstock Security. SMUD sponsored legislation in 2019, Assembly Bill 689, which was signed into law by Governor Newsom on September 5, 2019. This bill expressly allows SMUD the ability to operate a pilot project, of up to three acquisitions, to hold nonstock security in a corporation or other private entity if acquired as part of a procurement of goods or services from that entity, provided that no separate funding is expended solely for the nonstock security. This will allow SMUD to realize the financial benefits of its investments, partnerships, and intellectual property.

Future Regulation

The electric industry is subject to continuing legislative and administrative reform. States and Federal entities routinely consider changes to the way in which they regulate the electric industry. Recently, both further deregulation and forms of additional regulation have been proposed for the industry, which has been highly regulated throughout its history. SMUD is unable to predict at this time the impact any such proposals will have on the operations and finances of SMUD or the electric utility industry generally.

OTHER FACTORS AFFECTING THE ELECTRIC UTILITY INDUSTRY

CAISO Market Initiatives

The CAISO has initiated a number of initiatives and stakeholder processes that propose certain operational and market changes. SMUD has mitigated the impact of certain CAISO initiatives by taking actions aimed at remaining independent from the CAISO market. Consequently, SMUD participates in the CAISO market for only a small percentage of energy needs (2-3%), and the remaining CAISO usage is discretionary (including EIM, described below). SMUD will continue to monitor the various initiatives proposed by the CAISO and participate in its stakeholder processes to ensure that its interests are protected.

Resource Adequacy Filing

In September 2005, the State Legislature enacted and the Governor signed into law Assembly Bill 380 ("AB 380"), which requires the CPUC to establish resource adequacy requirements for all LSEs within the CPUC's jurisdiction. In addition, AB 380 requires publicly owned utilities, including SMUD, to meet the most recent resource adequacy standard as adopted by the WECC. In October 2005, the CPUC issued a decision stating that LSEs under its jurisdiction would be required, by June 2006, to demonstrate that they have acquired capacity sufficient to serve their forecast retail customer load plus a 15-17% planning reserve margin. In March 2021, the CPUC issued a decision requiring the three largest investor owned utilities (PG&E, Southern California Edison, and San Diego Gas & Electric) to target a minimum of 2.5% of incremental resources for their planning reserve margin for 2021 and 2022. Subsequently, in December 2021, the CPUC issued another decision that increased the investor-owned utilities' minimum target by an additional 2.5-5% of incremental resources for 2022 (which creates an effective planning reserve margin of 20-22%) and extended this target to 2023. The WECC has yet to formally adopt a resource adequacy requirement. However, consistent with current WECC practices, SMUD utilizes a 15% planning reserve margin when assessing the need for future resources.

Energy Imbalance Market

Federal and state policymakers have long-promoted the development of organized markets in the west as a means (among other reasons) to better integrate intermittent renewable resources into the electric system, the first of which markets is the Western EIM, operated by the CAISO. The CAISO successfully launched the EIM, a real time only imbalance market, on October 1, 2014, with PacifiCorp as the first participant. Since this time, the EIM has grown significantly with the additions of NV Energy in 2015, Arizona Public Service and Puget Sound Energy in 2016, Portland General Electric in 2017, Idaho Power and Powerex in 2018, BANC (Phase 1) in 2019, the Salt River Project and Seattle City Light in 2020, BANC (Phase 2), the Turlock Irrigation District, the Los Angeles Department of Water and Power, NorthWestern Energy, and the Public Service Company of New Mexico in 2021, and Avista and Tacoma Power in early 2022. Additionally, the EIM footprint will continue to expand further in 2022 and 2023 with the additions of Tucson Electric Power and the Bonneville Power Administration later in 2022 and WAPA Desert Southwest Region and El Paso Electric in 2023. The EIM will number 22 participating Balancing Authority Areas by Spring of 2023.

To date, participation in the EIM by SMUD has shown significant financial and operational benefits, in addition to furthering an already favorable working partnership between SMUD and the CAISO to develop solutions to integrate renewable resources in support of carbon reduction goals.

BANC's participation not only signaled the first public power participant in the EIM, but it was also implemented utilizing a unique phased approach, with SMUD (as the largest member of BANC) implementing in Phase 1 in 2019, while the other BANC members and WAPA (the "Phase 2 Parties") would join after evaluation and approvals in 2021. Upon completion of the EIM Phase 2 "gap assessment" (done to determine what was incrementally required for other BANC members and WAPA to participate in the EIM along with SMUD), it was decided to proceed. The BANC Commission therefore approved BANC to move forward with BANC EIM Phase 2 implementation, and the other BANC members and WAPA began EIM participation under Phase 2 on March 25, 2021.

All of the BANC EIM Phase 2 participants independently obtained approvals from their own governing bodies and executed an agreement with BANC to participate in Phase 2. Part of their Phase 2 participation included reimbursement to SMUD for their respective shares of the upfront infrastructure costs incurred by SMUD in Phase 1 to establish BANC as an EIM Entity. This reimbursement to SMUD by the Phase 2 Parties has been completed.

The CAISO and EIM participants, including SMUD and BANC, have participated in a study and stakeholder process to examine the benefits and develop a design framework to extend the successful EIM real time framework to the CAISO's day ahead market, referred to as the "extended day ahead market" or "EDAM." Like EIM, EDAM would broaden the access to regional resources for the reliable integration of renewable resources, only over a longer (day ahead) time horizon. This longer timeframe will allow for a more economic and efficient optimization of regional resources by providing grid operators greater time (day ahead as opposed to real time) to commit or decommit units based on market price signals. Only participants in the EIM will be allowed to extend their participation to EDAM. The CAISO launched a public stakeholder initiative in February of 2020, but due to significant power supply disruptions which occurred in August 2020, the EDAM initiative was put on hold. The process, however, was restarted during the Summer of 2021 and the CAISO and stakeholders are developing a proposal. Should the stakeholder process produce a final EDAM framework and tariff and attract participants, it could be in place by 2024. SMUD will likely need to consider its participation, should an EDAM develop, sometime in 2023.

Community Choice Aggregation

State Assembly Bill 117 (2002) created Community Choice Aggregation by authorizing Community Choice Aggregators ("CCAs") to aggregate customer electric load and purchase electricity for customers. CCAs can only be formed in IOU territory, and the IOU still transmits and delivers the power to customers, as well as provides metering, billing and customer service. A customer within the CCA territory is automatically "opted in" to the CCA program unless the customer takes affirmative action to receive electric service from the IOU. Various counties and cities in the State have formed CCAs, and many more are in the process of formation. The primary purposes of CCAs are local decision making and to provide greener electricity options for their respective community.

Valley Clean Energy Alliance ("VCE") is a CCA formed in 2016 by the County of Yolo, the City of Davis, and City of Woodland. The City of Winters joined VCE in 2021. SMUD has for 70 years performed many of the same services required by CCAs and CCAs' public power and clean energy objectives are in alignment with SMUD's track record in these areas. SMUD has contracted with VCE as a service provider to support VCE's data management, call center, power procurement, and technical energy service needs. The initial term of the contract is 5 years beginning May 2018.

SMUD has also contracted with East Bay Community Energy ("EBCE") to provide call center and data management services for an initial term of three years beginning January 2018. EBCE is a joint powers agency formed in 2016 by the cities of Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Oakland, Piedmont, San Leandro and Union City in Alameda County to implement a local CCA program. The cities of Pleasanton, Newark, and Tracy joined ECBE in 2021. SMUD and EBCE executed a contract extension through December 31, 2024.

Additionally, in June 2019, SMUD contracted with Silicon Valley Clean Energy ("SVCE") for an initial term of two years, and the parties extended the contract until the end of 2022. Under this contract, SMUD provides program services that will help local SVCE communities reduce carbon pollution while delivering engaging customer experiences through promoting energy efficiency and grid integration, as well as electrifying transportation, buildings and homes. SVCE is a joint powers agency formed in 2016 by the cities of Campbell, Cupertino, Gilroy, Lost Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and Unincorporated Santa Clara County to implement a local CCA program.

SMUD management does not expect its current arrangements with VCE, EBCE, and SVCE to have a material adverse impact on SMUD's financial position, liquidity or results of operations.

SMUD will assess the CCA market as it expands and determine whether new opportunities to assist other CCAs provide SMUD a net financial benefit.

See also "BUSINESS STRATEGY – Leveraging Core Competencies – *Community Choice Aggregation*."

PG&E Bankruptcy

On January 14, 2019, PG&E and its parent company, PG&E Corporation, announced their intention to file, on or about January 29, 2019, for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code (the "Bankruptcy Code") mainly as a result of wildfire liability claims and exposure. On January 29, 2019, PG&E and PG&E Corporation filed for bankruptcy protection under Chapter 11 of the Bankruptcy Code (the "Bankruptcy Code"). On May 28, 2020, the CPUC approved PG&E's Plan of Reorganization. On June 20, 2020 the United States Bankruptcy Court for the Northern District of California confirmed PG&E's Plan of Reorganization. SMUD does not anticipate any material impacts to SMUD in connection with PG&E's Plan of Reorganization.

In addition, other electric utilities, including the other major IOUs in the State, Southern California Edison and San Diego Gas & Electric Company, have experienced credit rating downgrades as a result of potential wildfire liabilities exposure, which may have implications for the electric market generally.

Other Factors

The electric utility industry in general has been, or in the future may be, affected by a number of other factors which could impact the financial condition and competitiveness of many electric utilities and the level of utilization of generating and transmission facilities. In addition to the factors discussed above, such factors include, among others, (a) effects of compliance with rapidly changing environmental, safety, licensing, regulatory and legislative requirements other than those described above; (b) changes resulting from conservation and demand side management programs on the timing and use of electric energy; (c) changes resulting from a national energy policy; (d) effects of competition from other electric utilities (including increased competition resulting from mergers, acquisitions, and "strategic alliances" of competing electric and natural gas utilities and from competitors transmitting less expensive electricity from much greater distances over an interconnected system) and new methods of, and new facilities for, producing low cost electricity; (e) the repeal of certain federal statutes that would have the effect of increasing the competitiveness of many IOUs; (f) increased competition from independent power producers and marketers, brokers and federal power marketing agencies; (g) "self-generation" or "distributed generation" (such as solar, microturbines and fuel cells) by industrial and commercial customers and others; (h) issues relating to the ability to issue tax exempt obligations, including severe restrictions on the ability to sell to nongovernmental entities electricity from generation projects and transmission service from transmission line projects financed with tax exempt obligations; (i) effects of inflation on the operating and maintenance costs of an electric utility and its facilities; (j) changes from projected future load requirements; (k) increases in costs and uncertain availability of capital; (l) issues relating to supply chains and the uncertain availability or increased costs of necessary materials; (m) shifts in the availability and relative costs of different fuels (including the cost of natural gas); (n) sudden and dramatic increases in the price of energy purchased on the open market that may occur in times of high peak demand in an area of the country experiencing such high peak demand, such as has occurred in the State; (o) issues relating to risk management procedures and practices with respect to, among other things, the purchase and sale of natural gas, energy and transmission capacity; (p) other legislative changes, voter initiatives, referenda and statewide propositions; (q) effects of changes in the economy; (r) effects of possible manipulation of the electric markets; (s) natural disasters or other physical calamities, including, but not limited to, earthquakes, droughts, severe weather, wildfires and floods; (t) changes to the climate, including increasing volatility in rainfall in the Western United States and a reduction in the depth and duration of the Sierra snowpack; (u) issues relating to cyber-security; and (v) outbreaks of infectious diseases or the occurrence of pandemics. Any of these factors (as well as other factors) could have an adverse effect on the financial condition of any given electric utility, including SMUD's electric utility, and likely will affect individual utilities in different ways.

SMUD is unable to predict what impact such factors will have on the business operations and financial condition of SMUD's electric system, but the impact could be significant. SMUD has taken major steps to mitigate the impacts of many of the changes. This Official Statement includes a brief discussion of certain of these factors. This discussion does not purport to be comprehensive or definitive, and these matters are subject to change subsequent to the date hereof. Extensive information on the electric utility industry is available from the legislative and regulatory bodies and other sources in the public domain, and potential purchasers of the [2022 Series J Bonds] should obtain and review such information.

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APPENDIX B

2020 AND 2021 CONSOLIDATED FINANCIAL STATEMENTS AND REPORT OF INDEPENDENT ACCOUNTANTS

APPENDIX C

BOOK-ENTRY SYSTEM

The information in this Appendix regarding DTC has been provided by DTC, and SMUD takes no responsibility for the accuracy or completeness thereof. SMUD cannot and does not give any assurances that DTC, DTC Participants or Indirect Participants will distribute the Beneficial Owners either (a) payments of interest or principal with respect to the 2022 Subordinated Bonds or (b) certificates representing ownership interest in or other confirmation of ownership interest in the 2022 Subordinated Bonds, or that they will so do on a timely basis or that DTC, DTC Participants or DTC Indirect Participants will act in the manner described in this Official Statement.

The Depository Trust Company ("DTC") New York, NY, will act as securities depository for the 2022 Subordinated Bonds. The 2022 Subordinated Bonds will be issued as fully registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully registered Bond certificate will be issued for the 2022 Subordinated Bonds in the aggregate principal amount of the 2022 Subordinated Bonds, and will be deposited with DTC.

DTC, the world's largest depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934, as amended. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues and money market instruments from over 100 countries that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations and certain other organizations. DTC is a wholly owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others, such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has a Standard & Poor's rating of AA+. The DTC rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com.

Purchases of the 2022 Subordinated Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the 2022 Subordinated Bonds on DTC's records. The ownership interest of each actual purchaser of each 2022 Subordinated Bond ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the 2022 Subordinated Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their beneficial ownership interests in the 2022

Subordinated Bonds, except in the event that use of the book-entry system for the 2022 Subordinated Bonds is discontinued.

To facilitate subsequent transfers, all 2022 Subordinated Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co. or such other name as may be requested by an authorized representative of DTC. The deposit of the 2022 Subordinated Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the 2022 Subordinated Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such 2022 Subordinated Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of the 2022 Subordinated Bonds may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the 2022 Subordinated Bonds, such as redemptions, tenders, defaults, and proposed amendments to the bond documents. For example, Beneficial Owners of the 2022 Subordinated Bonds may wish to ascertain that the nominee holding the 2022 Subordinated Bonds for their benefit has agreed to obtain and transmit notices to Beneficial Owners.

Redemption notices shall be sent to DTC. If less than all of the 2022 Subordinated Bonds are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in the 2022 Subordinated Bonds to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the 2022 Subordinated Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to SMUD as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the 2022 Subordinated Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal, premium, redemption proceeds and interest payments on the 2022 Subordinated Bonds will be made to Cede & Co. or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts, upon DTC's receipt of funds and corresponding detail information from SMUD or the Trustee, on a payment date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participants and not of DTC, its nominee, the Trustee or SMUD, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal, premium, redemption proceeds and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the Trustee. Disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of the Direct and Indirect Participants.

A Beneficial Owner shall give notice to elect to have its 2022 Subordinated Bonds purchased or tendered, through its Participant, to the Underwriter, and shall effect delivery of such 2022 Subordinated Bonds by causing the Direct Participant to transfer the Participant's interest in the 2022 Subordinated

Bonds, on DTC's records, to the Underwriter. The requirement of physical delivery of 2022 Subordinated Bonds in connection with an optional tender or a mandatory purchase will be deemed satisfied when the ownership rights in the 2022 Subordinated Bonds are transferred by Direct Participants on DTC's records and followed by a book-entry credit of tendered 2022 Subordinated Bonds to the Underwriter's DTC account.

DTC may discontinue providing its services as depository with respect to the 2022 Subordinated Bonds at any time by giving reasonable notice to SMUD or the Trustee. Under such circumstances, in the event that a successor depository is not obtained, bond certificates are required to be printed and delivered.

SMUD may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, bond certificates for such 2022 Subordinated Bonds will be printed and delivered to DTC.

Neither SMUD or the Trustee will have any responsibility or obligation to Participants, to Indirect Participants or to any Beneficial Owner with respect to (i) the accuracy of any records maintained by DTC, any Participant, or any Indirect Participant; (ii) the payment by DTC or any Participant or Indirect Participant of any amount with respect to the principal of or premium, if any, or interest on the 2022 Subordinated Bonds; (iii) any notice which is permitted or required to be given to Holders under the Resolution; (iv) the selection by DTC, any Participant or any Indirect Participant of any person to receive payment in the event of a partial redemption of 2022 Subordinated Bonds; (v) any consent given or other action taken by DTC as Bondholder; or (vi) any other procedures or obligations of DTC, Participants or Indirect Participants under the book-entry system.

APPENDIX D

SUMMARY OF CERTAIN PROVISIONS OF THE SUBORDINATE RESOLUTION

The following is a summary of certain provisions of the Subordinate Resolution. Other provisions of the Subordinate Resolution are described under the caption "SECURITY FOR THE SUBORDINATED BONDS." This summary is not to be considered a full statement of the terms of the Subordinate Resolution and accordingly is qualified by reference thereto and is subject to the full text thereof. Capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed thereto in the Subordinate Resolution.

Certain Definitions

"Assumed Interest Payments" means, for any fiscal year or period, interest which would accrue during such fiscal year or period on an amount equal to the then unamortized balance of the remaining sum of Assumed Principal Payments and at the interest rate on the date of such calculation on the Parity Subordinated Debt to which such Assumed Principal Payments relate.

"Assumed Interest Rate" for any Parity Bond or Parity Subordinated Debt means, for any fiscal year or period, the interest rate thereon on the date of such calculation.

"Assumed Principal Payments" means for any fiscal year or period the sum of the following amounts falling within such fiscal year or period: each Excluded Principal Payment amortized equally over the years (pro rata in the case of a partial year) in the period commencing on the stated due date for such Excluded Principal Payment and ending on the date 30 years from the date of issuance of the Parity Subordinated Debt to which such Excluded Principal Payment relates.

"Bond Debt Service" means all amounts required to be paid under the Subordinate Resolution from Net Revenues for principal, interest and reserve fund requirements on the Senior Bonds and all Parity Bonds then outstanding, as the same become due and payable.

"Defeasance Securities" shall mean and include any of the following securities, if and to the extent the same are at the time legal for investment of SMUD's funds:

> (i) any bonds or other obligations which as to principal and interest constitute direct obligations of, or are unconditionally guaranteed by, the United States of America, including obligations of any of the federal agencies set forth in clause (iii) below to the extent unconditionally guaranteed by the United States of America;
>
> (ii) any bonds or other obligations of any state of the United States of America or of any agency, instrumentality or local governmental unit of any such state (a) which are not callable prior to maturity or as to which irrevocable instructions have been given to the trustee of such bonds or other obligations by the obligor to give due notice of redemption and to call such bonds for redemption on the date or dates specified in such instructions, (b) which are secured as to principal and interest and redemption premium, if any, by a fund consisting only of cash or bonds or other obligations of the character described in the clause (i) above which fund may be applied only to the payment of such principal of and interest and redemption premium, if any, on such bonds or other obligations on the maturity date or dates thereof or the redemption date or dates specified in the irrevocable instructions referred to in subclause (a) of this clause (ii), as appropriate, and (c) as to which the principal of and interest on the bonds and obligations of the character described in the clause (i) above which have been deposited in such fund along with any

cash on deposit in such fund are sufficient to pay principal of and interest and redemption premium, if any, on the bonds or other obligations described in this clause (ii) on the maturity date or dates thereof or on the redemption date or dates specified in the irrevocable instructions referred to in subclause (a) of this clause (ii), as appropriate;

(iii) bonds, debentures, or other evidences of indebtedness issued or guaranteed by any agency or corporation which has been or may thereafter be created pursuant to an Act of Congress as an agency or instrumentality of the United States of America; and

(iv) with respect to the defeasance of any particular series of Bonds, any other securities specified in the Supplemental Resolution providing for their issuance.

"Electric System" and "Enterprise" means the entire electric system of SMUD, together with all additions, betterments, extensions and improvements to said system or any part thereof. The entire electric system of SMUD shall be deemed to be and to constitute a single unified and integrated system for the furnishing of electric energy to consumers of SMUD and a single enterprise. The terms "Electric System" and "Enterprise" shall have the same meaning and may be used interchangeably.

"Energy Payments" means, when used with respect to the Electric System, all actual costs incurred, or charges made therefor, by SMUD in any particular fiscal year or period to which said term is applicable for purchased power (including power purchased from any special district included within the boundaries of SMUD), electric and thermal energy and capacity and under contracts providing for payments by SMUD for electric or thermal energy or capacity whether or not such energy or capacity is delivered or capable of being delivered or otherwise made available to or received by or for the account of SMUD.

"Excluded Principal Payments" shall mean each payment of principal of Parity Subordinated Debt which the Board of Directors of SMUD determines (on a date not later than the date of issuance of such Parity Subordinated Debt) that SMUD intends to pay with moneys which are not Revenues. No such determination shall affect the security for such Parity Subordinated Debt or the obligation of SMUD to pay such payments from Revenues.

"Financial Products Agreement" means an interest rate swap, cap, collar, option, floor, forward or other hedging agreement, arrangement or security, however denominated, entered into by SMUD with a Qualified Provider not for investment purposes but with respect to specific Parity Bonds, Subordinated Bonds or Parity Subordinated Debt for the purpose of (1) reducing or otherwise managing SMUD's risk of interest rate changes or (2) effectively converting SMUD's interest rate exposure, in whole or in part, from a fixed rate exposure to a variable rate exposure, or from a variable rate exposure to a fixed rate exposure.

"Financial Product Payments" means payments periodically required to be paid to a counterparty by SMUD pursuant to a Financial Products Agreement. For the purpose of complying with any coverage test under the Subordinate Resolution, SMUD (or its consultant) may assume, with respect to any prospective Financial Product Payments that may adjust or vary pursuant to the terms of the related Financial Products Agreement, that the index or benchmark upon which the prospective Financial Product Payments are based shall be fixed for the prospective calculation period at the lesser of (a) the index or benchmark in effect as of the date of calculation, or (b) average rate of such index or benchmark over the most recent twelve calendar months preceding the date of calculation. If a twelve-month average index or benchmark as described in clause (b) is not calculable due to insufficient historic data or other reasons, SMUD (or its consultant) shall use the index or benchmark in effect as of the date of calculation.

"Financial Product Receipts" means amounts periodically required to be paid to SMUD by a counterparty pursuant to a Financial Products Agreement. For the purpose of complying with any coverage test under the Subordinate Resolution, SMUD (or its consultant) may assume, with respect to any prospective Financial Product Receipts that may adjust or vary pursuant to the terms of the related Financial Products Agreement, that the index or benchmark upon which the prospective Financial Product Receipts are based shall be fixed for the prospective calculation period at the lesser of (a) the index or benchmark in effect as of the date of calculation, or (b) average rate of such index or benchmark over the most recent twelve calendar months preceding the date of calculation. If a twelve-month average index or benchmark as described in clause (b) is not calculable due to insufficient historic data or other reasons, SMUD (or its consultant) shall use the index or benchmark in effect as of the date of calculation.

"Maintenance and Operation Costs" means, when used with respect to the Electric System, all actual maintenance and operation costs incurred, or charges made therefor, by SMUD in any particular fiscal year or period to which said term is applicable, but only if said charges are made in conformity with generally accepted accounting principles, and exclusive in all cases of depreciation or obsolescence charges or reserves therefor, amortization of intangibles or other bookkeeping entries of a similar nature, and also exclusive of all interest charges and charges for the payment of principal, or amortization, of bonded or other indebtedness of SMUD.

Such maintenance and operation costs of the Electric System include, generally, purchased power (including power purchased from any special district included within the boundaries of SMUD), and such part of the cost of fuel of any type or character (including nuclear fuel), taxes, salaries and wages, fees for services, materials and supplies, rents, office supplies and all other costs as are charged directly or apportioned to the operation and maintenance of the generation, transmission and distribution system, customer accounts, sales and administrative functions, or to the general operation of SMUD. Said term does not include costs, or charges made therefor, for capital additions, replacements, betterments, extensions or improvements to or retirements from the Electric System, which under generally accepted accounting principles are properly chargeable to the capital account or the reserve for depreciation, and does not include losses from the sale, abandonment, reclassification, revaluation or other disposition of any properties of SMUD nor such property items, including taxes and fuel, which are capitalized pursuant to the then existing accounting practice of SMUD.

"Net Revenues" for any fiscal period means the sum of (a) the Revenues for such fiscal period plus (b) the amounts, if any, withdrawn by SMUD from the Rate Stabilization Fund for treatment as Revenues for such fiscal period, less the sum of (c) all Maintenance and Operation Costs for such fiscal period, (d) all Energy Payments for such fiscal period not included in Maintenance and Operation Costs for such fiscal period, and (e) the amounts, if any, withdrawn by SMUD from Revenues for such fiscal period for deposit in the Rate Stabilization Fund pursuant to the Subordinate Resolution.

"Net Subordinated Revenues" means Net Revenues less Bond Debt Service.

"Parity Bonds" includes the Senior Bonds and all revenue bonds issued on a parity with the Senior Bonds as provided or permitted in the Senior Bond Resolution. No Parity Bonds (other than the Senior Bonds) are currently outstanding.

"Parity Subordinated Debt" means the Subordinated Bonds and all revenue bonds of SMUD having an equal lien and charge upon Net Subordinated Revenues and therefore payable on a parity with the Subordinated Bonds and junior to the Parity Bonds.

“Qualified Provider” means any counterparty to a Financial Products Agreement if the unsecured long-term debt obligations of such counterparty (or of the parent or a subsidiary of such counterparty if such parent or subsidiary unconditionally guarantees the performance of such counterparty under such Financial Products Agreement and the Trustee receives an opinion of counsel to the effect that such guarantee is a valid and binding agreement of such parent or subsidiary), or obligations secured or supported by a letter of credit, contract, guarantee, agreement, insurance policy or surety bond issued by such counterparty (or such guarantor parent or subsidiary), are rated in one of the three highest rating categories of a national rating agency (without regard to any gradation or such rating category) at the time of the execution and delivery of the Financial Products Agreement.

“Revenues” means all charges received for, and all other income and receipts derived by SMUD from, the operation of the Electric System, or arising from the Electric System, including income derived from the sale or use of electric energy generated, transmitted or distributed by any facilities of the Electric System, together with any receipts derived from the sale of any property pertaining to the Electric System or incidental to the operation of the Electric System or from any services performed by SMUD in connection with or incidental to the Electric System, or from any other source whatsoever directly or indirectly derived from the Electric System, but exclusive in every case of any moneys derived from the levy or collection of taxes upon any taxable property in SMUD.

The term “Revenues” also includes any income or revenues derived from the wholesale sale of water developed by the White Rock Project (as defined in Resolution No. 4775), or the Upper American River Project (as defined in Resolution No. 4938), but does not include revenues or income derived from the retail distribution of water through any distribution facility thereafter acquired by SMUD.

The term “Revenues” also includes all interest, profits or other income derived from the investment of any moneys in any fund or account established under the Subordinate Resolution or the Senior Bond Resolution.

Additional Covenants

The Subordinate Resolution contains the following additional covenants, among others:

(a) That the Electric System will be maintained in good repair, working order and condition at all times, and will be continuously operated in an efficient and economical manner.

(b) That SMUD will comply with all lawful orders of any governmental agency or authority having jurisdiction in the premises (except while the validity or application thereof is being contested in good faith).

(c) That proper records and accounts will be maintained of all transactions relating to the Electric System and the Revenues (open to inspection by the Trustee and the Holders of not less than 10 percent in principal amount of the Subordinated Bonds), to be audited annually by an independent certified public accountant within 90 days after close of the fiscal year, and copies of such financial statements supplied to Bondholders on request.

Tax Covenants

SMUD agrees in the Subordinate Resolution not to take any action which would result in interest on the 2022 Subordinated Bonds not being excluded from gross income for federal income tax purposes. SMUD also agrees to establish a separate Rebate Fund for the 2022 Subordinated Bonds and to deposit therein such amounts as are necessary to make the required rebate payments to the United States

Government under the Internal Revenue Code of 1986. Such deposits will be made from any Revenues legally available to SMUD after payment of maintenance and operation costs and Energy Payments, principal of and interest on the Parity Bonds, principal of and interest on the Subordinated Bonds, and any other obligations secured by the Revenues. Amounts in the Rebate Fund, and any earnings thereon, shall be paid to the United States Government as provided in the Tax Certificate.

Amendment of the Subordinate Resolution

The Subordinate Resolution and the rights and obligations of SMUD and of the Holders of the Subordinated Bonds may be modified or amended at any time pursuant to the affirmative vote at a meeting of Bondholders, or with the written consent without a meeting, of the Holders of 60% in aggregate principal amount of the Subordinated Bonds then outstanding, provided that no such modification or amendment shall (i) extend the fixed maturity of any Subordinated Bond, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon or reduce any premium payable upon the redemption thereof, without the consent of the Holder of each Subordinated Bond so affected, or (ii) reduce the aforesaid percentage of Subordinated Bonds required for consent to an amendment or modification, without the consent of the Holders of all the Subordinated Bonds then outstanding. Modifications or amendments may be made, without the consent of any Bondholders, to add covenants of SMUD or to surrender rights reserved by SMUD in the Subordinate Resolution, to cure ambiguities or defective or inconsistent provisions or in regard to questions arising under the Subordinate Resolution without adversely affecting the interests of the Bondholders, or to provide for the issuance of a Series of Subordinated Bonds, subject to the provisions contained in the Subordinate Resolution with respect thereto.

Events of Default and Remedies of Bondholders

Events of Default. The Subordinate Resolution declares each of the following to be an event of default:

(a) Failure to pay the principal of and premium on any Subordinated Bond when due and payable;

(b) failure to pay any installment of interest on any Subordinated Bond when due and payable, if such default continues for a period of 30 days;

(c) if the principal of any Parity Bonds shall be declared to be due and payable on account of the occurrence of a default under or breach of the terms thereof or the Senior Bond Resolution or a similar instrument; and

(d) if, under the provisions of any law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of SMUD or of the whole or any substantial part of its property, and such custody or control shall not be terminated or stayed within 60 days.

then and in each and every case during the continuance of such event of default, the Trustee or the Holders of not less than a majority in aggregate principal amount of the Subordinated Bonds at the time outstanding shall be entitled, upon notice in writing to SMUD, to declare the principal of all of the Subordinated Bonds then outstanding, and the interest accrued thereon, to be due and payable immediately, and upon any such declaration the same shall become and shall be immediately due and payable, anything in the Subordinate Resolution or in the Subordinated Bonds contained to the contrary notwithstanding.

Trustee to Represent Subordinated Bondholders. The Trustee is appointed as trustee to represent the Subordinated Bondholders in the matter of exercising and prosecuting on their behalf such rights and remedies as may be available to such Holders under the provisions of the Subordinated Bonds and the Subordinate Resolution, as well as under the Act or other provisions of applicable law. Upon any default or other occasion giving rise to a right of the Trustee to represent the Subordinated Bondholders, the Trustee may take such action as may seem appropriate to it, and, upon the request in writing of the Holders of twenty-five percent (25%) in aggregate principal amount of the Subordinated Bonds then outstanding, which request shall specify such default or occasion and the action to be taken by the Trustee, and upon being furnished with indemnity satisfactory to it, the Trustee shall take such action on behalf of the Bondholders as may have been requested.

Remedies. In case one or more of the events of default shall happen, then and in every such case the Holder of any Subordinated Bond at the time outstanding shall be entitled to proceed to protect and enforce the rights vested in such Holder by the Subordinate Resolution by such appropriate judicial proceeding as such Holder shall deem most effectual to protect and enforce any such right, either by suit in equity or by action at law, whether for the specific performance of any covenant or agreement contained in the Subordinate Resolution, or in aid of the exercise of any powers granted in the Subordinate Resolution, or to enforce any other legal or equitable right vested in the Holders of Subordinated Bonds by the Subordinate Resolution or by law

Distribution of Assets. Upon any distribution of assets of SMUD upon any dissolution, winding up, liquidation or reorganization of SMUD, whether in bankruptcy, insolvency, reorganization or receivership proceedings or upon an assignment for the benefit of creditors or any other marshalling of the assets and liabilities of SMUD or upon any acceleration of maturity of the Subordinated Bonds by declaration or otherwise,

(a) the holders of all Parity Bonds shall first be entitled to receive payment in full of the principal thereof (and premium, if any) and interest due thereon, or provision shall be made for such payment in cash, before the Holders of the Subordinated Bonds are entitled to receive any payment on account of the principal of (or premium, if any) or interest on the indebtedness evidenced by the Subordinated Bonds;

(b) any payment by, or distribution of assets of, SMUD of any kind or character, whether in cash, property or securities, to which the Holders of the Subordinated Bonds or the Trustee would be entitled except for the provisions of the Subordinate Resolution shall be paid or delivered by the person making such payment or distribution, whether a trustee in bankruptcy, a receiver or liquidating trustee or otherwise, directly to the holders of Parity Bonds or their representative or representatives or to the trustee or trustees under the Senior Bond Resolution or any similar instrument under which any instruments evidencing any of such Parity Bonds may have been issued, ratably according to the aggregate amounts remaining unpaid on account of the Parity Bonds held or represented by each, to the extent necessary to make payment in full of all Parity Bonds remaining unpaid after giving effect to any concurrent payment or distribution (or provision therefor) to the holders of such Parity Bonds; and

(c) in the event that, notwithstanding the foregoing, any payment by, or distribution of assets of, SMUD of any kind or character, whether in cash, property or securities shall be received by the Trustee or the Holders of the Subordinated Bonds before all Parity Bonds are paid in full, such payment or distribution shall be held in Trust for the benefit of, and shall be paid over to the holders of such Parity Bonds or their representative or representatives or to the trustee or trustees under the Subordinate Resolution or any similar instrument under which any instruments evidencing any of such Parity Bonds may have been issued, ratably as aforesaid, for application to the payment of all Parity Bonds remaining unpaid until all such Parity Bonds shall have been paid in full, after giving effect to any concurrent payment or distribution (or provision therefor) to the holders of such Parity Bonds.

Discharge of Subordinate Resolution

The Subordinate Resolution may be discharged by depositing with the Trustee in trust, moneys or Defeasance Securities, in such amount as the Trustee shall determine will, together with the interest to accrue thereon, be fully sufficient to pay and discharge the indebtedness on all Subordinated Bonds at or before their respective maturity dates.

APPENDIX E

SUMMARY OF CERTAIN PROVISIONS OF THE SENIOR BOND RESOLUTION

The following is a summary of certain provisions of the Senior Bond Resolution. This summary is not to be considered a full statement of the terms of the Senior Bond Resolution and accordingly is qualified by reference thereto and is subject to the full text thereof. Capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed thereto in the Senior Bond Resolution.

Between July 1997 and August 2003, SMUD received consents to amend the Senior Bond Resolution from the owners of the requisite percentage of Outstanding Senior Bonds. Pursuant to the authority granted by such consents, SMUD amended the Senior Bond Resolution in October 2003 by adopting the Forty-Eighth Supplemental Resolution and the Forty-Ninth Supplemental Resolution. The following summary of the Senior Bond Resolution reflects such amendments.

Certain Definitions

"Energy Payments" means, when used with respect to the Electric System, all actual costs incurred, or charges made therefor, by SMUD in any particular fiscal year or period to which said term is applicable for purchased power (including power purchased from any special district included within the boundaries of SMUD), electric and thermal energy and capacity under contracts providing for payments by SMUD for electric or thermal energy or capacity whether or not such energy or capacity is delivered or capable of being delivered or otherwise made available to or received by or for the account of SMUD.

"Net Revenues" for any fiscal period means the sum of (a) the Revenues for such fiscal period plus (b) the amounts, if any, withdrawn by SMUD from the Rate Stabilization Fund for treatment as Revenues for such fiscal period, less the sum of (c) all Maintenance and Operation Costs for such fiscal period, (d) all Energy Payments for such fiscal period not included in Maintenance and Operation Costs for such fiscal period, and (e) the amounts, if any, withdrawn by SMUD from Revenues for such fiscal period for deposit in the Rate Stabilization Fund pursuant to the Senior Bond Resolution.

"Parity Bonds" includes the Senior Bonds and all revenue bonds issued on a parity with the Senior Bonds as provided or permitted in the Senior Bond Resolution. No Parity Bonds (other than the Senior Bonds) are currently outstanding.

"Revenues" means all charges received for, and all other income and receipts derived by SMUD from, the operation of the Electric System, or arising from the Electric System, including income derived from the sale or use of electric energy generated, transmitted or distributed by any facilities of the Electric System, together with any receipts derived from the sale of any property pertaining to the Electric System or incidental to the operation of the Electric System or from any services performed by SMUD in connection with or incidental to the Electric System, or from any other source whatsoever directly or indirectly derived from the Electric System, but exclusive in every case of any moneys derived from the levy or collection of taxes upon any taxable property in SMUD.

The term "Revenues" also includes any income or revenues derived from the wholesale sale of water developed by the White Rock Project (as defined in Resolution No. 4775), or the Upper American River Project (as defined in Resolution No. 4938), but does not include revenues or income derived from the retail distribution of water through any distribution facility thereafter acquired by SMUD. The term "Revenues" also includes all interest, profits or other income derived from the investment of any moneys in any fund or account established under the Senior Bond Resolution.

Allocation of Revenues

After making an allocation of Revenues to Maintenance and Operation Costs and to Energy Payments not included in Maintenance and Operation Costs, the Treasurer of SMUD is required (subject to the last paragraph of this section) to set aside, on an equal priority with sums set aside for all other Parity Bonds, Net Revenues as follows:

> First: To the Electric Revenue Bond Interest Fund, in approximately equal monthly installments on or before the first day of each month, an amount equal to at least one-fifth (1/5) of the aggregate amount of interest becoming due on the Senior Bonds on the next succeeding semiannual interest payment date, until an amount sufficient to meet said interest payment is accumulated.
>
> Second: To the Electric Revenue Bond Redemption Fund, to be set aside in the Principal Account and Sinking Fund, respectively, in approximately equal monthly installments on or before the first day of each month, an amount equal to at least one-tenth (1/10) of the aggregate amount of principal becoming due on serial Senior Bonds and the aggregate minimum sinking fund payments required to be made with respect to term Senior Bonds during the next ensuing 12 months, until an amount sufficient to meet the principal and sinking fund requirements on all Senior Bonds outstanding is accumulated in said accounts, respectively.
>
> Third: To the Electric Revenue Bond Reserve Fund, such amounts as any supplemental resolution authorizing the issuance of a series of Senior Bonds may require to build up and maintain said fund.

If interest on Senior Bonds of a series or maturity is payable more frequently than semiannually, the Treasurer of SMUD shall set aside out of Net Revenues in the Interest Fund such amounts as may be required to pay interest on the Senior Bonds of such series or maturity on each interest payment date at least one month prior to such interest payment date. Allocation to the Electric Revenue Bond Redemption Fund and Electric Revenue Bond Reserve Fund shall be made as set forth above.

All remaining Revenues, after making the foregoing allocations, will be available to SMUD for all lawful SMUD purposes. Such remaining Revenues will be used for the purpose of, among other things, making any required deposits to the Rebate Fund. See "Tax Covenants."

Reserve Fund

The Electric Revenue Bond Reserve Fund is a parity reserve fund for the equal benefit of all Parity Bonds outstanding. Moneys in such fund (except any excess over the required balance which may be withdrawn and used for any SMUD use) shall be used solely for the purpose of making good any deficiency in any fund established for the payment of interest, principal or sinking fund payments pursuant to the Senior Bond Resolution or any resolution authorizing the issuance of any Parity Bonds.

The Electric Revenue Bond Reserve Fund is required to be maintained in an amount such that the amount in the combined reserve funds of all Parity Bonds then outstanding will at no time be less than the current annual interest requirements on all then outstanding Parity Bonds (except bonds for which payment has been provided in advance). If SMUD's debt service ratio in any fiscal year (the ratio of Net

Revenues during said fiscal year to maximum annual debt service during the period of three fiscal years next following said fiscal year on all Parity Bonds then outstanding) shall fall below 1.40, there shall be set aside in the reserve funds from the first available Net Revenues not less than 15 percent of the total current monthly interest requirements of all Parity Bonds until the debt service ratio again exceeds 1.40, or until the aggregate amount on deposit in the reserve funds is equal to the maximum annual debt service on all Parity Bonds, whichever occurs first. The combined reserve funds cannot be required to exceed the maximum annual debt service on all outstanding Parity Bonds.

Rates and Charges

SMUD has covenanted in the Senior Bond Resolution to establish and at all times maintain and collect rates and charges for the sale or use of electric energy generated, transmitted, distributed or furnished by SMUD which, together with certain items of other income permitted under the Senior Bond Resolution, will yield Revenues at least sufficient, with respect to the ensuing 12 months, to pay and provide for all sums required for Maintenance and Operation Costs and Energy Payments not included in Maintenance and Operation Costs and, in addition, to provide an aggregate sum equal to at least 1.20 times the total amount required for the payment of principal and interest, together with any sinking fund or reserve fund payments, on all Parity Bonds, in each case during such 12 months.

SMUD has full power to establish rates and charges for all SMUD services, and the levels of such rates are not subject to review or regulation by any other governmental agency, either federal or state.

Limitations on Additional Obligations Payable from Revenues

The Senior Bond Resolution provides that SMUD will not, so long as any Senior Bonds are outstanding, issue any obligations payable in whole or in part from Revenues except the following:

(a) Senior Bonds of any series authorized pursuant to the Senior Bond Resolution;

(b) Refunding bonds issued solely to refund all or part of the Parity Bonds;

(c) General obligation bonds or other securities secured by the full faith and credit of SMUD;

(d) Additional revenue bonds (including additional Parity Bonds), payable on a parity with the Senior Bonds, with an equal lien and charge upon the Revenues, but only subject to the following conditions:

(1) Such additional revenue bonds shall have been authorized;

(2) The proceedings for the issuance of such additional revenue bonds shall require SMUD to fix and collect rates and charges in an amount not less, with respect to such bonds, than the amounts required with respect to Senior Bonds issued under the Senior Bond Resolution;

(3) SMUD shall not then be in default under the Senior Bond Resolution or other resolutions authorizing the issuance of Parity Bonds; and

(4) A certificate of SMUD, certifying--

(1) that the Net Revenues, after the completion of the additions, betterments, extensions or improvements proposed to be financed from the proceeds of such additional revenue bonds, will be sufficient to pay the principal of and interest (and bond reserve fund requirements, if any) on all Parity Bonds then outstanding and on such additional revenue bonds then proposed to be issued, and

(2) that the Net Revenues, for a period of twelve consecutive months during the twenty-four months immediately preceding the date upon which such additional revenue bonds will become outstanding, have been at least equal to 1.25 times the sum of

(i) the annual interest,
(ii) the principal amount of serial bonds falling due, and
(iii) the amount of minimum sinking fund payments required for the payment of term bonds,

as computed for the year in which such sum shall then be a maximum, including both the then outstanding Parity Bonds and the additional revenue bonds then proposed to be issued, provided that--

(A) if rates and charges in effect on the date upon which such additional revenue bonds will become outstanding will be greater than those in effect during the entire twelve months elected for the foregoing computation, then the Net Revenues for said period of twelve months may be augmented by 75% of the estimated increase in Net Revenues computed to accrue to the Electric System in the first twelve months during which such rates and charges shall be in effect; and

(B) if such additional revenue bonds or any thereof shall be issued for the purpose of acquiring an existing revenue-producing electric system, 75% of the estimated pro forma net revenues of such existing system (calculated on the basis of assumed SMUD ownership and operation during such period but otherwise on the basis of actual gross revenues of such existing system at the rates actually charged therefor) for the preceding twelve months may be added to the actual Net Revenues of the Electric System for the twelve months elected for said computation and treated as if actually received by the Electric System during those twelve months; and

(e) Revenue bonds junior and subordinate to the Parity Bonds.

Additional Covenants

The Senior Bond Resolution contains the following additional covenants, among others:

(a) SMUD will cause the Electric System to be maintained in good repair, working order and condition at all times, and will continuously operate the Electric System in an efficient and economical manner, and so that all lawful orders of any governmental agency or authority having jurisdiction in the premises shall be complied with, but SMUD shall not be required to comply with any such orders so long as the validity or application thereof shall be contested in good faith.

SMUD further covenants and agrees that it will at all times, while any of the Bonds are outstanding maintain and comply with all necessary permits and licenses issued by the Atomic Energy Commission.

(b) None of the electric energy owned, controlled or supplied by SMUD shall be furnished or supplied free, but on the contrary shall always be sold or furnished so as to produce Revenues.

If SMUD shall sell water developed or made available by the Electric System, a reasonable charge therefor shall be made and the revenue received by SMUD therefrom shall be Revenues and accounted for as such, except that SMUD may furnish water developed or impounded by the Electric System for any purpose (other than the use of such water for hydroelectric purposes) without charge as SMUD in its discretion deems advisable if such water is so furnished without any distribution cost to SMUD. SMUD may sell any water for consumption for domestic or other purposes (exclusive of the use thereof for hydroelectric purposes), but SMUD shall charge itself a reasonable wholesale rate for any water sold by SMUD. SMUD also may sell water at wholesale to any other person, for distribution by such other person for domestic or other purposes (except use for hydroelectric purposes), and SMUD shall likewise charge a reasonable wholesale rate to any such other person. In each case, all such wholesale rates shall be included in Revenues. The revenue received by SMUD from any retail sale of water distributed by SMUD shall not be deemed Revenues, but shall be available to SMUD for any SMUD purpose.

(c) That all taxes and governmental charges and other lawful claims which might become a lien on the Electric System or the Revenues or impair the security of the Senior Bonds will be paid and discharged when due.

(d) SMUD will not sell or otherwise dispose of any property essential to the proper operation of the Electric System or to the maintenance of the Revenues. SMUD will not enter into any lease or agreement which impairs or impedes the operation of the Electric System or which otherwise impairs or impedes the rights of the Bondholders with respect to Revenues. Nothing contained in the Senior Bond Resolution shall prevent SMUD from entering into sale and leaseback agreements pursuant to which SMUD may acquire the use of property subject to the terms of such sale and leaseback agreements.

(e) That insurance adequate in amounts and as to risks covered will be maintained against such risks as are usually insurable in connection with similar electric systems, and in addition public liability and property damage insurance in amounts not less than $1,000,000 per accident and adequate fidelity bonds on all officers and employees of SMUD handling or responsible for SMUD funds, subject in each case to the condition that such insurance is obtainable at reasonable rates and upon reasonable terms and conditions. See "Insurance" for a description of SMUD's insurance.

(f) That the net proceeds realized by SMUD in the event all or any part of the Electric System is taken by eminent domain proceedings will be applied to the redemption or retirement of all Parity Bonds if sufficient therefor, and, if not, then pro rata to the redemption or retirement of Parity Bonds or to new facilities if the additional Revenues to be derived therefrom will sufficiently offset the loss of Revenues resulting from such eminent domain so that the ability of SMUD to meet its obligations will not be substantially impaired.

(g) That SMUD will at all times use its best efforts to maintain the powers, functions and duties now reposed in it pursuant to law.

(h) That SMUD will establish and at all times maintain and collect rates and charges for the sale or use of its electric energy sufficient to permit SMUD to purchase power or issue and sell Parity Bonds to finance additions, betterments, extensions and improvements to the Electric System as may be reasonably necessary to satisfy its then projected electric demand upon its Electric System, and that unless the Board determines that SMUD will be able to satisfy such demand through the purchase of electric energy, SMUD will proceed with all reasonable diligence to issue and sell such Parity Bonds.

Tax Covenants

SMUD agrees in the Senior Bond Resolution not to take any action which would result in interest on the Senior Bonds not being excluded from gross income for federal income tax purposes. SMUD also agrees to establish a separate Rebate Fund for the Senior Bonds and to deposit therein such amounts as are necessary to make the required rebate payments to the United States Government under the Internal Revenue Code of 1986. Such deposits will be made from any Revenues legally available to SMUD after payment of maintenance and operation costs and Energy Payments, principal of and interest on the Parity Bonds and any other obligations secured by the Revenues. Amounts in the Rebate Fund, and any earnings thereon, shall be paid to the United States Government as provided in the Tax Certificate.

Amendment of the Senior Bond Resolution

The Senior Bond Resolution and the rights and obligations of SMUD and of the Holders of the Senior Bonds may be modified or amended at any time pursuant to the affirmative vote at a meeting of Bondholders, or with the written consent without a meeting, of the Holders of 60 percent in aggregate principal amount of the Senior Bonds then outstanding, provided that no such modification or amendment shall (i) extend the fixed maturity of any Senior Bond, or reduce the principal amount thereof, or reduce the rate or extend the time of payment of interest thereon or reduce any premium payable upon the redemption thereof, without the consent of the Holder of each Senior Bond so affected, or (ii) reduce the aforesaid percentage of Senior Bonds required for consent to an amendment or modification, without the consent of the Holders of all the Senior Bonds then outstanding. Modifications or amendments may be made, without the consent of any Bondholders, to add covenants of SMUD or to surrender rights reserved by SMUD in the Senior Bond Resolution, to cure ambiguities or defective or inconsistent provisions or in regard to questions arising under the Senior Bond Resolution without adversely affecting the interests of the Bondholders, or to provide for the issuance of a Series of Senior Bonds, subject to the provisions contained in the Senior Bond Resolution with respect thereto.

Events of Default and Remedies of Bondholders

The Senior Bond Resolution declares each of the following to be an event of default:

(a) Failure to pay the principal of and premium on any Senior Bond when due and payable;

(b) Failure to pay any installment of interest on any Senior Bond when due and payable, if such default continues for a period of 30 days;

(c) Default by SMUD in the observance of any of the covenants, agreements or conditions on its part in the Senior Bond Resolution or in the Senior Bonds, if such default continues for a period of 60 days after written notice thereof (specifying such default and requiring the same to be remedied) has been given to SMUD by the Trustee, or to SMUD and the Trustee by the Holders of not less than 25 percent in aggregate principal amount of the Senior Bonds at the time outstanding; and

(d) If, under the provisions of any law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of SMUD or of the whole or any substantial part of its property, and such custody or control shall not be terminated or stayed within 60 days.

In the event of default, the Trustee or the Holders of not less than a majority in aggregate principal amount of the outstanding Senior Bonds may, upon written notice to SMUD, declare the principal of all outstanding Senior Bonds, and the interest accrued thereon, to be due and payable immediately. The Trustee is appointed as trustee to represent Bondholders and may take such action as may seem appropriate to it, and, upon the written request of the Holders of 25 percent in aggregate principal amount of the outstanding Senior Bonds, and upon being furnished with indemnity satisfactory to it, will take such action on behalf of Bondholders as is specified in such written request. Each Bondholder is entitled to proceed to protect and enforce the rights vested in such Holder by the Senior Bond Resolution by such appropriate judicial proceedings as such Holder deems most effectual.

The rights of Bondholders are limited and restricted to the use and application of Revenues as provided in the Senior Bond Resolution and do not extend to the levy of any attachment or execution upon or forfeiture of any of the properties of SMUD or to any moneys derived by SMUD from the levy or collection of taxes.

In addition to the limitations on remedies contained in the Senior Bond Resolution, the rights and remedies provided by the Senior Bonds and the Senior Bond Resolution, as well as the enforcement by SMUD of contracts with customers of the Electric System, may be limited by and are subject to bankruptcy, insolvency, reorganization and other laws affecting the enforcement of creditors' rights.

Discharge of Senior Bond Resolution

The Senior Bond Resolution may be discharged by depositing with the Trustee in trust, moneys or Federal Securities or general obligation bonds of the State of California, in such amount as the Trustee shall determine will, together with the interest to accrue thereon, be fully sufficient to pay and discharge the indebtedness on all Senior Bonds at or before their respective maturity dates.

APPENDIX F

PROPOSED FORM OF LEGAL OPINION FOR 2022 SUBORDINATED BONDS

[Closing Date]

Sacramento Municipal Utility District
Sacramento, California

Sacramento Municipal Utility District
Subordinated Electric Revenue Refunding Bonds, 2022 Series C
(Final Opinion)

Ladies and Gentlemen:

We have acted as bond counsel to the Sacramento Municipal Utility District ("SMUD") in connection with the issuance of $_______ aggregate principal amount of Sacramento Municipal Utility District Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022 Subordinated Bonds"), issued pursuant to Resolution No. 85-11-1 of the Board of Directors of SMUD, adopted November 7, 1985, as amended and restated pursuant to Resolution No. 01-06-10, adopted June 21, 2001 (the "Subordinate Master Resolution"), as supplemented and amended by later resolutions of said Board of Directors (as so supplemented and amended, the "Resolution"), including Resolution No. 22-05-[__], adopted May 19, 2022 (the "Thirteenth Supplemental Resolution"). Capitalized terms not otherwise defined herein shall have the meanings ascribed thereto in the Resolution.

In such connection, we have reviewed the Resolution; the Tax Certificate, dated the date hereof (the "Tax Certificate"), executed by SMUD; opinions of counsel to SMUD and the Trustee; certificates of SMUD, the Trustee and others; and such other documents, opinions and matters to the extent we deemed necessary to render the opinions set forth herein.

The opinions expressed herein are based on an analysis of existing laws, regulations, rulings and court decisions and cover certain matters not directly addressed by such authorities. Such opinions may be affected by actions taken or omitted or events occurring after original delivery of the 2022 Subordinated Bonds on the date hereof. We have not undertaken to determine, or to inform any person, whether any such actions are taken or omitted or events do occur or any other matters come to our attention after original delivery of the 2022 Subordinated Bonds on the date hereof. Accordingly, this letter speaks only as of its date and is not intended to, and may not, be relied upon or otherwise used in connection with any such actions, events or matters. Our engagement with respect to the 2022 Subordinated Bonds has concluded with their issuance, and we disclaim any obligation to update this letter. We have assumed the genuineness of all documents and signatures provided to us and the due and legal execution and delivery thereof by, and validity against, any parties other than SMUD. We have assumed, without undertaking to verify, the accuracy of the factual matters represented, warranted or certified in the documents, and of the legal conclusions contained in the opinions, referred to in the second paragraph hereof. Furthermore, we have assumed compliance with all covenants and agreements contained in the Resolution and the Tax Certificate, including (without limitation) covenants and agreements compliance with which is necessary to assure that future actions, omissions or events will not cause interest on the 2022 Subordinated Bonds to be included in gross income for federal income tax purposes.

We call attention to the fact that the rights and obligations under the 2022 Subordinated Bonds, the Resolution and the Tax Certificate and their enforceability may be subject to bankruptcy, insolvency, receivership, reorganization, arrangement, fraudulent conveyance, moratorium and other laws relating to or affecting creditors' rights, to the application of equitable principles, to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against municipal utility districts in the State of California. We express no opinion with respect to any indemnification, contribution, liquidated damages, penalty (including any remedy deemed to constitute or to have the effect of a penalty), right of set-off, arbitration, judicial reference, choice of law, choice of forum, choice of venue, non-exclusivity of remedies, waiver or severability provisions contained in the foregoing documents, nor do we express any opinion with respect to the state or quality of title to or interest in any of the assets described in or as subject to the lien of the Resolution or the accuracy or sufficiency of the description contained therein of, or the remedies available to enforce liens on, any such assets. Our services did not include financial or other non-legal advice. Finally, we undertake no responsibility for the accuracy, completeness or fairness of the Official Statement, dated ______, 2022, or other offering material relating to the 2022 Subordinated Bonds and express no opinion or conclusion with respect thereto.

Based on and subject to the foregoing, and in reliance thereon, as of the date hereof, we are of the following opinions:

1. The 2022 Subordinated Bonds constitute the valid and binding limited obligations of SMUD.

2. The Resolution, including the Thirteenth Supplemental Resolution, has been duly adopted by, and constitutes the valid and binding obligation of, SMUD. The Resolution creates a valid pledge, to secure the payment of the principal of and interest on the 2022 Subordinated Bonds, of the Net Subordinated Revenues, subject to the provisions of the Resolution permitting the application thereof for the purposes and on the terms and conditions set forth in the Resolution.

3. Interest on the 2022 Subordinated Bonds is excluded from gross income for federal income tax purposes under Section 103 of the Internal Revenue Code of 1986 and is exempt from State of California personal income taxes. Interest on the 2022 Subordinated Bonds is not a specific preference item for purposes of the federal alternative minimum tax. We express no opinion regarding other tax consequences related to the ownership or disposition of, or the amount, accrual or receipt of interest on, the 2022 Subordinated Bonds.

Faithfully yours,

ORRICK, HERRINGTON & SUTCLIFFE LLP

per

APPENDIX G

FORM OF CONTINUING DISCLOSURE AGREEMENT

This Continuing Disclosure Agreement (the "Disclosure Agreement") is executed and delivered by the Sacramento Municipal Utility District (the "Issuer") and U.S. Bank Trust Company, National Association in its capacity as Dissemination Agent (the "Dissemination Agent") in connection with the issuance of $_________ aggregate principal amount of Sacramento Municipal Utility District Subordinated Electric Revenue Refunding Bonds, 2022 Series C (the "2022 Subordinated Bonds"). The 2022 Subordinated Bonds are being issued pursuant to the Issuer's Resolution No. 85-11-1, adopted on November 7, 1985, as amended and restated by Resolution No. 01-06-10 (the "Subordinate Master Resolution"), as supplemented by supplemental resolutions, including Resolution No. 22-05-[__], adopted on May 19, 2022 (the "Thirteenth Supplemental Resolution"). The Subordinate Master Resolution and all supplemental resolutions, including the Thirteenth Supplemental Resolution, are collectively referred to herein as the "Subordinate Resolution." Pursuant to Section 80.11 of the Subordinate Resolution, the Issuer and the Dissemination Agent covenant and agree as follows:

SECTION 1. Purpose of the Disclosure Agreement. This Disclosure Agreement is being executed and delivered by the Issuer and the Dissemination Agent for the benefit of the Holders and Beneficial Owners of the 2022 Subordinated Bonds and in order to assist the Participating Underwriters in complying with S.E.C. Rule 15c2-12(b)(5).

SECTION 2. Definitions. In addition to the definitions set forth in the Subordinate Resolution, which apply to any capitalized term used in this Disclosure Agreement unless otherwise defined in this Section 2, the following capitalized terms shall have the following meanings:

"Annual Report" shall mean any Annual Report provided by the Issuer pursuant to, and as described in, Sections 3 and 4 of this Disclosure Agreement.

"Beneficial Owner" shall mean any person which has or shares the power, directly or indirectly, to make investment decisions concerning ownership of any 2022 Subordinated Bonds (including persons holding Bonds through nominees, depositories or other intermediaries).

"Disclosure Representative" shall mean the Treasurer of the Issuer or his or her designee, or such other officer or employee as the Issuer shall designate in writing to the Trustee from time to time.

"Dissemination Agent" shall mean U.S. Bank Trust Company, National Association, acting in its capacity as Dissemination Agent hereunder, or any successor Dissemination Agent designated in writing by the Issuer and which has filed with the Trustee a written acceptance of such designation.

"EMMA" shall mean the MSRB's Electronic Municipal Market Access system.

"Financial Obligation" shall mean, for purposes of the Listed Events set out in Section 5(a)(15) and Section 5(a)(16), a (i) debt obligation; (ii) derivative instrument entered into in connection with, or pledged as security or a source of payment for, an existing or planned debt obligation; or (iii) guarantee of (i) or (ii). The term "Financial Obligation" shall not include municipal securities (as defined in the Securities Exchange Act of 1934, as amended) as to which a final official statement (as defined in the Rule) has been provided to the MSRB consistent with the Rule.

"Listed Events" shall mean any of the events listed in Section 5(a) of this Disclosure Agreement.

"MSRB" shall mean the Municipal Securities Rulemaking Board.

"Participating Underwriter" shall mean any of the original underwriters of the 2022 Subordinated Bonds required to comply with the Rule in connection with offering of the 2022 Subordinated Bonds.

"Repository" shall mean the MSRB through EMMA or any other entity or system designated or authorized by the Securities and Exchange Commission to receive reports pursuant to the Rule.

"Rule" shall mean Rule 15c2-12(b)(5) adopted by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as the same may be amended from time to time.

"State" shall mean the State of California.

SECTION 3. Provision of Annual Reports.

(a) The Issuer shall, or shall cause the Dissemination Agent to, not later than one hundred eighty (180) days after the end of the Issuer's fiscal year (presently December 31), commencing with the report for the 2022 Fiscal Year, provide to each Repository an Annual Report which is consistent with the requirements of Section 4 of this Disclosure Agreement. The Annual Report may be submitted as a single document or as separate documents comprising a package, and may include by reference other information as provided in Section 4 of this Disclosure Agreement; provided that the audited financial statements of the Issuer may be submitted separately from the balance of the Annual Report and later than the date required above for the filing of the Annual Report if they are not available by that date. If the fiscal year changes for the Issuer, the Issuer shall give notice of such change in the same manner as for a Listed Event under Section 5 hereof.

(b) Not later than fifteen (15) Business Days prior to the dates specified in subsection (a) for providing the Annual Report to each Repository, the Issuer shall provide its respective Annual Report to the Dissemination Agent. If by such date, the Dissemination Agent has not received a copy of the Annual Report from the Issuer, the Dissemination Agent shall contact the Issuer to determine if the Issuer is in compliance with the first sentence of this subsection (b).

(c) If the Dissemination Agent is unable to verify that an Annual Report of the Issuer has been provided to each Repository by the date required in subsection (a), the Dissemination Agent shall send a notice to each Repository and the MSRB (if the MSRB is not a Repository) in substantially the form attached as Exhibit A.

(d) The Dissemination Agent shall:

(1) determine each year prior to the date for providing the Annual Report the name and address of each Repository and the then-applicable rules and procedures for filing the Annual Report with each Repository, if any; and

(2) file a report with the Issuer certifying that the Annual Report has been provided pursuant to this Disclosure Agreement, stating the date it was provided and listing each Repository to which it was provided.

SECTION 4. Content of Annual Reports.

(a) The Issuer's Annual Report shall contain or include by reference the following:

(1) The audited financial statements of the Issuer for the prior fiscal year, prepared in accordance with generally accepted accounting principles as promulgated to apply to governmental entities from time to time by the Governmental Accounting Standards Board and where not in conflict with the Financial Accounting Standards Board ("FASB") pronouncements or accounting principles prescribed by FASB. If the Issuer's audited financial statements are not available by the time the Annual Report is required to be filed pursuant to Section 3(a), the Annual Report shall contain unaudited financial statements, and the audited financial statements shall be filed in the same manner as the Annual Report when they become available.

(2) An update of the following types of information contained in Appendix A to the official statement, dated ______, 2022 and related to the 2022 Subordinated Bonds:

(i) The table entitled "Power Supply Resources."

(ii) The table entitled "Projected Requirements and Resources to Meet Load Requirements."

(iii) The table entitled "Average Class Rates" (to the extent such table relates to rates and revenues of the Issuer).

(iv) The table entitled "Selected Operating Data."

(v) The table entitled "Unconsolidated Financial Data."

(vi) The balance in the Decommissioning Trust Fund, the current estimate of decommissioning costs, the decommissioning costs to date, and the annual contribution level to the Decommissioning Trust Fund, all relating to the Rancho Seco Nuclear Power Plant.

(vii) The table entitled "Estimated Capital Requirements."

(b) Any or all of the items listed above may be included by specific reference to other documents, including official statements of debt issues of the Issuer or public entities related thereto, which have been submitted to each Repository or the Securities and Exchange Commission. If the document included by reference is a final official statement, it must be available from the MSRB. The Issuer shall clearly identify each such other document so included by reference.

SECTION 5. Reporting of Listed Events.

(a) Pursuant to the provisions of this Section 5, the Issuer shall give, or cause to be given, notice of the occurrence of any of the following events with respect to the 2022 Subordinated Bonds not later than ten (10) business days after the occurrence of the event:

(1) principal and interest payment delinquencies;

(2) non-payment related defaults, if material;

(3) unscheduled draws on any applicable debt service reserves reflecting financial difficulties;

(4) unscheduled draws on credit enhancement reflecting financial difficulties;

(5) substitution of credit or liquidity providers, or their failure to perform;

(6) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701 TEB) or other material notices or determinations with respect to the tax status of the 2022 Subordinated Bonds or other material events adversely affecting the tax status of the 2022 Subordinated Bonds;

(7) modifications to rights of Bondholders, if material;

(8) bond calls, if material, and tender offers;

(9) defeasances;

(10) release, substitution or sale of property securing repayment of the 2022 Subordinated Bonds, if material;

(11) rating changes;

(12) bankruptcy, insolvency, receivership or similar event of the Issuer;

(13) the consummation of a merger, consolidation, or acquisition involving the Issuer or the sale of all or substantially all of the assets of the Issuer, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material;

(14) appointment of a successor or additional trustee or the change of name of the Trustee, if material;

(15) incurrence of a Financial Obligation of the Issuer, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a Financial Obligation of the Issuer, any of which affect Bondholders, if material; and

(16) default, event of acceleration, termination event, modification of terms, or other similar events under the terms of a Financial Obligation of the Issuer, any of which reflect financial difficulties.

(b) For the purpose of the event identified in Section 5(a)(12), the event is considered to occur when any of the following occur: the appointment of a receiver, fiscal agent or similar officer for the Issuer in a proceeding under the U.S. Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the Issuer, or if such jurisdiction has been assumed by leaving the existing governmental body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the Issuer.

(c) Whenever the Issuer obtains knowledge of the occurrence of a Listed Event, the Issuer shall as soon as possible determine if such event is required to be reported pursuant to this Section 5.

(d) If the Issuer has determined that such event is required to be reported pursuant to this Section 5, the Issuer shall promptly notify the Dissemination Agent in writing. Such notice shall instruct the Dissemination Agent to report the occurrence pursuant to subsection (e).

(e) If the Dissemination Agent has been instructed by the Issuer to report the occurrence of a Listed Event, the Dissemination Agent shall file a notice of such occurrence with the MSRB (if the MSRB is not a Repository) and each Repository.

SECTION 6. Termination of Reporting Obligation. The obligations of the Issuer and the Dissemination Agent under this Disclosure Agreement shall terminate upon the legal defeasance, prior redemption or payment in full of all of the 2022 Subordinated Bonds. If such termination occurs prior to the final maturity of the 2022 Subordinated Bonds, the Issuer shall give notice of such termination in the same manner as for a Listed Event under Section 5.

SECTION 7. Dissemination Agent; Filings.

(a) The Issuer may, from time to time, appoint or engage a Dissemination Agent to assist it in carrying out its obligations under this Disclosure Agreement, and may discharge any such Dissemination Agent, with or without appointing a successor Dissemination Agent. The Dissemination Agent shall not be responsible in any manner for the content of any notice or report prepared by the Issuer pursuant to this Disclosure Agreement. If at any time there is not any other designated Dissemination Agent, the Issuer shall be the Dissemination Agent. The initial Dissemination Agent shall be U.S. Bank Trust Company, National Association.

(b) Unless and until one or more different or additional Repositories are designated or authorized by the Securities and Exchange Commission, all filings with a Repository which are required by this Disclosure Agreement shall be filed with the MSRB through EMMA and shall be in an electronic format and accompanied by such identifying information as prescribed by the MSRB in accordance with the Rule.

SECTION 8. Amendment; Waiver. Notwithstanding any other provision of this Disclosure Agreement, the Issuer and the Dissemination Agent may amend this Disclosure Agreement, and any provision of this Disclosure Agreement may be waived, provided that the following conditions are satisfied:

(a) If the amendment or waiver relates to the provisions of Sections 3(a), 4, or 5(a), it may only be made in connection with a change in circumstances that arises from a change in legal requirements, change in law, or change in the identity, nature or status of an obligated person with respect to the 2022 Subordinated Bonds, or the type of business conducted;

(b) The undertaking, as amended or taking into account such waiver, would, in the opinion of nationally recognized bond counsel, have complied with the requirements of the Rule at the time of the original issuance of the 2022 Subordinated Bonds, after taking into account any amendments or interpretations of the Rule, as well as any change in circumstances; and

(c) The amendment or waiver either (1) is approved by the Holders of 60% of the 2022 Subordinated Bonds, or (2) does not, in the opinion of nationally recognized bond counsel, materially impair the interests of the Holders or Beneficial Owners of the 2022 Subordinated Bonds.

In the event of any amendment or waiver of a provision of this Disclosure Agreement, the Issuer shall describe such amendment in its next respective Annual Report, and shall include, as applicable, a narrative explanation of the reason for the amendment or waiver and its impact on the type (or, in the case of a change of accounting principles from those described in Section 4(a)(1), on the presentation) of financial information or operating data being presented by the Issuer. In addition, if the amendment relates to the accounting principles to be followed in preparing financial statements, (1) notice of such change shall be given in the same manner as for a Listed Event under Section 5, and (2) the Annual Report for the year in which the change is made should present a comparison (in narrative form and also, if feasible, in quantitative form) between the financial statements as prepared on the basis of the new accounting principles and those prepared on the basis of the former accounting principles.

SECTION 9. Additional Information. Nothing in this Disclosure Agreement shall be deemed to prevent the Issuer from disseminating any other information, using the means of dissemination set forth in this Disclosure Agreement or any other means of communication, or including any other information in any Annual Report or notice of occurrence of a Listed Event, in addition to that which is required by this Disclosure Agreement. If the Issuer chooses to include any information in any Annual Report or notice of occurrence of a Listed Event in addition to that which is specifically required by this Disclosure Agreement, the Issuer shall have no obligation under this Disclosure Agreement to update such information or include it in any future Annual Report or notice of occurrence of a Listed Event.

SECTION 10. Default. In the event of a failure of the Issuer or the Trustee to comply with any provision of this Disclosure Agreement, the Trustee shall, at the request of any Participating Underwriter or the Holders of at least 25% aggregate principal amount of Outstanding Bonds and upon being indemnified to its satisfaction from and against any costs, liability, expenses and fees of the Trustee, including, without limitation fees and expenses of its attorneys, or any Holder or Beneficial Owner of the 2022 Subordinated Bonds may take such actions as may be necessary and appropriate, including seeking mandate or specific performance by court order, to cause the Issuer or the Dissemination Agent, as the case may be, to comply with its obligations under this Disclosure Agreement. A default under this Disclosure Agreement shall not be deemed an Event of Default under the Subordinate Resolution, and the sole remedy under this Disclosure Agreement in the event of any failure of the Issuer or the Dissemination Agent to comply with this Disclosure Agreement shall be an action to compel performance.

SECTION 11. Duties, Immunities and Liabilities of Dissemination Agent. The Dissemination Agent shall have only such duties as are specifically set forth in this Disclosure Agreement, and the Issuer agrees to indemnify and save the Dissemination Agent, its officers, directors, employees and agents, harmless against any loss, expense and liabilities which it may incur arising out of or in the exercise or performance of its powers and duties hereunder, including the costs and expenses (including attorneys' fees) of defending against any claim of liability, but excluding liabilities due to the Dissemination Agent's negligence or willful misconduct. The Dissemination Agent shall have only such duties as are specifically set forth in this Disclosure Agreement and no implied duties for obligation shall be read into this Disclosure Agreement against the Dissemination Agent. The Dissemination Agent has no power to enforce nonperformance on the part of the Issuer. The Dissemination Agent shall be paid compensation by the Issuer for its services provided hereunder in accordance with its schedule of fees provided to the Issuer and all expenses, legal fees and costs of the Dissemination Agent made or incurred by the Dissemination Agent in the performance of its duties hereunder. The obligations of the Issuer under this Section shall survive resignation or removal of the Dissemination Agent and payment of the 2022 Subordinated Bonds.

SECTION 12. Notices. Any notices or communications to or among any of the parties to this Disclosure Agreement may be given as follows:

To the Issuer:	Sacramento Municipal Utility District 6201 S Street, MS B405 Sacramento, California 95817 Attention: Treasurer Telephone: (916) 732-6509 Fax: (916) 732-5835
To the Dissemination Agent:	U.S. Bank Trust Company, National Association Global Corporate Trust One California Street, Suite 1000 San Francisco, California 94111 Telephone: (415) 677-3699 Fax: (415) 677-3769
To the Trustee:	U.S. Bank Trust Company, National Association Global Corporate Trust One California Street, Suite 1000 San Francisco, California 94111 Telephone: (415) 677-3699 Fax: (415) 677-3769

The Issuer, the Dissemination Agent and the Trustee may, by giving written notice hereunder to the other person listed above, designate a different address or telephone number(s) to which subsequent notices or communications should be sent. Unless specifically otherwise required by the context of this Disclosure Agreement, a party may give notice by any form of electronic transmission capable of producing a written record. Each such party shall file with the Trustee and Dissemination Agent information appropriate to receiving such form of electronic transmission.

SECTION 13. Beneficiaries. This Disclosure Agreement shall inure solely to the benefit of the Issuer, the Dissemination Agent, the Participating Underwriters and Holders and Beneficial Owners from time to time of the 2022 Subordinated Bonds, and shall create no rights in any other person or entity.

SECTION 14. Counterparts. This Disclosure Agreement may be executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

Dated: ______, 2022.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

By____
Treasurer

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
as Dissemination Agent

By____
Authorized Officer

ACKNOWLEDGED:

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION, as Trustee

By: _______________________________
Authorized Officer

EXHIBIT A

NOTICE TO REPOSITORIES OF FAILURE TO FILE ANNUAL REPORT

Name of Issuer:	Sacramento Municipal Utility District
Name of Bond Issue:	Subordinated Electric Revenue Refunding Bonds, 2022 Series C
Name of Borrower:	Sacramento Municipal Utility District
Date of Issuance:	________, 2022

NOTICE IS HEREBY GIVEN that the Sacramento Municipal Utility District (the "Issuer") has not provided an Annual Report with respect to the above-named Bonds as required by Section 80.11 of Resolution No. 22-05-[__], each adopted May 19, 2022, by the Issuer. [The Issuer anticipates that the Annual Report will be filed by _____________.]

Dated:_______________

U.S. BANK TRUST COMPANY, NATIONAL ASSOCIATION,
on behalf of Sacramento Municipal Utility District

____

cc: Sacramento Municipal Utility District

President Rose then turned to agenda item 14, statements from the public regarding items not on the agenda. He stated that in accordance with the Emergency Board Meeting Procedures, public comment for items not on the agenda would be provided to the Board electronically and placed into the record if received within two hours after the meeting ended.

Public comment, a copy of which is attached, was received from the following member of the public:

- Tou Lee

President Rose then turned to Directors' Reports.

Director Bui-Thompson reported on her attendance at Sacramento Metro Chamber's Capitol-to-Capitol (Cap to Cap) trip to Washington, DC, with several other Board members. She then reported on the Trout Derby that had been held at Rancho Seco and announced the following winners:

Day 1 (April 9, 2022):

Kids Division

- Grace Machorro (5.28 lbs.)

Youth Division

- Landon Beba (0.74 lbs.)

Adult Division

- Michael Fritzsche (5.68 lbs.)
- John Machorro (5.22 lbs.)
- Garrett Fuji (5.04 lbs.)
- Janet Ellis (5.04 lbs.)
- Gary Krula (4.43 lbs.)
- David Tabuchi (4.43 lbs.)
- Rick Rinehart (4.34 lbs.)
- Francis Flores (3.83 lbs.)
- Justin Lockhart (3.64 lbs.)
- Larry Valderama (3.24 lbs.)

Day 2 (April 10, 2022):

Kids Division

- Mike Lindsey (4 lbs.)
- Grace Machorro (1.61 pounds)

Youth Division

- Alex Mendleski (3.84 lbs.)
- Jemell McGuire (3.42 lbs.)
- Aden Marion (1.19 lbs.)

Adult Division

- Mary Valderama (5.39 lbs.)
- Gary Krula (5.18 lbs.)
- Jay Huey (5.14 lbs.)
- Garrett Fuji (5.13 lbs.)
- Larry Valderama (5.06 lbs.)
- Sylvester Valderama (4.66 lbs.)
- Dave Quick (4.46 lbs.)
- Dan Quick (4.43 lbs.)
- Ryan Rosano (4.23 lbs.)
- Ken Murakami (4.08 lbs.)

Director Fishman reported on his participation in Cap to Cap as well as his attendance at the California Climate Summit where he had briefly spoken.

Director Herber reported on her attendance at Cap to Cap as well as the Earth Day celebration held at Southside Park. She then reported on her speaking engagement at the Boas and Bow Ties event hosted by the Rainbow Chamber where SMUD had received some awards. She reported on her meeting with the Director and President of the Sacramento Zoo, which is looking to move to Elk Grove. She closed by expressing her thanks to Directors Kerth and Tamayo for their participation in the ad hoc to develop a Land Acknowledgement Statement.

Director Kerth acknowledged Mark Laver for his work in the recent opening of accessible features at Southside Park. He then reported on his attendance at the State of Natomas event hosted by the Natomas Chamber of Commerce, as well as the North Sacramento Chamber of Commerce's Salute to Democracy where Vice President Sanborn had given a speech. He reported on his attendance at Cap to Cap as well as his attendance at the ribbon cutting for the River City Food Bank along with Director Herber.

Director Tamayo reported on his participation in Cap to Cap and thanked the Metro Chamber for putting it on.

Vice President Sanborn reported on her attendance at Earth Day She noted that she had attended some virtual sessions of Cap to Cap. She then reported on her attendance at the Antelope Lion's Club Picnic in the Park where staff had promoted SMUD's climate goals and encouraged the public to sign up at www.cleanpowercity.org. She reported on her attendance at the Volunteers of

America event and the Black Chamber of Commerce jazz event in downtown. She then reported on her acceptance of the Hero of Hope Award on behalf of SMUD from My Sister's House. She closed by stating that the Intergovernmental Panel on Climate Change (IPCC) had released a report that makes clear permanent damage is occurring to the environment, and the work being done by SMUD is critical.

President Rose displayed the award from My Sister's House and thanked Directors Sanborn and Herber for representing SMUD as he was not able to attend. He reported that he had also attended the Earth Day event as well as the Greater Sacramento Economic Council Annual Awards, along with Director Fishman, where he had accepted the Competitiveness Award on behalf of SMUD. He reported on his participation in Cap to Cap and thanked his friend, Rancho Cordova Mayor Donald Terry, for his work in leading the Community Resources Development team.

Paul Lau, Chief Executive Officer and General Manager, reported on the following items:

1) **Earth Month.** As you know, last month was Earth Month, and we celebrated it at many community events, including 12 showcase events across the region. From Kids Day in the Park in Rancho Cordova, and the Environmental Council of Sacramento's Earth Day event in Southside Park, we showcased our Clean Energy Vision and showed customers how to make small changes that result in big impacts. All told, we recruited 500 new Clean PowerCity champions to "Join the charge," and be a part of our Clean Energy Vision.

2) **Student Events.** We were excited to be able to bring back two of our flagship student events that we were not able to hold for the last two years because of the pandemic. The Solar Car Race was held at Cosumnes River College on April 20, 2022. Students raced solar-powered cars across a track at the college. They designed and built the cars that featured solar

panels, motors and gear sets that we provided. And, on May 13th and 14th, we also held the popular Solar Regatta at our Rancho Seco Recreational Area. High school and college students from across the region and state, raced full-sized, solar-powered boats they designed and built themselves. These events are part of our commitment to helping local educators introduce renewable energy concepts to students as early as possible and part of our broader STEM (or science, technology, engineering and math) education efforts.

3) **<u>Light Up Navajo</u>.** Last month, we sent a five-person SMUD line crew to Arizona to help electrify hundreds of rural households in the Navajo Nation that had never been connected to the electric grid. The SMUD crew was there for about two weeks. This really is life changing work that is improving the quality of life for so many in ways those of us who have grown up with electricity in our homes cannot even imagine. The families we helped were incredibly appreciative, and I could not be more proud of the SMUD team's work. This builds on our previous support for Light Up Navajo. We also sent a crew in 2019.

4) **<u>Diversity, Equity, Inclusion & Belonging</u>.** Diversity, Equity and Inclusion is part of the foundation that makes SMUD a great place to work, and, as the Board knows, we are embedding DE&I in everything we do. I am happy to share that we have selected employees for our Diversity, Equity, Inclusion & Belonging Council. The council is made up of representatives from our Employee Resource Groups and all of our business units. Its primary role will be to help connect SMUD's DE&I strategy and activities, into all of SMUD's operations. The council will advise, advocate, inform, assess and monitor the DE&I team's strategic process, and will give recommendations

to the DE&I team on behalf of their respective areas. Our efforts in this area have been noticed. Late last month, the National Alliance for Partnerships in Equity, announced the winners for its Equity Champions Awards. We won an award in the Innovation Through Challenge category. This was given to organizations for their innovative work to adjust, collaborate and provide programs, to ensure equitable access to high-quality education throughout the COVID-19 pandemic.

5) **Awards.** Our SEED Program recently received the 2022 Reciprocity Partner of the Year Award, from the state's Department of General Services. It recognizes the outstanding achievements of state departments, agencies, employees and reciprocity partners, in contracting with small business and disabled veteran business enterprise firms throughout California. We also recently won two awards from the American Society of Civil Engineers. One was the Outstanding Environmental Engineering Project. This was for our Station E Remediation and Substation construction project. The other was the Outstanding Energy Project. This was for our White Rock Tunnel Rehabilitation project. Congratulations to the teams on those projects. I was honored and humbled, to be recognized by the Sacramento Asian Pacific Islander Chamber of Commerce, as their 2022 Honoree at last Friday's inaugural AAPI Night Market. It was a great event to celebrate AAPI Heritage Month where the Chamber brought our region together to discover and celebrate our AAPI community and culture. The Chamber is a long-time and valued SMUD partner, and I sincerely appreciate the recognition.

6) **Board Video.** Tonight's video is the latest in our series of tips of the many things customers can do to support our journey to zero carbon. Little actions can have a big impact and, as you

will see in the video, there are many free and low-cost things customers can do to join the charge.

President Rose requested the Summary of Board Direction, but there were no items. He then noted that Vice President Sanborn had requested to speak.

Vice President Sanborn stated the Board would like to honor a SMUD employee who had recently passed away. She stated Lolita Shirley was a 30-year employee who had worked in the Contact Center in Customer Service, and she expressed the Board's condolences to her family and all who knew and loved her.

Mr. Lau stated that Ms. Shirley was a friend whom he had known and worked with for over 30 years. He stated that she was energetic, loveable, and would truly be missed.

Director Herber stated that she also had worked with Ms. Shirley, and she was known to always be happy and pleasant and would be missed.

No further business appearing, President Rose adjourned the meeting in honor of Lolita Shirley at 7:04 p.m.

Approved:

____________________ President	____________________ Secretary

Team Soteria Tackles Food Waste in Folsom

By: Anishka Venkatesh, Yena Kim, Audrey Do, Alisha Mark, Christina Lu, and Paige Thionnet

Overall Concept

- Organic waste, especially food, emits methane when sent to landfills.
  - Like carbon dioxide, methane is also a greenhouse gas containing carbon. In fact, it is 20x more potent than CO_2.
- SB-1383: a state law that aims to reduce organic waste disposal.
- Food waste is a serious problem, and with SB-1383 going into effect in our area we saw an opportunity to educate people!

What did our project consist of?

1

Donut Donations

Local donut shop donations

2

FYCCF

Folsom Youth Climate Change Festival

3

Future Endeavors

Our future plans with GenZero

1

Donut Donations

Donut Donations

Every Friday since mid-March, our team has been rescuing excess donuts from our local donut shop, and donating them to Yena's church and HART of Folsom. Each week, we have donated around 100 donuts.

We also shared about how we got started with this on our Tik Tok!

2

Folsom Youth Climate Change Festival

FYCCF

- Two sessions: 10am–12pm, 1pm–3pm
- Both sessions included a panel and Q & A comprised of ½ of our members and a representative from the City of Folsom's Waste and Recycling Division.
    - Answered questions about our motivation, what inspired us, our backgrounds, why this is important etc.

Our planning process

April

FYCCF
A festival dedicated to educating the public about SB-1383

January

Social Media
Promote on Social Media and in schools

SAVE OUR PLANET

Planning
Team Soteria was formed, we started brainstorming

Zoom Meetings
Met with Folsom Waste and Recycling

March

February

Booths

District Petition
Asking FCUSD to implement organic waste bins

SB 1383
Held by Folsom Waste and Recycling to educate on SB 1383

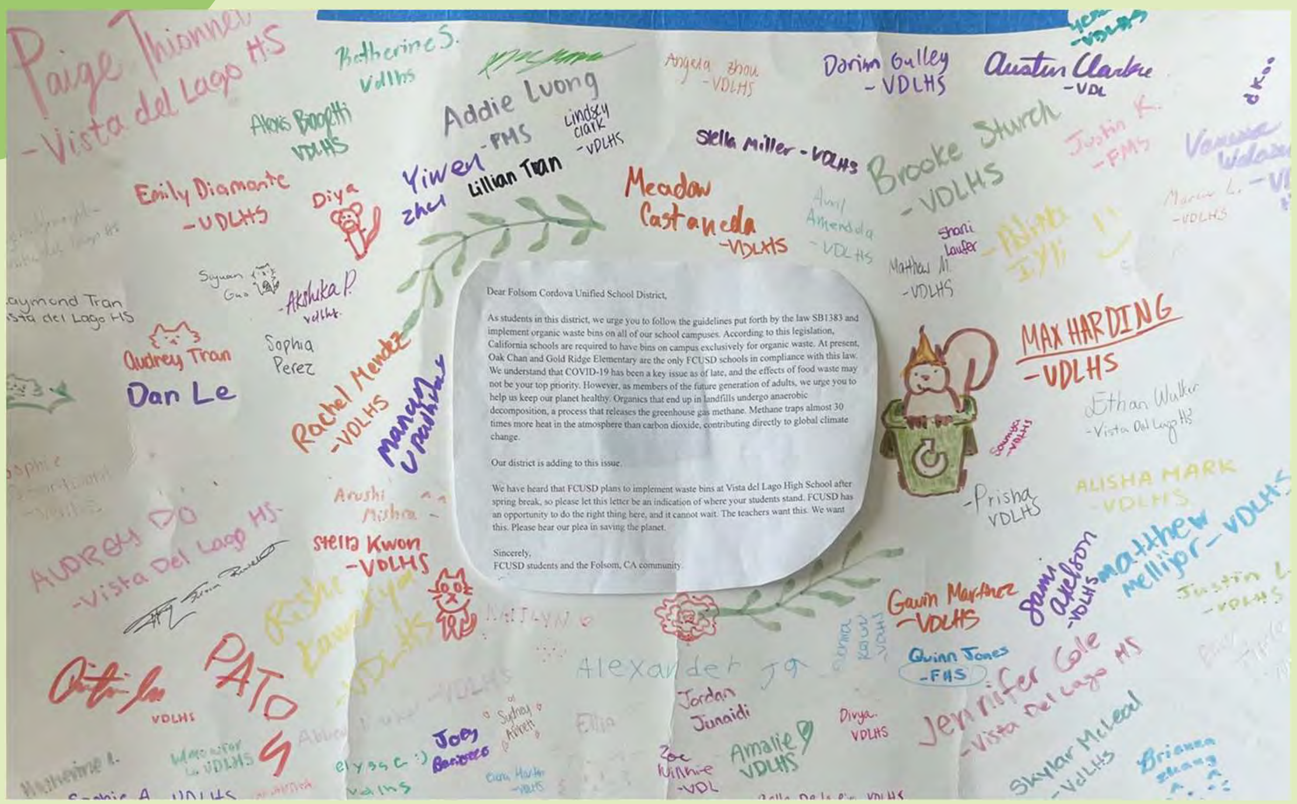
Compost
Teaching attendees how to compost and what they can put in their organic waste bins

Sustainable Baking
Free baked goods that produced zero waste

Eggshell Chalk
Chalk made out of eggshells that we collected

Raffle
Fun raffle for environmentally friendly goods

District Petition



Dear Folsom Cordova Unified School District,

As students in this district, we urge you to follow the guidelines put forth by the law SB1383 and implement organic waste bins on all of our school campuses. According to this legislation, California schools are required to have bins on campus exclusively for organic waste. At present, Oak Chan and Gold Ridge Elementary are the only FCUSD schools in compliance with this law. We understand that COVID-19 has been a key issue as of late, and the effects of food waste may not be your top priority. However, as members of the future generation of adults, we urge you to help us keep our planet healthy. Organics that end up in landfills undergo anaerobic decomposition, a process that releases the greenhouse gas methane. Methane traps almost 30 times more heat in the atmosphere than carbon dioxide, contributing directly to global climate change.

Our district is adding to this issue.

We have heard that FCUSD plans to implement waste bins at Vista del Lago High School after spring break, so please let this letter be an indication of where your students stand. FCUSD has an opportunity to do the right thing here, and it cannot wait. The teachers want this. We want this. Please hear our plea in saving the planet.

Sincerely,
FCUSD students and the Folsom, CA community.


DISTRICT
Litter


WASTE&
RECYCLING


COMPOSTING
THE SCIENCE
behind
FOODWASTE


RECIPE &
INSTRUCTIONS
DO NOT EAT


RAFFLE

Booths and Donors

Sustainable Ice Cream

Provided by ReThink

Voting Booth

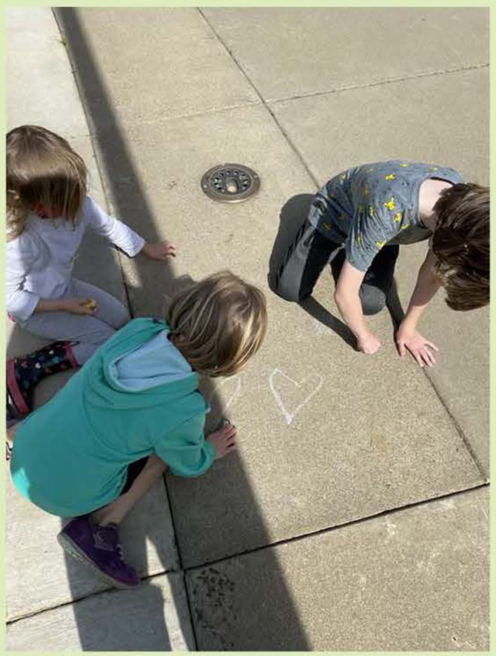
League of Women Voters

Photos from our event!

[more photos here!]


DISTRICT
letter
CHALK
BOOTH
FOLSOM
WASTE &
RECYCLING
THE SCIENCE
behind
FOODWASTE
RAFFLE

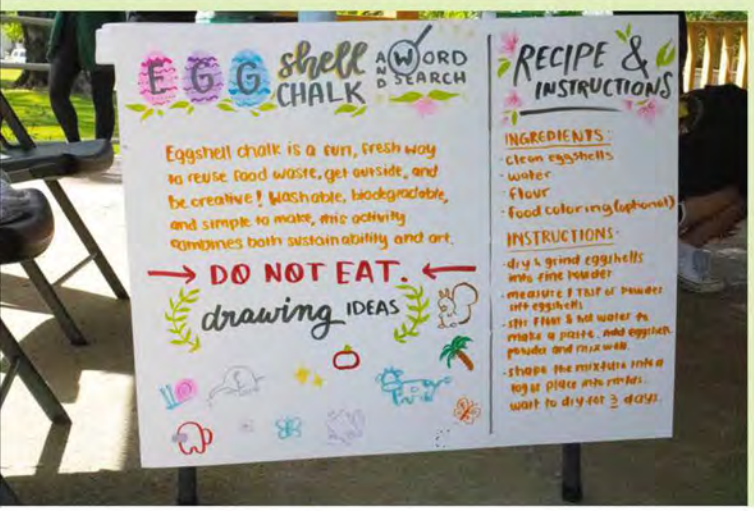

RECYCLE
the POWER of
SUSTAINABILITY
REDUCE
REUSE




the POWER of
SUSTAINABILITY
RECYCLE
REDUCE
REUSE


the POWER of
SUSTAINABILITY
REDUCE
REUSE
RECYCLE


ELMER'S
Tri-Fold


EGG shell CHALK
AND WORD SEARCH
Eggshell chalk is a fun, fresh way to reuse food waste, get outside, and be creative! Washable, biodegradable, and simple to make, this activity combines both sustainability and art.
→ DO NOT EAT. ←
drawing IDEAS
RECIPE & INSTRUCTIONS
INGREDIENTS:
- clean eggshells
- water
- flour
- food coloring (optional)
INSTRUCTIONS:
- dry & grind eggshells into fine powder
- wait to dry for 3 days.


Waste In
City of Folsom


City of Folsom

Over 100 attendees!

Social Media Statistics

1,908

Followers on Tik Tok

69k

Views in Total

19.2k

Likes on Tik Tok

365

VIewers on the Tik Tok Live

Reflection

- What would you do differently if you were to redo the project?

- What worked well? What proved to be more of a challenge?

- How did your project vary from the concept you listed in your video and why?

3

The Future of Team Soteria

GenZero: The Future of Team Soteria

- ❑ Non-profit organization
- ❑ Different Chapters
- ❑ Expand to different school districts
- ❑ Name: GenZero
- ❑ Small projects
    - ❑ Waste Free Wednesday
    - ❑ Tree Planting

Acknowledgements:

Mackenzie Jones, Marie McKeeth, Sarah Isabel Moe (Folsom Waste and Recycling), Ted Ocampo (Folsom event coordinator), Kirsten Margetts (HART of Folsom), Jessica Harrison (ReThink Ice Cream), Marjorie Patzer (League of Women Voters), VDLHS Teachers, Bake a Difference, VDLHS Student Volunteers, Donut Volunteers, and all our followers who have been a part of this great journey.

Thank You!

Our team email:
teamsoteria7@gmail.com

Socials:

Click on the logo :)

Exhibit to Agenda Item #3

Approve the issuance of **SMUD 2022 Series J Revenue Refunding Bonds** and/or **SMUD 2022 Series C Subordinated Electric Revenue Refunding Bonds**, authorize the distribution of the Preliminary Official Statement, and authorize the Chief Executive Officer and General Manager to execute documents necessary to complete the refunding transaction or transactions, including the **Bond Purchase Agreement** or **Agreements**.

Board of Directors Meeting

Thursday, May 19, 2022, scheduled to begin at 5:30 p.m.

Virtual Meeting (online)

Authorize Staff to Proceed with a Bond Refunding

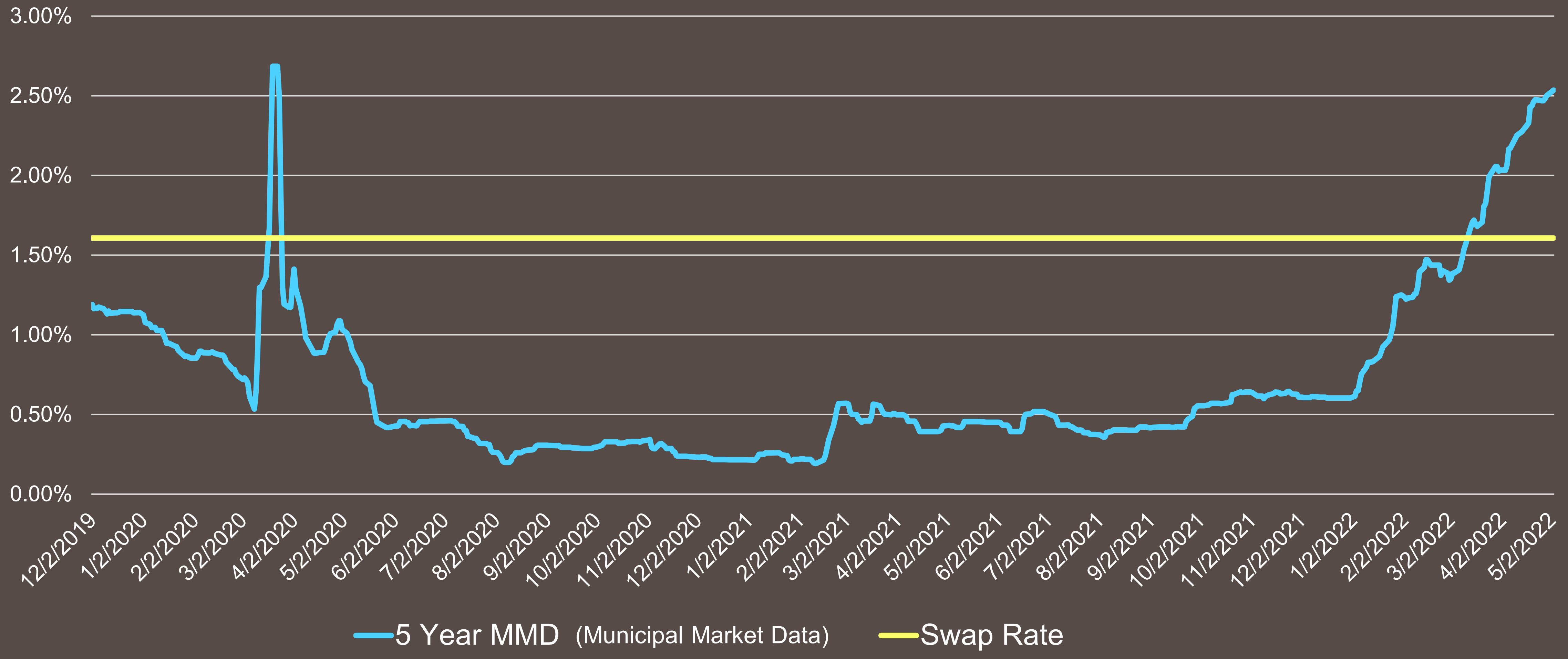
Issuance of Series 2022J Refunding Bonds

- Refund the remaining $158 million 2012 Series Y bonds
- Provide approximately $26 million cash flow savings ($2.3 million per year)
- Seeking authorization for both options below. Staff will determine the option that maximizes savings and limits risk closer to the date of pricing.
  - **Option 1:** Issue approximately $137 million fixed rate bonds with maturities from 2023 to 2033. Terminates the forward starting interest rate swap (hedge) entered in 2019, or
  - **Option 2**: Issue approximately $158 million variable rate bonds with similar maturities. Swap becomes effective resulting in synthetically fixed (hedged) bonds.

Execute Necessary Documents

- Preliminary Official Statement (primary disclosure document)
- Bond Purchase Agreement
- All other necessary documents to complete transactions

Swap Provided Rate Protection



SMUD®

SB 450: Public Disclosure Requirement Related to Bond Issuance

Government Code Section 5852.1 requires a Good Faith Estimate of Cost provided by the Underwriter/Financial Advisor

2022 Series J Refunding Bonds
Good Faith Estimate of Cost

True Interest Cost (TIC):	2.94%
Cost of Issuance:	$824,468.00
Bond Proceeds:	$151,275,899.80
Total Payment Amount:	**$174,035,552.78**

Note: "Total Payment Amount" on Refunded bonds was $200.04 million, producing savings of $26 million

SMUD

Questions?

From: Tou Lee
To: Public Comment
Subject: [EXTERNAL] More Funding on Grid Alternatives
Date: Thursday, April 28, 2022 10:37:16 AM

The neighborhood in Del Paso Heights of North Sacramento is in need of more funding to be devoted to programs that offer solar to income-eligible homeowners in the area. Please consider funding Grid Alternatives for this neighborhood to improve energy efficiency and help with low income families.

Tou Lee
Resident of Del Paso Heights

SSS No. DP&O 22-004	**BOARD AGENDA ITEM** STAFFING SUMMARY SHEET	Committee Meeting & Date: Policy, June 8, 2022 — Board Meeting Date: June 16, 2022

	TO		TO
1.	Claire Rogers	6.	Suresh Kotha
2.	Attila Miszti	7.	
3.	Brandy Bolden	8.	
4.	Farres Everly	9.	**Legal**
5.	Jennifer Davidson	10.	**CEO & General Manager**

Consent Calendar	X	**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**	X	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Maria Veloso Koenig	Distribution Planning & Operations	EA403	5794	5/20/22

NARRATIVE:

Requested Action: Accept the monitoring report for **Strategic Direction SD-4, Reliability.**

Summary: The purpose is to provide the Board with an update on SD-4, Reliability for the year 2021. The information in the monitoring report can be used by the Board to determine if any policies or metrics need to be changed or further developed.

Board Policy: *(Number & Title)* SD-4, Reliability. The information in the monitoring report will provide a summary of system reliability, availability, and related activities for 2021.

Benefits: Allows the Board of Directors and Executive Staff a better understanding of the Board Policies and gives them an opportunity to make revisions if necessary.

Cost/Budgeted: N/A

Alternatives: Provide the Board written report and communications through the CEO & General Manager.

Affected Parties: N/A

Coordination: Power Generation, Transmission Planning & Operations

Presenter: Maria Veloso Koenig; Director, Distribution Planning & Operations

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
SD-4, Reliability Board Monitoring Report	5

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

OFFICE MEMORANDUM

TO: Board of Directors **DATE:** May 31, 2022

FROM: Claire Rogers CR 5/31/22

SUBJECT: **Audit Report No. 28007426**
Board Monitoring Report; SD-04: Reliability

Audit and Quality Services (AQS) received the SD-04 *Reliability* 2021 Annual Board Monitoring Report and performed the following:

- A review of the information presented in the report to determine the possible existence of material misstatements;
- Interviews with report contributors and verification of the methodology used to prepare the monitoring report; and
- Validation of the reasonableness of a selection of the report's statements and assertions.

During the review, nothing came to AQS' attention that would suggest the SD Board Monitoring report did not fairly represent the source data available at the time of the review.

CC:

Paul Lau

Board Monitoring Report 2021
SD-4 Board Strategic Direction on Reliability

1. Background

Strategic Direction SD-4 states that:

Meeting customer energy requirements is a core value of SMUD.

Therefore:

a) SMUD will assure all customer energy requirements are met. This will be accomplished through the use of: (i) its generation resources and purchase power portfolio 100 percent of the time; and (ii) its transmission assets to assure an overall availability of at least 99.99 percent.

b) SMUD will achieve distribution system reliability by:

   Limiting the average frequency of outage per customer per year to:

      With major event: 0.99 – 1.33
      Excluding major event: 0.85 – 1.14

   Limiting the average duration of outages per customer per year to:

      With major event: 67.5 – 93.3 minutes
      Excluding major event: 49.7 – 68.7 minutes

   Ensuring that no individual circuits exceed these targets for more than two consecutive years. For circuits that exceed these targets for two consecutive years, a remedial action plan will be issued and completed within eighteen months.

c) SMUD will maintain the electric system in good repair and make the necessary upgrades to maintain load serving capability and meet regulatory standards.

2. Executive Summary

Improving reliability is essential to meeting customer energy requirements and drives customer loyalty.

SMUD was in compliance for both generation and transmission availability. SMUD met all energy supply requirements 100% of the time through its generation resources and purchased power. At a peak load of 3,019 MW (which occurred on June 18), 39% of the generation was provided by internal resources and 61% was provided by purchased power. The transmission availability was at 100% for the year.

SMUD was in compliance for both SAIDI and SAIFI (excluding major events). Reliability targets including major events were exceeded for both SAIDI (227.2 minutes) and SAIFI (1.54). The 2021 distribution system reliability performance is summarized in Table 1 below.

Table 1: 2021 Distribution System Reliability Performance

	With Major Events		Excluding Major Events	
	SD-4 Limit	**2021 Results**	**SD-4 Limit**	**2021 Results**
SAIFI	1.33	1.54	1.14	1.04
SAIDI (minutes)	93.3	227.2	68.7	60.4

Major events are those defined as events caused by earthquake, fire, or storms of sufficient intensity which result in a state of emergency being declared by the government. Absent the declaration of a state of emergency, any other natural disaster may be excluded only if it affects more than 15% of the system facilities or 10% of the customers, whichever is less.

Of the total number of distribution circuits, 97.9%, or 744 circuits, met the Board's reliability criteria. Twenty-three projects (primarily cable replacement) were issued to improve reliability, of which thirteen have been completed. The remaining ten projects are on schedule to be completed within the eighteen-month requirement. These projects include cable replacement, avian mitigation, targeted tree-trimming and other work.

3. Additional Supporting Information

Generation

Hydro Generation Facilities

The availability rate for SMUD's hydro generation system in 2021 was 89.72% and for the June 1st through September 30th peak period, hydro generation availability was 98.91%. SMUD's Upper American River Project (UARP) hydro system generated 551,358 MWh. The budgeted generation was 1,557,524 MWh.

Gas Pipeline Operations

SMUD's gas pipeline had a 100% availability rating in 2021 and provided a constant flow of gas to SMUD's thermal generation facilities. All necessary maintenance activities were successfully completed in accordance with our operations and maintenance plans and procedures.

Thermal Generation Facilities

The overall availability rate for SMUD's thermal generation facilities in 2021 was 92.80% and for the June 1st through September 30th peak period, thermal plant availability was 98.46%. SMUD's thermal generation facilities generated a net total of 5,708,495 MWh against the budgeted generation of 4,610,564 MWh.

Transmission and Distribution

SMUD has approximately 488 miles of transmission lines and 10,611 miles of distribution lines including 69kV. Approximately 40% of the distribution lines are installed overhead and 60% are installed underground. The transmission system is predominately overhead except for 19 miles of underground lines located in the Carmichael and downtown areas.

4. Challenges

There were two major events in 2021. The first major event occurred between January 26 – 29 consisting of 600 outages, a SAIDI contribution of 158.7 minutes, a SAIFI contribution of 0.40, and affecting over 250,000 customers while the second major event took place on December 13th consisting of 124 outages, a SAIDI contribution of 8.0 minutes, a SAIFI contribution of 0.10, and affecting over 68,000 customers. The storms brought very high winds and significant rainfall. Additionally, the rainfall from these storms saturated the soil and with the high winds, numerous trees were uprooted and fell into several of SMUD's overhead lines. These types of tree related outages take longer to resolve since the trees have to be removed prior to the start of the electrical repair work.

Staff monitors circuit reliability regularly to assess circuits that could potentially exceed the reliability limits. Outage causes, trends, and reliability impacts are analyzed to identify projects that will bring the reliability of these circuits within the acceptable range. This ongoing process ensures that circuit reliability impacts are identified and addressed as they occur throughout the year. The main drivers for the distribution system performance excluding major events, along with the mitigation measures for each, are summarized below.

Drivers for Reliability Performance

Vehicle Accidents

The number one reliability driver in 2021 was vehicle accidents. Overall, we saw a 2% increase in the number of vehicle accidents, a 22% increase in SAIDI minutes and 47% increase in SAIFI for 2021 when comparing with 2020.

In 2021, SMUD installed new visibility strips on 100 poles, installed a pole barrier system at one pole location and relocated five poles based on the analysis of car-pole incidents that identified assets that have been impacted multiple times. Staff regularly assesses car-pole incidents and develops appropriate mitigation. In 2022, SMUD plans to install pole barrier systems at two pole locations, new visibility strips on 200 poles, and relocate five poles.

Underground Cable Failures

In 2021, underground cable failures were the second leading driver of reliability performance. The number of outages due to cable failures decreased by 5% compared to 2020. Additionally, SAIDI and SAIFI values decreased by 20% and 41% respectively. Improved performance in this area is primarily driven by the increase in cable replacement from 273,000 circuit feet to 370,000 circuit feet as well as the completion of the project that replaced the 69kV cable on Carmichael Lines 3 & 4.

Equipment Failures

Equipment failures are associated with a wide variety of distribution line components, such as fuses, poles, wire hardware, broken connectors, broken jumpers, failed transformers, broken cutouts and more. Outages due to failed equipment continue to be evaluated to locate and address any systemic deficiencies.

Failed equipment was the third leading cause of outages in 2021. Outages due to equipment failures increased by 1% while SAIDI and SAIFI increased by 39% and 108%, respectively, when compared to 2020. Specifically, we experienced more 69kV equipment failures in 2021. There was only one 69 kV equipment failure in 2020 with a SAIDI of 0.09 minutes and SAIFI of 0.002 affecting 1,562 customers. Contrarily, there were six 69kV equipment failures in 2021 affecting 76,154 customers with a combined SAIDI of 3.6 minutes and SAIFI of 0.12. Although there were six 69kV equipment failures in 2021, each failure involved a different type of equipment. Therefore, there are no increasing failure trends for 69kV equipment that failed in 2021.

Correcting deficiencies on the 69kV system has a large reliability impact because 69kV circuits affect a larger number of customers than lower operating voltages. Staff is actively looking for ways to reduce equipment failures. Staff reviews outage reports for accuracy and failure trends. Through routine inspections, inspectors and troubleshooters make every attempt to identify deficiencies before they result in failure.

5. **Recommendation:** It is recommended that the Board accept the Monitoring Report for SD-4 Reliability.

6. Appendices

Appendix 1: Generation Supplementary Information

Hydro Generation Facilities

Major hydro generation maintenance and construction activities include:

- Union Valley and Ice House gates analysis, dam safety inspections and responses to FERC part 12D assessments
- 2kV power system undergrounding from Union Valley Powerhouse to Junction Dam
- South Fork backup generator design and installation
- Fresh Pond equipment cover installation
- Generator partial discharge monitoring system installation
- Jaybird Penstock flowmeter installation
- Jaybird Tunnel repair and rock trap cleanout
- Loon Lake chiller installation
- UARP battery system replacement at Slab Creek, Loon Lake and Jaybird powerhouses
- Jaybird penstock and access road stabilization
- Camino powerhouse unit breaker replacement
- Completed the contract for the 480V unit breakers in the UARP

Gas Pipeline Operations Capital improvements and major maintenance activities include:

- Completed Main Line Valve (MLV)-1 Station Rock replacement to improve personnel safety, prevent further erosion/soil migration, and improve aesthetics of a highly visible station.
- Completed Morrison Creek Pipe Support Replacement Project eliminating active corrosion on the pipe, evaluating the integrity of the effected pipe to be uninhibited, and preventing reoccurrence.
- Completed MLV actuator replacements for MLVs on Line 800C, eliminating unsupported products and installing latest design supported by industry using SMUD personnel and upskilling our internal workforce.
- Standardization of Polarization Cell Replacement (PCR) devices (symmetrical and asymmetrical) that offer protection against AC and protect our DC CP system.
- Completed MLV-8 station PCR Design Package.
- Completed Cosumnes Power Plant Meter & Regulating station PCR Design Package.
- Identified, corrected, catalogued, and as-built existing PCR installations along 800C.
- SMUD engineering conducted a thorough internal review of the pipeline risk analysis assessment with all GPO stakeholders as per the prescriptive integrity management method defined in ASME B31.8S. This evaluation identifies the highest risk areas along SMUD’s gas transmission pipeline.
- Completed California Public Utilities Commission (CPUC) Damage Prevention Audit.

Completed Materials Verification Project, demonstrating that SMUD is compliant with the latest publication of regulations in DOT/PHMSA 49 CFR 192.

Thermal Generation Facilities

Major thermal generation maintenance and construction activities completed include:

Carson Power Plant:

- Steam controls upgrade
- Distributed control system (DCS) upgrade

Procter & Gamble Power Plant:

- Installation of a new centrifugal chiller
- Station Service Transformer and Auxiliary Unit were rewound prior to summer peak after internal failures due to a fault in the Station Service Transformer
- Combustion Turbine Engine 1B (185-183) overhaul; due to vibration issues the engine was shipped back to GE and installation is expected in 2022

Campbell Power Plant & McClellan Power Plant:

- McClellan Power Plant successfully completed an upgrade to the Generator Protection Panel

Cosumnes Power Plant:

- CT Generator Cutsforth Shaft Grounding Device
- Access Platform Improvements

Appendix 2: Graphs

The graphs below provide a five-year comparison of the impacts of outage causes to the frequency (SAIFI) and duration (SAIDI) of outages.

Graph 1: Multi-Year Comparison
System Average Frequency Index (SAIFI)

Graph 2: Multi-Year Comparison
System Average Duration Index (SAIDI)

Appendix 3: Reliability Comparison

Table 2 below provides a comparison between SMUD's average distribution system performance compared to that of Pacific Gas and Electric's (PG&E)'s distribution system. PG&E defines its distribution system as operating voltages less than 60kV and uses IEEE 1366 standards to define major event days, while SMUD includes the 69kV operating voltage as part of the distribution system and uses an alternate method to determine major event days. The information regarding PG&E's system average performance was obtained from the 2020 reliability report posted on the California Public Utilities Commission (CPUC) website. PG&E's 2021 Reliability Report has not been posted on the CPUC website.

Table 2: Distribution System Reliability Comparison (excluding major events)

Year	**SAIDI (minutes)**		**SAIFI**	
	SMUD	**PG&E**	**SMUD**	**PG&E**
2017	58.0	90.0	1.10	0.79
2018	44.7	90.7	0.80	0.84
2019	66.0	103.1	1.04	0.88
2020	47.6	111.2	0.90	0.93
2021	60.4	N/A	1.04	N/A
Notes: 1. Listed SAIFI and SAIDI numbers are based on outages greater than 5 minutes (CPUC criteria).				

Appendix 4: Year-to-Date 2022 Reliability Update

Table 3: 2022 Year-to-Date Distribution System Reliability Performance

	Excluding Major Events		
	SD-4 Limit	**Jan.1 – March 31, 2022**	**2022 YE Projection**
SAIFI	1.14	0.26	1.06
SAIDI (minutes)	68.7	13.2	59.1

Barring Major Events we are forecasting year end distribution system reliability performance to be within the SD-4 limits.

DRAFT

RESOLUTION NO. ________________

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

This Board accepts the monitoring report for **Strategic Direction SD-4, Reliability**, substantially in the form set forth in **Attachment ____** hereto and made a part hereof.

SSS No. LEG 2022-0076	**BOARD AGENDA ITEM** STAFFING SUMMARY SHEET	Committee Meeting & Date: ERCS – 06/15/22; Board Meeting Date: June 16, 2022

TO		TO	
1.	Frankie McDermott	6.	
2.	Suresh Kotha	7.	
3.	Brandy Bolden	8.	
4.	Lora Anguay	9.	**Legal**
5.		10.	**CEO & General Manager**

Consent Calendar	X	**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**	X	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Joe Schofield	Legal Department	B406	5446	06/01/22

NARRATIVE:

Requested Action: Make findings pursuant to Government Code section 54953(e) to continue meetings via virtual (online/teleconference) meeting for the next 30 days.

Summary: Pursuant to Executive Order N-29-20 issued on March 17, 2020, and Executive Order N-35-20 issued on March 21, 2020, as well as the Emergency Board Meeting Procedures adopted by this Board via Resolution No. 20-06-08 on June 18, 2020, this Board has conducted regular Board meetings and other public meetings via remote (online/teleconference) meetings.

On September 16, 2021, Governor Newsom signed Assembly Bill 361 (AB 361), which became effective immediately upon signature, containing language that eased Brown Act requirements to allow local agencies to meet remotely. AB 361 allows meetings to continue to be conducted by teleconference, similar to the process used during the current COVID-19 pandemic, but only when there is a declared state of emergency when the local governing body makes findings that there are imminent health risks to meeting in person.

On February 25, 2022, Executive Order N-04-22 was issued leaving the California State of Emergency due to the threat of COVID-19 in effect for the foreseeable future. Though the State of Emergency remains in effect, mask mandates have been dropped locally and at the State level.

On April 21, 2022, CAL/OSHA re-adopted its workplace COVID-19 Emergency Temporary Standards (ETS), as modified, effective May 6, 2022, through December 31, 2022, including outbreak reporting; SMUD staff continue to report COVID-19 infections, though at a decreasing rate; the lack of a requirement to sign in at SMUD Board meetings with contact information could make contact tracing nearly impossible; and the most recently reported COVID-19 data published , by the Sacramento County Department of Public Health on its Epidemiology COVID-19 Dashboard, and covering the period up to June 4, 2022, indicated a local COVID-19 case rate of 37.3% and 11 deaths since the last update. Since June 1, 2022, Sacramento County has been in the high severity tier for COVID-19. All surrounding counties are also in the high severity tier. Moreover, when SMUD Board and Committee meetings were held in person, they could last as long as four hours with all participants in a single room. And although we could space out participants, they would still be breathing one another's respirated air for what could be a lengthy period of time.

By Resolution 21-10-01 adopted on October 12, 2021, Resolution No. 21-10-03 adopted on October 21, 2021, Resolution No. 21-11-05 adopted on November 18, 2021, Resolution No. 21-12-04 adopted on December 9, 2021, Resolution No. 22-03-01 adopted on March 8, 2022, Resolution No. 22-03-03 adopted on March 17, 2022, Resolution No. 22-04-01 adopted on April 13, 2022, Resolution No. 22-04-03 adopted on April 21, 2022, and Resolution No. 22-05-06 adopted on May 19, 2022, this Board has previously made findings to continue to hold regular Board meetings and other public meetings via solely virtual (online/teleconference) format.

Staff's recommendation is to continue to hold regular Board meetings and other public meetings via solely virtual (online/teleconference) meeting and continue to monitor developments related to the COVID-19 pandemic. Pursuant to Government Code section 54953(e), this Board must make findings every 30 days that conditions warrant continuing to meet virtually instead of in-person.

Board Policy: *(Number & Title)*	Governance Process GP-3, Board Job Description – j) Take such other actions as may be required by law.
Benefits:	Making the determination to continue remote meetings will allow for efficient conduct of SMUD business.
Cost/Budgeted:	Contained in Business Unit budget for internal labor.
Alternatives:	Take no action and comply with all original Brown Act requirements.
Affected Parties:	SMUD, Board of Directors, Public
Coordination:	Executive Office, Board Office, Legal Department, Information Technology, Communications
Presenter:	Laura Lewis, Chief Legal & Government Affairs Officer

Additional Links:

SUBJECT	ITEM NO. ***(FOR LEGAL USE ONLY)***
Make Findings to Continue Online/Teleconference Meetings	6

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

DRAFT

RESOLUTION NO. ________________

WHEREAS, SMUD is committed to preserving public access and participation in meetings of the Board of Directors and to the safety of meeting attendees; and

WHEREAS, all meetings of the Board of Directors are open and public, as required by the Ralph M. Brown Act (Gov't Code, §§ 5495054963) ("Brown Act"), so that any member of the public may attend, participate in, and watch SMUD's governing body conduct its business; and

WHEREAS, the newly enacted Government Code section 54953(e) authorizes a local agency's governing body, during a proclaimed state of emergency, to participate in its public meetings using remote teleconferencing without compliance with the requirements of Government Code section 54953(b)(3), under specified conditions; and

WHEREAS, a required condition is that a state of emergency is declared by the Governor pursuant to Government Code section 8625, proclaiming the existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions as described in Government Code section 8558; and

WHEREAS, another condition is that state or local officials have imposed or recommended measures to promote social distancing, or, the legislative body determines that meeting in person would present imminent risks to the health and safety of attendees; and

WHEREAS, on February 28, 2022, the California Department of Public Health rescinded the mask requirement effective March 1, 2022, for all individuals regardless of vaccination status and instead issued a strong recommendation that all persons, regardless of vaccine status, continue indoor masking; and

WHEREAS, the Sacramento County Department of Public Health on its Epidemiology COVID-19 Dashboard continues to show elevated case and death data, with the case rate increasing by approximately 10 times between the end of March 2022 and early June; and

WHEREAS, on June 1, 2022, Sacramento County returned to high community transmission rates for COVID-19 as defined by the Centers for Disease Control and Prevention, and all surrounding counties are also currently so classified; and

WHEREAS, on April 21, 2022, the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) re-adopted its workplace COVID-19 Emergency Temporary Standards (ETS), as modified, effective May 6, 2022, through December 31, 2022, including outbreak reporting; and

WHEREAS, SMUD is incrementally reintroducing staff to its administrative buildings, staff infections continue to be reported with some consistency, and, under the current schedule, the majority will not return to working on-site until August or September 2022; and

WHEREAS, SMUD Board and Committee meetings can last as long as four hours, with participants sitting in the same room sharing air the entire time; and

WHEREAS, it would be impractical for SMUD to take steps necessary to prevent imminent risks to the health and safety of attendees, such as by holding public meetings outdoors, ensuring public meeting attendees are vaccinated, have appropriate face coverings, and wear them consistent with public health guidance; and

WHEREAS, all meetings, agendas, meeting dates, times, and manner in which the public may participate in the public meetings of the SMUD Board and offer public comment by telephone or internet-based service options including video conference are posted on the SMUD website and physically outside of SMUD's Headquarters Building; and

WHEREAS, by Resolution No. 21-10-01 adopted on October 12, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-10-03 adopted on October 21, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-11-05 adopted on November 18, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 21-12-04 adopted on December 9, 2021, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

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WHEREAS, by Resolution No. 22-03-01 adopted on March 8, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-03-03 adopted on March 17, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-04-01 adopted on April 13, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-04-03 adopted on April 21, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, by Resolution No. 22-05-06 adopted on May 19, 2022, this Board made findings that requisite conditions exist for the SMUD Board to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; **NOW, THEREFORE**,

BE IT RESOLVED BY THE BOARD OF DIRECTORS
OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. Risks to Health and Safety of Attendees. The Board has reconsidered the circumstances of the state of emergency and hereby finds that the

DRAFT

state of emergency continues to directly impact the ability of the members to meet safely in person and holding SMUD Board meetings in person would present imminent risks to the health and safety of attendees.

Section 2. Remote Teleconference Meetings. SMUD staff are hereby authorized and directed to take all actions necessary to carry out the intent and purpose of this Resolution, including conducting open and public meetings in accordance with section 54953(e) and other applicable provisions of the Brown Act.

Section 3. Effective Date of Resolution. This Resolution shall take effect immediately upon its adoption and shall be effective until the earlier of (i) July 16, 2022, or (ii) such time the Board of Directors adopts a subsequent resolution in accordance with Government Code section 54953(e)(3) to extend the time during which the SMUD Board may continue to teleconference without compliance with paragraph (3) of subdivision (b) of section 54953.

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SSS No. RSNBS 22-003	**BOARD AGENDA ITEM** STAFFING SUMMARY SHEET	Committee Meeting & Date ERCS - 06/15/22
		Board Meeting Date June 16, 2022

TO		TO	
1.	Bryan Swann	6.	
2.	Suresh Kotha	7.	
3.	Frankie McDermott	8.	
4.	Brandy Bolden	9.	**Legal**
5.	Lora Anguay	10.	**CEO & General Manager**

Consent Calendar	X	**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**	X	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Garry Mariscal	Resource Strategy	B205	6448	5/27/2022

NARRATIVE:

Requested Action: Adopt SMUD's 2030 Zero Carbon Plan as SMUD's Zero Carbon Integrated Resource Plan (IRP) to meet California Energy Commission (CEC) IRP regulatory filing requirements.

Summary: Pursuant to the Clean Energy and Pollution Reduction Act of 2015 (SB 350, De Leon), publicly owned utilities (POU) like SMUD are required to submit Integrated Resource Plans (IRP) to the California Energy Commission (CEC) at least every five years, which, among other things, set forth goals and actions to comply with SB 350 requirements. SMUD's Board last adopted its IRP on October 18, 2018 (Resolution No. 18-10-11), which SMUD staff filed with the CEC in April 2019, meeting the CEC's first POU IRP filing requirement as prescribed in SB350.

On July 16, 2020, the Board declared a Climate Emergency (Resolution No. 20-07-05) and directed the CEO/GM to report on clear, actionable and measurable strategies, and plans to reach SMUD's climate emergency goals of carbon neutrality by 2030.

Following this Climate Emergency declaration, SMUD staff worked to identify a flexible pathway for SMUD to eliminate all of its carbon emissions by 2030. This roadmap, SMUD's 2030 Zero Carbon Plan, represents the results of internal modeling, stakeholder input, and community outreach. On April 28, 2021, the Board approved the SMUD 2030 Zero Carbon Plan (Resolution No. 21-04-05).

SMUD's 2030 Zero Carbon Plan meets or exceeds all requirements of Public Utilities Code section 9621. Staff recommends the Board adopt SMUD's 2030 Zero Carbon Plan as SMUD's Zero Carbon IRP for filing with the CEC.

Board Policy: *(Number & Title)* Governance Process GP-3 (j), Board Job Description – Take such other actions as may be required by law. Strategic Direction SD-9, Resource Planning.

Benefits: Meets SMUD's IRP reporting requirements under SB350 and updates our outdated IRP currently on file with the CEC.

Cost/Budgeted: N/A

Alternatives: Do not file SMUD's 2030 Zero Carbon IRP with the CEC and leave outdated IRP on file with regulators.

Affected Parties: All SMUD Departments, SMUD Customers and Community

Coordination: Executive Office, Board Office, Resource Strategy, Power Generation, Legal, Marketing & Corporate Communications

Presenter: Bryan Swann, Director, Resource Strategy

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
Adopt 2030 Zero Carbon Plan as the Updated Integrated Resource Plan	7

April 2021

2030 Zero Carbon Plan

SMUD's ambitious plan to reach zero carbon emissions in its power supply by 2030.

2030 Zero Carbon Plan

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2030 Zero Carbon Plan Clarifications

On March 26, 2021, we published our 2030 Zero Carbon Plan and invited public comments on the Plan. This additional public comment and consultation process followed an already extensive stakeholder process that began in December 2020 and is described in our later section on our Public consultation process.

During the March 26 to April 16, 2021 public comment period, we received 48 public comments and an additional nine general comments and recommendations. The input was provided by customers, local stakeholders, community organizations, individuals and other interested parties. We appreciate the thoughtful comments that were provided and used those to develop the six clarifications to our 2030 Zero Carbon Plan that are listed below. The 2030 Zero Carbon Plan was accepted by the SMUD Board at its April 28, 2021 meeting, including these clarifications.

1. Study and prioritize retirement of McClellan in 2024 and Campbell in 2025

As highlighted on pages 78-79 in the 2030 Zero Carbon Plan, our preliminary analyses suggest that McClellan could be retired in 2024 and Campbell in 2025. We wish to clarify that we intend to conduct detailed reliability studies in 2021 to confirm the feasibility of retiring McClellan in 2024 and prioritize this retirement. Similarly, for Campbell, we will conduct detailed reliability studies in 2021 or 2022 to confirm feasibility of its retirement in 2025 as an additional priority and then subsequently prepare detailed plans for the decommissioning of these plants and replacement of their capacity using suitable carbon free resources.

2. Eliminate the use of fossil fuels as soon as possible but no later than 2030

It is SMUD's intent to retire all our thermal gas fired power plants as soon as possible or repurpose these plants to utilize a clean fuel such as green hydrogen. Some of our generators may be able to burn 100 percent hydrogen with limited modifications once hydrogen becomes available at scale and a reasonable cost. Therefore, re-tooling and reinvesting in critical components of our plants may be more cost effective than full retirement and subsequent investment in brand-new clean energy technologies. Further detailed reliability studies will determine whether we will retool or retire the plants to ensure reliable and cost-effective operation of the system. If we were to retool the plants, there may be a period of time where a transition fuel such as biodiesel, biogas, or ethanol could be used until another zero carbon fuel like green hydrogen is cost effective and feasible for use with our generators. We will conduct life cycle emissions analyses of the potential clean fuels prior to committing to their use. In any case, our plan is to focus on renewables and storage to eliminate the need to run the plants for energy. This means that these re-tooled units will be used only during times when they are necessary to support reliability and keep the lights on. This will reduce their use by about 90% compared to today. For those limited hours each year when these plants are still needed, we plan to use renewable fuels such as renewable natural gas and biodiesel as transitional fuels until clean fuels such as green hydrogen become more available and more affordable.

In addition to exploring the use of clean fuels, we intend to conduct research into other new technologies that could ultimately allow us to retire some or all of our thermal fleet. We plan to study options for long duration storage, vehicle to grid technology and the use of virtual power plants. Each of these technologies has the potential to help SMUD reduce the need and use of our thermal assets. We intend to maximize the use of these types of resources once we prove they are a safe and cost-effective way to maintain reliability of the system

3. **Study the potential retirement of Carson, Procter & Gamble and Cosumnes prior to executing re-tooling strategy**

Prior to making any decision on whether to re-tool or retire the remaining plants, SMUD will conduct detailed reliability and economic analysis to determine all feasible, reliable and cost-effective resources available that could reduce or eliminate the need for the plants. All feasible, reliable and cost-effective options will be pursued to both reduce our greenhouse footprint and limit our need for fossil fuel based generation resources.

4. **The 2030 Zero Carbon Plan is flexible and will consider a variety of technologies**

SMUD will continue to research or expand several additional zero carbon technologies beyond those specifically listed in the Plan. Among the resources to be considered are concentrating solar power, large scale thermal storage, microgrids and fuel cells. As stated in the 2030 Zero Carbon Plan, we believe flexibility is important. The Plan will be adjusted as we research or determine how these and other technologies may play a role in helping us reach zero carbon emissions without compromising reliability or affordability. In addition, as we progress with implementation the exact timing, size, location and types of resource additions we will leverage post 2025 will become more defined.

5. **Maximize the value of SMUD's existing hydro facilities in the Upper American River Project (UARP).**

We wish to clarify that in implementing the 2030 Zero Carbon plan, we will

- seek to optimize the operations of our hydro system to facilitate the integration of renewable resources within our service territory for both grid-scale and behind the-meter resources
- examine opportunities to pursue additional pumped storage or similar options within the existing physical boundaries of the UARP system

6. **Behind-the-meter resources and virtual net metering**

SMUD has a long history of supporting rooftop solar and other distributed resources. We see rooftop solar, behind-the-meter battery storage and other distributed energy resources as important resources in our 2030 Zero Carbon Plan. As highlighted in the Plan, we expect rooftop solar resources to grow from about 240MW today to as much as 500-750MW by 2030 and behind-the-meter batteries to reach 50-250 MW by 2030. The Plan calls for piloting, proving and scaling new technologies and business models that utilize customer assets to create virtual power plants, vehicle-to-grid applications and other flexible demand resources. As these programs are developed, they will be designed to offer benefits for the customer as well as for the grid.

The tariffs at which SMUD will buy and sell power to customers with rooftop solar and storage, play an important role in customers' decisions to invest in these technologies. However, tariff design and compensation levels for these resources are handled through our normal rate setting process that includes extensive stakeholder and public outreach. In addition, SMUD intends to offer a virtual net energy metering (or VNEM) program for income-qualified customers in the next rate setting process.

Executive summary

SMUD's goal to eliminate carbon emissions from our power supply by 2030 is more ambitious than already aggressive state mandates and is ahead of virtually all other utilities in the United States. Our 2030 Zero Carbon Plan is a flexible road map to achieve our zero carbon goal while ensuring all customers and communities we serve reap the benefits of decarbonization.

For more than a half century, SMUD has focused on growing the amount of carbon-free electricity we provide to the Sacramento region. Construction of our Upper American River Project (UARP), a 688-MW hydroelectric system in the Sierra Nevada Mountains west of Lake Tahoe, began in 1957. Today, the UARP supplies 16% of our energy needs with low-cost, carbon-free electricity. With a range of other clean energy resources in our portfolio, SMUD's energy supply is on average 50% carbon-free today.

It's in our DNA to lead the way in carbon reduction. We've consistently set renewable energy and carbon reduction goals that are ahead of and more aggressive than state mandates. We set these aggressive goals because it's the right thing to do.

Having ambitious goals helped SMUD become the first large California utility to have at least 20% of our energy come from renewable sources. We have a long list of notable firsts: The original green power pricing program for our customers, the first utility in California to make time-based rates standard for all customers and the first solar-powered electric vehicle charging station in the western United States. But we recognize these are not enough.

Globally, 2016 and 2020 were the hottest years on record and California has witnessed first-hand the devastating impacts of carbon on our climate, with devastating wildfires, rising temperatures and decreased snowpack. In 2018, SMUD set one of the most aggressive carbon reduction targets in the country with the goal of achieving net zero emissions by 2040, five years ahead of California's 2045 net zero goal. In July 2020, our Board of Directors declared a climate emergency and adopted a resolution calling for SMUD to take significant and consequential actions to become carbon neutral (net zero carbon) by 2030. The Board also directed SMUD staff to report by March 31, 2021 on clear, actionable and measurable strategies and plans to reach SMUD's climate emergency goals. Rapidly advancing clean energy technology and a collaborative and inclusive approach to carbon reduction has allowed SMUD to set the even more ambitious goal of zero carbon by 2030, with the 2030 Zero Carbon Plan being our strategy to achieve that goal.

Eliminating carbon emissions will deliver far-reaching benefits. It's the right thing to do for the environment, air quality, our children and grandchildren and for equity in communities that have traditionally been left out of decisions and discussions about carbon emissions. This ambitious goal puts the Sacramento Region on the map as an example to follow and a region where innovative, climate-friendly businesses want to be.

We have a track record of setting game changing goals and achieving them. Our 2030 Zero Carbon Plan details how we'll get to zero without compromising reliability or affordability. It comes with a commitment to keep rate increases within the rate of inflation. While nine years is an aggressive timeline, we know the clean energy and clean technology sectors and customer preferences will change significantly between now and 2030, so flexibility is central to our Plan.

Going absolute zero carbon is a bold and ambitious goal -- one we believe we can and must achieve. We can't get there with today's technology and we can't get there alone. That's why innovation and partnership are key pillars of the Plan. Working in partnership with our customers and community, government agencies, community leaders and organizations, business leaders and the business community, legislators, regulators and others, we'll help align resources and programs for maximum impact in all communities. We know, for example, that widespread adoption of customer-owned distributed energy resources like electric vehicles and rooftop solar will be key to achieving zero carbon. Making these technologies accessible to all customers will be a central focus of our program development efforts over the coming years.

Our 2030 Zero Carbon Plan is our road map to eliminate carbon emissions from our electricity production by 2030 while maintaining a reliable and affordable service and partnering with our customers, communities and a wide-range of stakeholders on this journey.

Our commitment to our customers and community

As a community-owned, not-for-profit utility, our customers and community are at the heart of all we do. By pursuing zero carbon, we're helping create a cleaner and healthier region for all. Our goal of zero carbon by 2030 is anchored in our longstanding commitment to provide safe and reliable power with rates among the lowest in California. We won't compromise on this commitment.

Our customers, community and other partners are central to our vision and part of the solution to decarbonize our region. Their input and participation have helped us develop the 2030 Zero Carbon Plan. Ongoing communications and engagement with our customers and community will help ensure we continue to deeply understand their needs, which will be essential to enhance our programs to support zero carbon while meeting our customers' evolving preferences. Continuing to educate customers on the benefits of zero carbon and ways they can take action will also be critical to achieving our goal.

SMUD's zero carbon goal is best achieved by finding mutually beneficial solutions and we reaffirm our commitment to being inclusive, supporting regional innovation, clean tech jobs and attracting clean energy investments to the region through collaborative partnerships.

We have an opportunity to bring together a wide-range of stakeholders — businesses, elected officials, community leaders and organizations, think tanks, academia, regulators, start-ups, native tribes, venture capitalists and others to align resources for maximum impact. We'll partner with others to develop technology, healthy ecosystems, find innovative sources of funding and develop new business models. We will also need to work closely with regulators with respect to climate-friendly policies and regulations that encourage electrification in the building and transportation sectors, which are currently the largest emitters of carbon/greenhouse gases in California.

SMUD is committed to achieving our zero carbon goal in an inclusive way that leaves no communities behind. For decades, SMUD has supported low-income customers with innovative programs to make energy efficiency and other technologies accessible. In 2016, SMUD introduced additional energy saving pilots which expanded our reach and helped thousands of income qualified customers adopt carbon reduction measures in their homes and reduce their overall energy bill burden. Measures included replacing gas appliances with electric appliances, installing rooftop solar systems, insulation, heating and cooling systems, and lighting and/or other weatherization improvements. We'll continue to re-examine our programs and pilots to tailor them to supporting our goal and our customers' needs in all segments.

Our Sustainable Communities Initiative helps bring environmental equity and economic vitality to all communities in our service area, with special attention given to historically under-resources neighborhoods. We believe in the ability to make a greater collective community impact through partnerships. Through our Sustainable Communities Initiative, we collaborate with private industry, government agencies and nonprofits to invest in and implement programs that provide equitable access to indicators of sustainable community success, with a focus on social wellbeing, healthy environment, prosperous economy and mobility.

We're looking at other creative ways to support investment in underserved communities, including partnerships with financial institutions and other businesses and pursuing foundation and private investments to support decarbonization programs.

We'll continue working with our business customers to identify partnership opportunities to align resources, test technology, electrify buildings and transportation. Together, we'll develop tailored programs and pilots, while exploring co-development of new technologies and solutions. We plan to partner to seek funding for new initiatives that can help our region decarbonize faster and at lower cost.

Policy makers and regulators play an incredibly important role in shaping our zero carbon future. We plan to work collaboratively to promote cost-effective measures to reduce carbon emissions and support policy that encourages carbon reduction. We'll also work with government agencies to seek funding opportunities for new technologies and solutions that support SMUD's research and development efforts.

We have a history of partnering with our community and are excited to have broad support from our customers and community for our commitment to eliminating carbon from our power supply. We will build on what we're already doing – leading by example and engaging members of our community and industry – and together we can create and work toward a shared vision for the future. We'll continue to empower our communities to work with us to make sure Sacramento communities are livable, resilient and ready for a low-carbon future.

Community benefit

The road to zero: Four focus areas

As a community-owned, not-for-profit utility, our customers and community are at the heart of all we do. By pursuing zero carbon, we're helping create a cleaner and healthier region for all. Our goal of zero carbon by 2030 is anchored in our longstanding commitment to provide safe and reliable power with rates among the lowest in California. We won't compromise on this commitment.

Our customers, community and other partners are central to our vision and part of the solution to decarbonize our region. Their input and participation have helped us develop the 2030 Zero Carbon Plan. Ongoing communications and engagement with our customers and community will help ensure we continue to deeply understand their needs, which will be essential to enhance our programs to support zero carbon while meeting our customers' evolving preferences. Continuing to educate customers on the benefits of zero carbon and ways they can take action will also be critical to achieving our goal.

SMUD's zero carbon goal is best achieved by finding mutually beneficial solutions and we reaffirm our commitment to being inclusive, supporting regional innovation, clean tech jobs and attracting clean energy investments to the region through collaborative partnerships.

We have an opportunity to bring together a wide range of stakeholders — businesses, elected officials, community leaders and organizations, think tanks, academia, regulators, start-ups, native tribes, venture capitalists and others to align resources for maximum impact. We'll partner with others to develop technology, healthy ecosystems, find innovative sources of funding and develop new business models. We will also need to work closely with regulators with respect to climate-friendly policies and regulations that encourage electrification in the building and transportation sectors, which are currently the largest emitters of carbon/greenhouse gases in California.

Our 2030 Zero Carbon Plan is a road map with the flexibility needed to adjust to changing technology and customer preferences to completely eliminate the use of fossil fuels in our electricity production by 2030. With the clean energy technology in our power supply today, we expect to be able to reduce our carbon emissions by 90%, without compromising reliability or our low rates. Eliminating the last 10% will be more challenging and will require SMUD to take bold actions and pioneer new game-changing technologies.

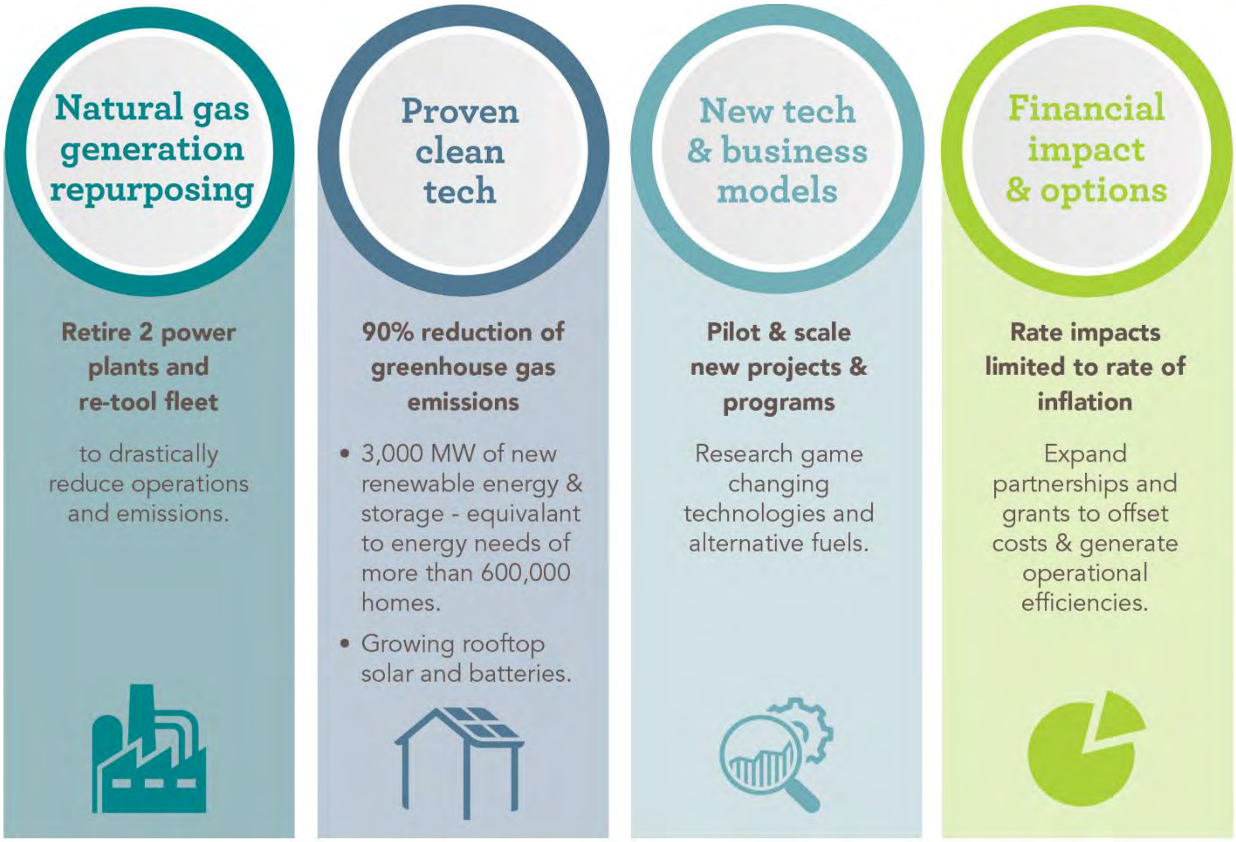
To achieve zero carbon, we're focused on four main areas:

- **Natural gas generation repurposing**. Eliminating greenhouse gas emissions from our power plants is essential to reach our goal of zero carbon. We're focused on reimagining our existing generation portfolio to eliminate greenhouse gas emissions through retirement, re-tooling and using renewable fuels.

- **Proven clean technologies,** which are carbon-free technologies available today, including solar, wind and geothermal energy and battery storage. We'll significantly expand our investments in these technologies and adjust our plan as we progress in the other three areas.

- **New technologies and business models**, which are technologies that are either currently unknown or are not ready for large-scale adoption due to price, reliability or other factors. We'll launch pilot projects and programs to test and prove new and emerging technologies and develop paths for prioritizing technology adoption and scaling.

- **Financial impact and options.** We're focused on making sure achieving our zero carbon goal is possible at a reasonable cost that minimizes rate increases for our customers. We'll do that by identifying savings and pursuing partnerships and grants that support the Plan.

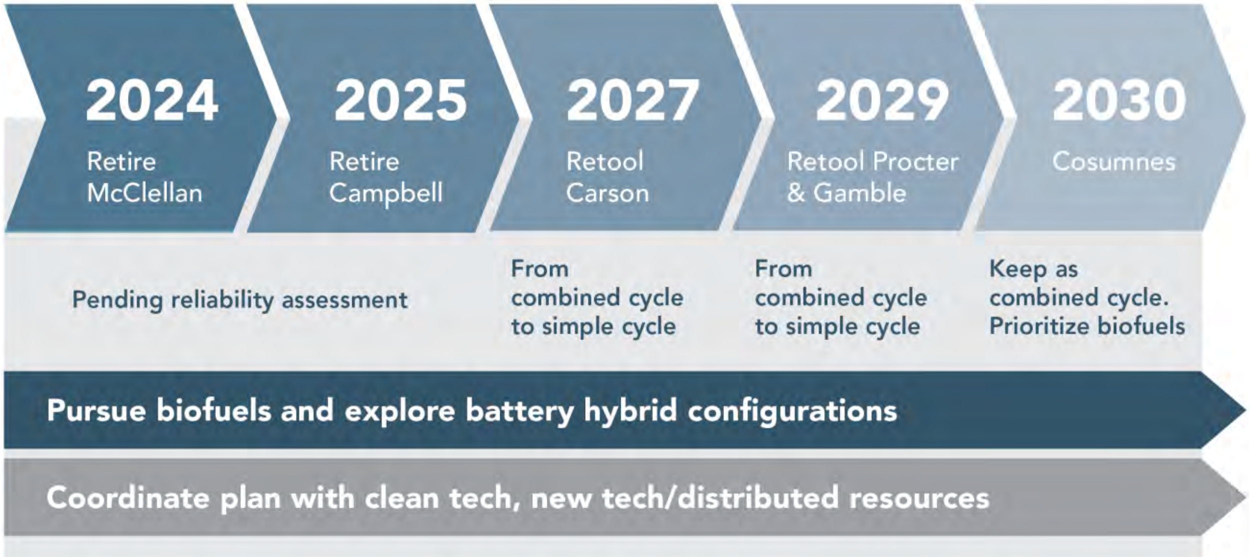


We're committed to eliminating carbon emissions in our power supply while recognizing flexibility is needed to adapt as new technology emerges, costs decline and our customers adopt more distributed energy resources and other technology. While pursuing each of the four areas will be important through 2030, activities may accelerate or decline in individual areas based on overall progress and advancements in specific areas.

Natural gas generation repurposing

Our gas power plants provide low-cost, reliable energy. While recent investments mean SMUD's Cosumnes Power Plant is the most efficient combined cycle gas plant in California, today our gas plants are our main source of greenhouse gas emissions, so retiring and/or refueling them is a significant part of how we'll reach zero emissions. We looked at a variety of options in developing our 2030 Zero Carbon Plan.

We believe our gas power plants can continue to play a vital role to support reliability without emitting greenhouse gases. By retooling two of our plants from constant operations to become more flexible peaking units, we can drastically reduce their use and carbon emissions while maintaining most of their capacity. We're targeting operating them on biofuels such as renewable gas from landfills, biodiesel or other renewable sources when they'll need to operate for reliability.



Our Campbell and McClellan gas plants are located in areas already affected by air pollution. Modifying or retiring these plants will bring air quality benefits to these historically under-resourced communities because they're located in areas of SMUD's territory with some of the highest environmental sensitivity scores. Based on our studies to date, we believe we can retire McClellan in 2024 and Campbell in 2025 and replace them with proven clean technologies. Final decisions about the retirement of these plants will be based on additional reliability studies and discussions and engagement with the community.

Our Plan, which includes retiring two power plant and retooling other, will reduce our emissions and improve air quality in Sacramento. Below is the summary of our plan to retire, retool and minimize the use of natural gas at our plants.

Power Plant	Generator Type	Unit	Capacity (MW)	Fuel Source
Sacramento Power Authority at Campbell Soup	**Retired***			
McClellan Gas Turbine	**Retired***			
Central Valley Financing Authority at Carson Ice	Combustion Turbine	1	50	Biofuels**
	Steam Turbine	2	**Retired**	
	Combustion Turbine	3	50	Biofuels**
Sacramento Cogeneration Authority at Procter & Gamble	Combustion Turbine	1	50	Biofuels**
	Steam Turbine	2	**Retired**	
	Combustion Turbine	3	50	Biofuels**
	Simple Cycle Peaking	4	50	Biofuels**
SMUD Financing Authority at the Cosumnes Power Plant	Steam Turbine	1	207	Waste Heat
	Combustion Turbine	2	207	Biofuels**
	Combustion Turbine	3	207	Biofuels**

**Final generator configurations are pending reliability assessment.*
***Final 2030 fuel mix is to be determined. Dependent on options available and may include one or more of the following: hydrogen, biogas, renewable natural gas, biofuels.*

Proven clean technologies

Proven clean technologies are the relatively mature zero emission technologies available in the market today and have demonstrated reliability and cost benefits. Along with reimagining our natural gas power plants, proven clean technologies are the foundation of this Plan and we expect they'll help reduce our carbon emissions by about 90% by 2030, far exceeding the regulatory and legislative mandates in place today.

Proven clean technologies include utility-scale wind, solar, batteries, hydroelectric power, biomass, geothermal, as well as customer-owned solar and battery storage. Our Zero Carbon Plan includes a significant increase in investments proven clean technology over the next nine years, by SMUD and our customers.

Utility-scale investments (2021-2030)

- **Local solar:** 1,100 to 1,500 MW
- **Regional Solar:** 100 MW
- **Local battery storage:** 700 to 1,100 MW
- **Wind** (various locations): 390 to 590 MW
- **Geothermal** (various locations): 100 to 220 MW

These utility-scale investment ranges are based on current and expected market conditions and costs for new technologies, recognizing market conditions can change quickly, impacting resource availability and costs. External market factors such as changes in

California and western U.S. electricity market rules also play an important role in resource adoption, as do legislative and regulatory changes. If emerging technologies develop faster than expected, we will adjust our proven clean technology strategy accordingly. Similarly, if costs for new technologies decline slower than expected or if promising research areas don't yield the expected results, we may need to scale up our investments in other areas.

Customer-owned adoption of solar and storage (2021-2030)

- **Customer rooftop solar:** 250 to 500 MW
- **Customer battery storage:** 50 to 250 MW

We recognize our customers' investment in rooftop solar and battery technologies depend to a large extent on costs as well as overall customer sentiment about zero-carbon technologies. Investment estimates are based on today's forecast of probable adoption rates and the ranges reflect the uncertainty of costs associated with these systems over the next decade.

To safeguard reliability, it's also important that SMUD maintains a diverse resource portfolio that reflects different generation technologies and geographic diversity. So, our Plan includes intermittent renewable energy such as wind and solar as well as energy storage and geothermal resources that support reliability.

New technologies and business models

Emerging technologies play a critical role in our Plan, specifically to eliminate the remaining 10% of carbon emissions. We'll look to emerging distributed energy resource options and large-scale new technology innovations. This includes focusing on new applications for customer-owned distributed energy resources by assessing the attractiveness, costs and reliability of emerging technologies and business models. After launching and evaluating pilot programs and projects we will evaluate, prioritize and scale the technologies and programs we expect will have the largest impact reducing carbon in our 2030 resource mix, especially in terms of short duration generation capacity. To that end, we're focused on four main areas of technology:

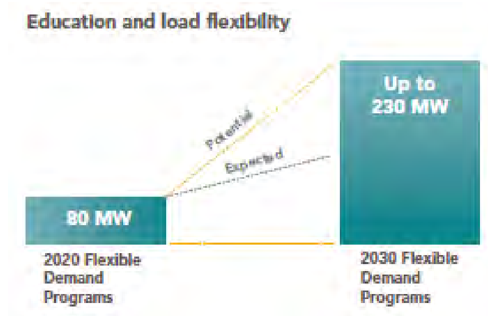
- Electrification.
- Education and demand flexibility.
- Virtual power plants (VPP) and vehicle-to-grid technology (V2G).
- New grid-scale technologies.

Taken together, we expect customer-owned resources and SMUD customer-focused programs will contribute between 360 and 1,300 MW of capacity to our grid by 2030, depending on the rate of customer adoption and the success of the programs and technologies we develop.

Electrification

Electrification of buildings and vehicles is a priority for SMUD today to support the decarbonization of these sectors, which are the largest carbon emitters in California. Our 2030 Zero Carbon Plan continues to prioritize electrification of transportation as well as new and existing buildings. In addition to piloting innovative electrification programs, we'll continue to engage under-resourced and low-income communities to achieve bill savings and ensure access to clean technologies. Examples of potential programs include:

- Electrifying multi-family homes, schools, commercial buildings, and under-resourced communities.
- New construction smart homes.
- Financing options.
- Turnkey EV charging solutions for residential and commercial properties.
- Incentives for used EVs.



Learnings from these pilot programs will help us identify the ones to scale. Pursuing external grants to help make these initiatives more affordable for all customers, we'll also advocate for regulatory changes and seek to collaborate regionally to accelerate the adoption of zero carbon technologies.

We're on an important journey with our customers and it's important to help ensure our customers understand the actions they can take to help support decarbonizing our region. Through pilot programs aimed at flexible energy use, we can help customers reduce their energy usage and bills at times when the stress on our grid is the highest. These types of universal customer programs reduce carbon emissions without requiring customers to spend money on advanced technologies. If successful, we'll scale our flexible demand programs as a lower cost alternative to large solutions such as utility-scale battery storage.

Customers will also have options to participate in programs that leverage the advanced and automation capabilities of their own devices, such as thermostats and electric vehicles, for deeper bill and carbon savings. We expect to develop about 165 MW of flexible load programs by 2030, but more could be possible as our programs continue to evolve to leverage advancing technology.

Virtual power plants (VPP) and vehicle-to-grid technology (V2G)

These programs seek to optimize the operation of our customers' equipment and distributed energy resources, balancing customer and grid needs to maximize benefits for both, while compensating customers for the energy they supply into SMUD's grid for use by other customers.

A virtual power plant consists of many small devices often owned by customers and located at their homes and businesses. When operated and managed together in a coordinated way, they can become an alternative to a conventional utility-scale power plant. VPPs can include electric vehicles, batteries, thermostats and electric water heaters. By aggregating their capacity and flexibility, a VPP can mimic a power plant and provide services that help reduce electric peak demand during hot summer days or cold winter nights, potentially reducing the need for SMUD to build or buy other resources freeing resources to more aggressively invest in renewable energy.

We will launch several VPP pilot programs between 2021 and 2024 to demonstrate and test their reliability, cost and value compared to alternative resources. This will inform selection of the best model for bringing VPPs to scale between 2025 and 2030. Our goal is to develop a flexible program where customers can bring a variety of devices that we use as one VPP to help reduce demand during key times of the year. Our approach will include working with third-party providers to jointly test VPP programs that can offer grid services such as resource adequacy and short-term energy.

Vehicle-to-grid technology is a key area of VPP innovation. Electric vehicle batteries can be connected to the grid to help stabilize the grid by either providing energy to the grid during periods of very high electric demand or by taking a portion of surplus renewable energy available on the electric grid to charge the grid-connected vehicle. We anticipate vehicle-to-grid advancements will offer some of the benefits of stationary battery storage without the added investment of a separate stationary battery.

New grid-scale technologies

While retiring and retooling our gas plants will drastically reduce emissions, the use of natural gas will not be completely eliminated unless we identify sufficient amounts of renewable fuels or develop alternative generation sources. Our initial studies indicate about half of our fuel needs after retooling can be met with renewable natural gas that we already have under contract. Additional fuel sources or technical advancements are necessary to close the remaining gap and fully eliminate our greenhouse gas emissions. We're looking at several options to address this:

- Biofuels and other clean fuels, including renewable natural gas, green hydrogen, biodiesel and ethanol.
- Long duration storage which could include technologies such as flow batteries, thermal storage and liquid air energy storage.
- Carbon capture and sequestration, including the Allam-Fetvedt cycle to assess the feasibility of this and similar technologies in the Sacramento region.
- Pumped storage hydro using our existing UARP dams and hydroelectric facilities.

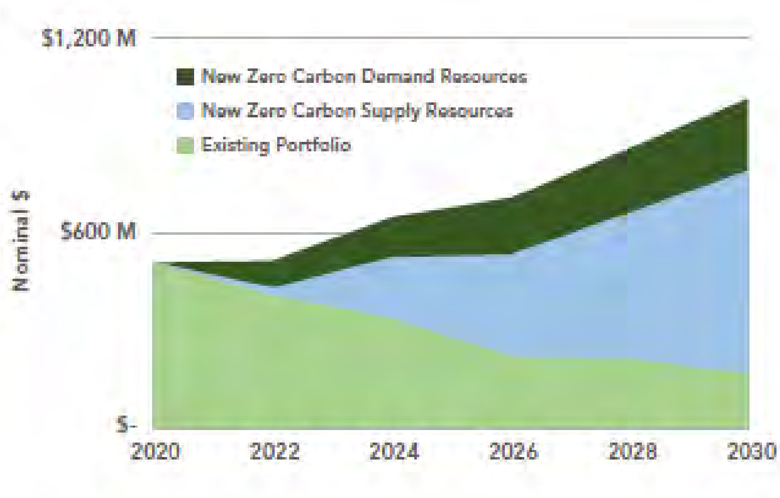
This research and the ability to secure sufficient volumes of biofuels will allow us to scale up the most promising technologies. We'll continue to evaluate and seek innovative options as new technologies emerge.

Financial impacts and options

SMUD's rates are significantly lower than those of neighboring utilities and are among the lowest in California. We believe eliminating carbon emissions from our power supply by 2030 is achievable with rate increases that don't exceed the rate of inflation, which is consistent with California utility rate increases over the past 25 years. While these low rate increases are achievable, they will be challenging to achieve.

We've identified the need for between $50 and $150 million in sustained and ongoing savings to help offset the costs of our Plan, which we'll deliver through operational savings and pursuing partnerships and grants. We expect to work closely with community organizations, industry partners, government agencies and regulators to jointly develop and finance innovative solutions and pave the way for cost reductions in new and emerging clean technologies.

Cost of SMUD's electricity supply 2020-2030, including Zero Carbon portfolio costs



The estimated costs and rate impacts discussed in this section represent one possible outcome based on our current expectations for market developments and costs. There are many factors that could cause the costs for achieving our zero carbon goals to go higher or lower than our initial estimates presented here. For example, if costs for technologies such as solar and battery storage decline faster or more significantly than expected, we may be able to accelerate the pace of our carbon reduction efforts without sacrificing affordability. Conversely, if costs are higher than expected or if some technologies fail to deliver on their projected potential, the overall pace and choices of technologies may need to be adjusted. We expect to revisit the 2030 Zero Carbon Plan regularly to adjust as necessary to these changing factors.

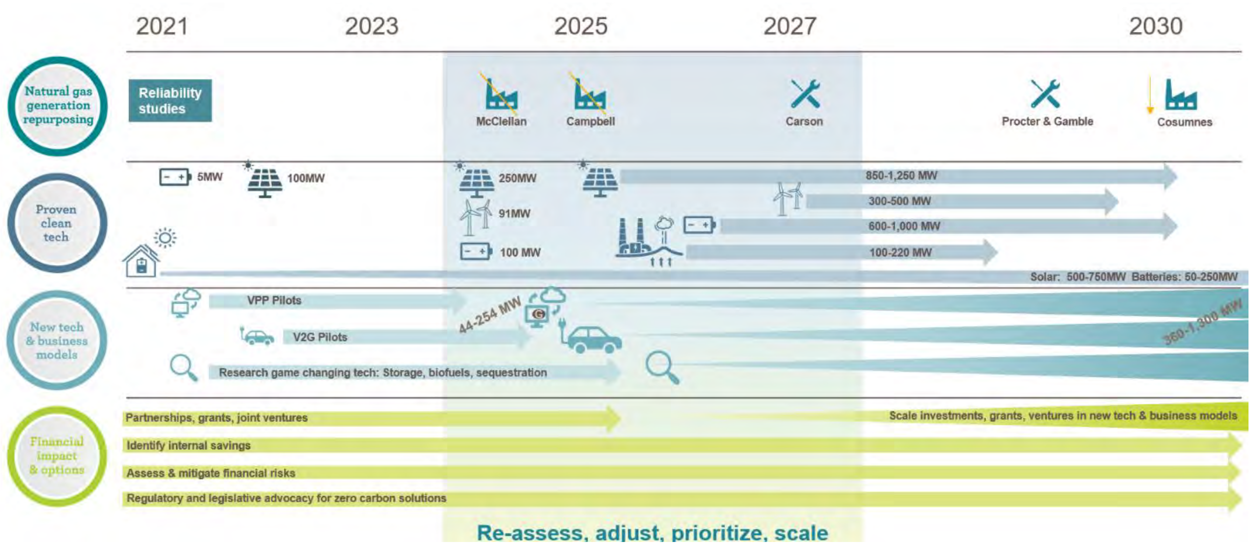
2030 zero carbon action plan

Our initial analysis indicates SMUD can reach zero carbon by 2030, while recognizing that there are a number of unknowns and risks and we'll adjust our Plan as technology, customer adoption and other factors change. While the specifics of our long-term activities to support decarbonization will be adjusted based on what we learn through the early implementation of our Plan and the results of our research and pilot programs, we have a number of priorities for the first year of the Plan as summarized in the table below.

Year 1 Zero Carbon Plan implementation priorities
Implement plan for the Natural Gas Generator Repurposing Strategy, including • Perform detailed studies of reliability, economics and environmental impacts of retiring McClellan and Campbell. • Research new utility-scale technologies, fuels and options.
Implement plan for the Proven Clean Technology Strategy, including: • Conduct locational analysis, system impact study and economic valuation and solicit counterparty offers. • Study strategic new technology options complementing the Natural Gas Generator Repurposing Strategy. • Explore delivery options for out-of-area renewables. • Develop and issue competitive solicitation for new proven clean technology projects.
Implement plan for New Technology and Business Models Strategy, including: • Perform information technology system upgrades to enable DERs and VPPs. • Include DERs in operations, distribution and grid planning processes. • Launch new customer-partner pilot programs for VPP Involving thermostats, EVs, rooftop solar and batteries. • Launch pilots for behavioral demand response “Flex Alert”, EV managed charging and vehicle-to-grid demonstrations.
Evaluate the 2030 Zero Carbon Plan for NERC reliability standards, system adequacy requirements, operational reliability requirements, and new reliability services contributions.
Assess system adequacy and reliability impacts, including: • Evaluate operational reliability requirements to manage the variability of solar and wind generation. • Evaluate grid reliability services contribution from virtual power plants, distributed energy resources, demand response and load flexibility. • Perform detailed studies of sub-transmission system impacts from the re-tooling of the Carson plant.
Set internal goals for operational efficiencies needed to manage risks to rate impacts.
Organize grant capture team to proactively seek opportunities for funding partnerships and research with manufacturers, vendors, government agencies, utilities and research institutions.
Engage government, agencies and policy makers • Brief policymakers on the 2030 Zero Carbon Plan. • Advocate for and support electrification policies. • Support cities’ and county General Plans and Climate Action Plans. • Connect with federal agencies and policy makers on climate action and our 2030 Zero Carbon Plan.
Identify new workforce skills needed to support zero carbon technologies.

Year 1 Zero Carbon Plan implementation priorities
Develop and implement a comprehensive regional communications, marketing, outreach and educational effort.

High-level summary of the key elements and actions in our 2030 Zero Carbon Plan.



Introduction

In July 2020, Sacramento Municipal Utility District's (SMUD's) Board of Directors adopted a climate emergency declaration, prompting SMUD to develop a bold and ambitious plan for reaching zero carbon by 2030 while ensuring we continue to provide safe, reliable, affordable and inclusive power to our customers and community. This 2030 Zero Carbon Plan is a flexible road map to eliminate greenhouse gas emissions (GHG) from our power supply by 2030. It was developed following completion of several technical studies.

We have identified investments in local solar and large-scale batteries as well as a plan to repurpose and retire our natural gas power plants. We can achieve our goals most effectively through customer partnerships that embrace more distributed energy resources (DERs). Our studies found that new technologies and renewable fuels are needed to achieve our goals most cost-effectively.

This Plan was developed in collaboration with our stakeholders through several events and public meetings between December 2020 and March 2021. As we implement this flexible plan, we'll continue seeking inputs and ideas from our customers, community and other stakeholders.

This report is organized as follows:

- **SMUD's carbon reduction journey** is a retrospective look at the work SMUD has done so far to reduce our carbon footprint.
- **Building resilient customers and communities** is a snapshot of the work SMUD has undertaken to support under-resourced communities and low-income customers.
- **A history of planning for the future** is a brief summary of our previous long-term plan and aspects we're building upon in this 2030 Zero Carbon Plan.
- The **Energy system overview** provides a snapshot of our current energy delivery system, which is the foundation that we'll build our 2030 strategies upon.
- Then, we focus on the development of our 2030 Zero Carbon Plan. This includes an overview of our **2030 Zero Carbon Plan**, our **public consultation process** and describes the **plan structure**.
- Our plan is divided into four strategies – **natural gas generation repurposing**, **proven clean technologies**, **new technology and business models** and **finance** – that make up our flexible road map to eliminate GHGs from our power supply by 2030.
- Implementation of our plan will require close coordination with local, state and federal regulations. Our **government affairs** strategy provides a plan to ensure we're closely coordinated with many governing partners.
- Our report concludes with our **Action plan and risk mitigation strategy**.

About SMUD

SMUD is a community-owned, not-for-profit utility that generates, transmits and distributes electricity. SMUD began serving Sacramento in 1946 and is now the nation's 6th-largest community-owned electric utility, serving a population of over 1.5 million people and providing services to about 640,000 residential and commercial customers. Our service territory is nearly

900-square-miles and includes California's capital city, most of Sacramento County and small slices of Placer and Yolo counties.

Our vision is to deliver clean energy with zero carbon emissions while maintaining our commitment to reliable service, sustainable communities and affordable rates.

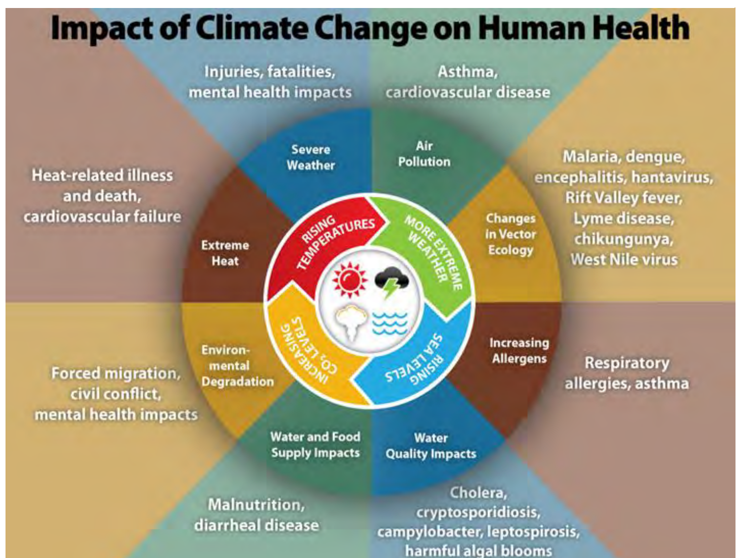
As a community-owned utility, SMUD is governed by a 7-member Board of Directors elected by voters to serve 4-year terms. Our Board of Directors determines policy direction and appoints our Chief Executive Officer & General Manager, who is responsible for SMUD's day-to-day operations.

Climate change

Temperatures around the world are rising and 2020 tied with 2016 as the hottest years on record. [1] Climate science has shown that fossil fuel combustion and land use changes disrupting carbon sinks[2] have greatly increased atmospheric concentrations of GHGs, resulting in climate change and a wide range of cascading impacts to ecosystems and economies around the world. The changing climate is already impacting SMUD's operations, employees, customers, communities and plans for the future.

Locally, the impacts of climate change include extreme heat, droughts, wildfires, flooding, species loss, rising sea levels and human displacement. Research suggests that the number of extreme heat days (days when the highs exceed 95°F) in the Sacramento Valley will increase and, by the end of the century, could include four months each year.[3] Rising temperatures are anticipated to impact the productivity of nearly 20% of our region's workforce that work in high climate risk industries, such as manufacturing, construction and agriculture. These industries may experience labor productivity decreases between 1% and 2.2% by the late century. [4]

Figure 1. Impact of climate change on human health



Source: Federal Centers for Disease Control & Prevention

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[1] https://www.noaa.gov/news/2020-was-earth-s-2nd-hottest-year-just-behind-2016#:~:text=It's%20official%3A%202020%20ranks%20as,an%20analysis%20by%20NOAA%20scientists.

[2] Carbon sinks that occur in nature include plants, soil and the ocean, which naturally absorb atmospheric carbon.

[3] Risky Business Project. *From Boom to Bust? Climate Risk in the Golden State.* April 2015. Available online: https://riskybusiness.org/site/assets/uploads/2015/09/California-Report-WEB-3-30-15.pdf. Last access: 05 Jan. 2021.

[4] ibid

In the past, correlation in historical weather patterns, such as average temperatures or snowpack, could be used as reasonable predictors of customer electricity load and generation from SMUD's Upper American River Project (UARP) hydroelectric system. However, we're in a period of uncertainty where historical data is no longer a reliable indicator of the future. Prolonged droughts and lower-than-average snowpack results in less water available to generate hydroelectric power, which is one of the cleanest and most economical power sources we have. These challenges also present opportunities to accelerate our pursuit of sustainable, resilient and cost-effective solutions. SMUD is committed to evolving our operations and business practices to keep pace with these changes.

Climate emergency

In recognition of the severity of the global climate emergency, in July 2020, SMUD's Board of Directors adopted a Climate Emergency Declaration requiring SMUD to work toward our most ambitious carbon reduction goal — carbon neutrality in our electric power supply by 2030. Through the declaration, the Board acknowledged a climate emergency within its jurisdiction and signaled that:

- The planning process will be open, transparent and will be explored in a public process with the Board.
- SMUD will collaborate with local cities, counties, agencies, businesses and other organizations.
- SMUD affirms its commitment to environmental justice principles and leadership through our Sustainable Communities Initiative.
- SMUD has made a strong commitment to find additional opportunities to accelerate decarbonization.
- By March 31, 2021, the CEO & General Manager will report on clear, actionable and measurable strategies and plans to reach SMUD's climate emergency goals.

Our accelerated carbon reduction journey builds on previous efforts and our latest resource plan: the 2040 Clean Energy Plan, which was accepted by the California Energy Commission (CEC) in 2019. Rapidly advancing clean energy technology and a collaborative and inclusive approach to carbon reduction has allowed SMUD to set the even more ambitious goal of zero carbon by 2030, with this 2030 Zero Carbon Plan being our strategy to achieve that goal.

To achieve our 2030 zero carbon goal, we must address our reliability needs, for which new and emerging technologies such as energy storage, flexible load, carbon capture and storage and renewable gas technologies will be needed. We'll also need to increase investment in new clean energy supplies, new and emerging technology and pursue new business models and partnerships.

Global efforts to decarbonize energy supply

This Plan lays out an aggressive, flexible and inclusive clean energy pathway, with a goal of zero carbon that SMUD cannot and should not achieve alone. By working with other pioneering utilities, governments, businesses, agencies, community leaders and organizations, academia, start-ups and others, we will align resources to maximize carbon emission reductions with broad and long-lasting impact. Our 2030 Zero Carbon Plan is part of a growing body of work that's necessary to combat this climate change emergency. As part of our climate emergency, our Board set a goal of achieving carbon neutrality by 2030.

Other, smaller utilities, such as City Light (Seattle) and the San Francisco Public Utilities Commission's Hetch Hetchy Power System (City and County of San Francisco) have already achieved carbon neutral operations. Both utilities have resource portfolios built around access to large swaths of hydroelectric power. At City Light, over 80% of delivered power is generated from hydroelectricity and Hetch Hetchy, 100% is from hydroelectricity.[5,6] Hetch Hetchy does have a small amount of non-hydro renewable generation, representing about 2% of the system (11 megawatt (MW) of solar, wind, and biogas). But, for utilities without access to significant hydro resources, like SMUD, achieving carbon neutrality will not be as straightforward. As shown in Table 1, SMUD's carbon reduction goals are among the most ambitious globally. More details are available in Appendix D: Global energy decarbonization efforts.

Table 1. Global carbon neutrality and net zero goals

Location	Target Year	GHG Reduction Goal
SMUD	2030	Carbon neutrality
Sacramento County	2030	Carbon neutrality
Puget Sound Energy	2030	Net zero GHG (carbon neutrality by 2045)
Lincoln Electric (Nebraska)	2040	Net zero GHG
Portland General Electric	2040	Net zero GHG
California	2045	Carbon neutrality
LADWP	2045	100% renewable electricity
Sweden	2045	Net zero GHG
Arizona Public Service Electric	2050	100% carbon free electricity
Madison Gas & Electric	2050	Net zero GHG
Ameren	2050	Net zero GHG
PSE&G	2050	Net zero GHG
Dominion	2050	Net zero GHG
Southern Company	2050	Net zero GHG
Orlando Utility Commission	2050	Net zero GHG, proposes carbon offsets for EVs
Alliant (Wisconsin)	2050	Net zero GHG, allows carbon offsets
Entergy	2050	Net zero GHG, allows carbon offsets
Duke Energy	2050	Net zero GHG, allows carbon offsets
DTE	2050	Net zero GHG, allows carbon offsets
Consumers Energy	2050	Net zero GHG, allows carbon offsets

[5] https://www.seattle.gov/city-light/energy-and-environment#:~:text=Over%2080%25%20of%20the%20power,Skagit%20and%20Pend%20Oreille%20Rivers.&text=*City%20Light%20does%20not%20have,in%20its%20power%20supply%20portfolio. Last Accessed: 24 March 2021
[6] https://sfwater.org/modules/showdocument.aspx?documentid=16653. Last Accessed: 24 March 2021

Engaging with our under-resourced communities

Climate change is a critical public health issue which disproportionately impacts our under-resourced communities. The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity, now and into the future. It includes 17 sustainable development goals, which are an urgent call for action by all countries in a global partnership. They recognize that ending poverty and other deprivations go hand-in-hand with strategies that improve health and education, reduce inequality and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.[7] Similarly, the United Nations Declaration on the Rights of Indigenous Peoples recognizes that indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment. These global agreements have relevance to SMUD, our operations, our employees and our customers.

Closer to home, our under-resourced communities lack equitable access to many essential community components that we attribute with a high quality of life, including living wages and training opportunities, affordable housing, access to transportation and connectivity, health care access, nutrition, education opportunities, computer and internet access and a healthy environment. Our neighbors in these communities feel the physical impacts of climate change more acutely than wealthier communities while bearing little responsibility for the crisis, and history has shown that these communities often suffer unintended consequences when new social policies or strategies are introduced.

Involvement of all our communities is foundational to this plan and we recognize that, too often under-resourced communities are excluded from the process and conversation when goals and implementation plans are developed. SMUD recognizes the importance of partnering with all the communities we serve. We commit to reaching impacted communities as we work toward our goal of zero carbon.

If designed well and with citizens and communities in mind, climate action can avoid green gentrification and displacement and can help address some of the pre-existing social and economic inequalities in our region. Additionally, collaborative reexamination of indigenous practices that support healthy ecosystems can also help us build a more resilient region. The strategy for one city, one neighborhood, or even a single facility will not be a one-size fits all solution. We're committed to engaging all our community members so they may participate in building a plan that supports their community's vision for the future and may fully understand potential impacts of the plan.

[7] For a full list of the UN's sustainable development goals, see Appendix B.

SMUD's carbon reduction journey

For several decades, SMUD has been recognized nationally and internationally for our environmentally conscious and innovative renewable power and energy efficiency programs. Our commitment to zero emission and low GHG resources dates back decades, and in fact, began with the development of the UARP hydroelectric project in 1957. We continued clean energy leadership as we developed one of the first utility-scale solar photovoltaic power plants in 1984; our first solar-powered electric vehicle (EV) charging station in 1992 and our first community targeting net-zero energy in midtown Sacramento.[8]

SMUD strives to provide our customers with a sustainable power supply, which is defined as one that reduces SMUD's GHG emissions while assuring reliability of the system, minimizing environmental impacts on land, habitat, water quality, air quality and maintaining affordable rates relative to other California utilities. Our Board sets policy direction to for our sustainable power supply through Strategic Direction – 9 Resource Planning. The full text of SD-9 can be viewed here.

In the 1990s, we were already buying renewable energy from wind, geothermal and biomass sources. By 1997, we were offering our first voluntary green pricing program, Greenergy®, to our customers. And in 2001, we established our first renewables portfolio standard (RPS), with a combined energy supply goal for our RPS and Greenergy program of 12% by 2006 and 23% by 2011.[9] By 2008, we established a separate RPS goal of procuring 20% of our retail electricity sales from renewables by 2010. SMUD was the first large community-owned utility in California to achieve a 20% RPS goal, and has continued to grow our portfolio of non-emitting resources over the past decade, reaching 33% in 2020.

Our commitment to addressing climate change was brought to the forefront in 2003 when, as a precursor to setting GHG reduction targets, SMUD became the first utility to certify our emissions inventory (2002) under the newly formed California Climate Action Registry.[10] Soon after, we were one of the first utilities to support the passage of Assembly Bill 32, California's landmark climate change legislation. In 2008, we committed to reducing our emissions by 90% below our 1990 levels by 2050, exceeding the state target of 80% below 1990 levels by 2050. And in 2009, we received the first Climate Change Leadership Award from the Association of Climate Change Officers. We've continued to exceed our goals and expect to be nearly 15% below our 2020 GHG emissions goal.[11]

Historically, energy efficiency programs have significantly contributed to SMUD's carbon reduction efforts. Helping our customers use less electricity has effectively offset increasing demand, managed peak energy use and helped customers save on their utility bills. With growth

[8] For more information on our net-zero energy community in Midtown Sacramento, see https://www.youtube.com/watch?app=desktop&v=fW2YtZ1eDl8. Last Accessed: 24 March 2021.
[9] https://www.smud.org/-/media/Documents/Going-Green/PDFs/SMUD-RPS-Guidebook---FINAL-1.ashx. Last accessed: 14 December 2020.
[10] http://www.caclimateregistry.org/wp-content/plugins/carrot/carrot_reports/sacramento-municipal-utility-district-2002-ca.pdf last accessed 16 December 2020.
[11] Emissions values take some time to finalize. 2020 emissions values won't be finalized until Summer 2021.

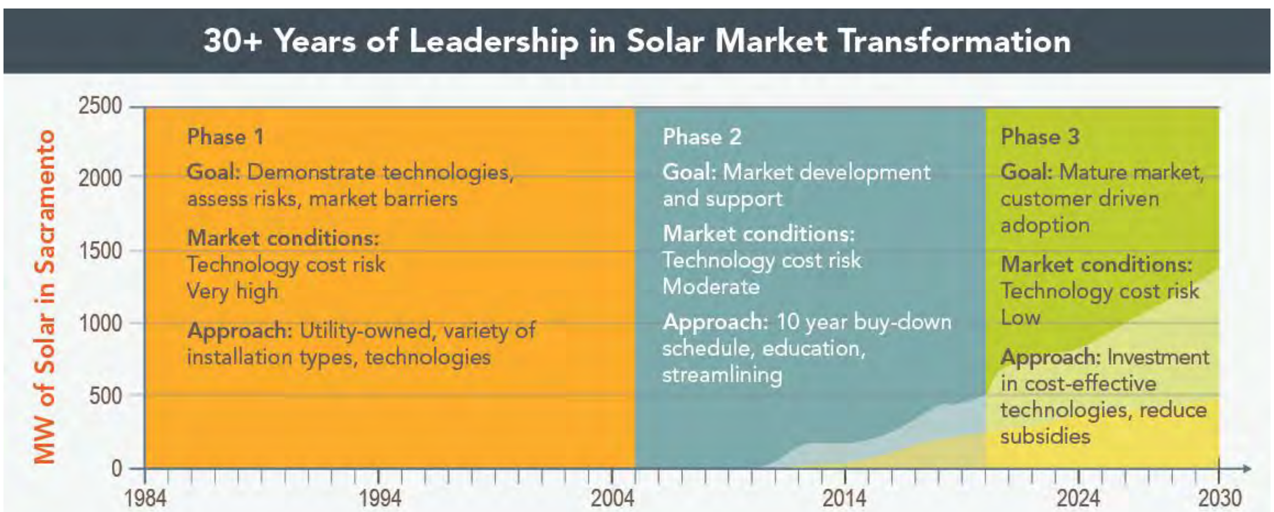
in renewable energy supplies and the imperative to reduce carbon emissions, our approach to energy efficiency has expanded and now integrates building electrification into our programs to help customers take advantage of clean, renewable electricity supplies. We've also developed innovative program offerings, allowing our customers a choice to voluntarily buy additional renewable energy.

By 2012, we reduced our normalized emissions by 30% below 1990 levels and by 2019, our normalized emissions were 45% below 1990 levels.[12] Accepted by the CEC in 2019, our 2040 Clean Energy Plan outlines a path to net-zero emissions by 2040. Read our 2018 Sustainability Report for more detailed information about our commitment to clean energy.

Pioneer in solar energy and market transformation

For over 30 years, SMUD has been promoted and encouraged the adoption of solar technologies, helping commercialize this important carbon-free resource. In the early 1980s we saw that solar photovoltaic systems (PV) – although very expensive at the time – had great potential for the future. With this understanding, we set out to overcome roadblocks to developing solar energy through a robust long-term market transformation strategy.

Figure 2. Leadership in the solar market transformation



By implementing these strategies, SMUD created a body of knowledge and experience that supported market development and growth, lowered costs and helped the solar market transition to the mature, profitable, large-scale global industry we have today.

[12] To assess our progress in achieving our GHG reduction targets, we "normalize" our emissions to ensure that beneficial weather or hydroelectric conditions do not understate or overstate our carbon reduction achievements. In 2019, these normalizations increased our reported normalized emissions by nearly 10%.

Bringing solar to our communities

In the early 1990s, SMUD was one of the first utilities to develop a rooftop solar program, installing hundreds of utility-owned solar systems on the roofs of customers' homes and businesses. Installations helped SMUD evaluate the technology and paved the way for a transition to a customer-owned program in the late 1990s. At this stage, SMUD made large purchases of modules and inverters, designed as solar system kits, and offered them at a discounted price to customers. We trained installers, which helped establish regional solar contractors who helped to scale the technology, giving a much-needed boost to the solar industry.

As part of our Solar Advantage Home program, launched in 2001, and our later SolarSmart Homes® program, we worked with local home builders to promote installation of solar coupled with efficient new homes exceeding building code requirements. By doing so, the program demonstrated how rooftop solar systems can be integrated into new home design and construction. Over the course of the program, 4,000 new SolarSmart Homes were built.

By 2007, we launched our part of California's Million Solar Roofs initiative. Through this ambitious program, we committed $125 million in incentives for the installation of solar at homes and businesses. The program was a success, reaching its goal of 130 MW, with solar on more than 15,000 homes and businesses in Sacramento, helping the market transition to a mature solar industry.

We've learned a lot from our 40-year experience with solar. Through the 1980s and 1990s, we found ways to reduce costs and improve performance. Our first utility-scale solar development was our Rancho Seco PV 1 plant in 1984, one of the first utility-scale PV plants in the world, which established Sacramento as an early leader in solar. By 2009, SMUD signed feed-in tariffs (FIT) with projects totaling 100 MW, powering on average over 20,000 homes per year. Earlier this year, we welcomed our newest solar project at Rancho Seco, a 160 MW solar PV project capable of powering over 36,000 homes per year.

Incorporating wind technology

Wind turbines are now one of the most economical energy generating technologies, and in most cases, are lower cost than fossil-fuel generators.[13] We also have access to a great wind resource region at our doorstep in Solano County. Our Solano Wind Farms produce enough electricity to power more than 63,000 homes per year.[14] We plan to expand these projects by replacing some older, less efficient turbines with larger and more efficient units. This expansion will reduce the footprint of our wind projects while increasing net output by over 70 MW, enough

[13] https://www.lazard.com/media/451419/lazards-levelized-cost-of-energy-version-140.pdf
[14] Based on 750 kWh/month average household electricity use.

to power more than 21,000 homes per year. In 2019, we began purchasing energy under contract for 200 MW of wind energy from a wind-rich region in New Mexico.

Hydroelectric power

We own and operate a hydro project in the Upper American River called the UARP. The UARP contains multiple powerhouses along the same waterway, which means the same "fuel" is used over-and-over as water flows downstream from one powerhouse to the next. Operating and maintaining our hydro facilities requires a license from the Federal Energy Regulatory Commission (FERC), which issued SMUD a new 50-year license in July 2014. [15]

An additional 6% of our power generation is provided by hydro power purchase contracts, allowing us to meet an average of about 20% of our total power needs with carbon-free hydro generation. Today, including our hydroelectric resources and other carbon free resources, our energy mix is on average 50% carbon free.

Investments in other renewables

Although solar, hydro and wind comprise the largest share of our zero GHG emission portfolio, our procurement of biomass and geothermal power adds diversified value to our portfolio. These resources generally provide constant generation over time. Some of these resources may also be able to respond to fluctuations in load and provide other reliability services.

Biomass resources

Biomass is a local renewable resource and abundant in nature. Biomass resources include residues from forestry (like dead and dying trees, vegetation materials from the UARP), urban wood wastes, food waste, agricultural residues, dairy wastes and other organic wastes. These biomass resources can be converted to bioenergy via thermochemical and biochemical processes for power, heating, cooling, fuels, chemicals, renewable natural gas (RNG), biogas, hydrogen and other value-added products with zero net and negative carbon emissions.

Occurring abundantly in nature, biomass can be a problematic waste if unmanaged and should be disposed of in a sustainable and environmentally safe manner. Ideally, some biomass can and should be composted for soil amendments. However, compost demand cannot address the full amount of the waste problem. Another solution is converting the left-over waste to renewable biomass energy.

Although bioenergy (biomass-derived energy) generally requires combustion technologies, the alternative dispositions of biomass are usually more harmful to the environment or public safety than the impacts of energy production. Bioenergy can also be a critical strategy to reduce potent climate pollutants, such as short-lived climate pollutants (SLCPs). According to the California Air Resources Board (CARB), increasing bioenergy – especially biogas production and use – is

[15] FERC's new license order for the UARP can be found here: https://www.smud.org/-/media/Documents/In-Our-Community/Recreational-Areas/UARP/Hydro-License-Compliance/License-and-Amendments/FERC-Project-No-2101-Order-Issuing-New-License-07-23-2014.ashx. Last accessed: 11 December 2020.

critical to reduce SLCPs, which can be tens to thousands of times more damaging to the climate than carbon dioxide.[16]

The decomposition of biomass at landfills, wastewater treatment plants and dairies create methane (essentially natural gas) and other pollutants that can be greatly mitigated through collection of the gases. Biomass collected through forest thinning and wildfire mitigation projects are beneficial because they provide revenue for thinning projects and avoid pile burning or catastrophic wildfires.[17]

SMUD has a long history of purchasing biomass energy, including from large generators in Washington state and small local dairies. Currently, we procure energy from Sacramento's Kiefer Landfill as well as landfills in Yolo county and biogas from Sacramento's Regional Sanitation District.[18] We have also supported the development of five digesters at local dairies.

Geothermal

Geothermal energy takes advantage of temperature differences within the earth's crust, such as areas hot enough to produce steam from water. This steam can be used in steam turbines – one of the oldest methods for powering machines. This resource is valuable because geothermal energy is a constant power source, unlike intermittent wind and solar energy.

There are ideal locations for geothermal development throughout California, including the Imperial Valley and Sonoma County as well as sources in Nevada that are accessible via our existing transmission line. We have been buying geothermal energy since the early 1980s and currently receive 52 MW annually through contracts in California and Nevada. That's enough to power more than 38,000 homes per year.[19]

Giving our community tools to confront climate change

Undisputedly, California is a national leader in addressing climate change, and SMUD's goals are even more ambitious than those set forth by the state. Our commitment to improving the quality of life for our customers and community is evident through our progressive policies and outcome-driven actions. We've demonstrated success in providing low carbon energy solutions to our customers and implementing robust, community-focused programs aimed at conserving energy and accelerating the transition away from a fossil-fuel based economy toward an economy that supports sustainable resources and sustainable communities.

Community partnerships and programs

We have a robust portfolio of customer programs that reduce GHGs by using or producing energy more effectively through energy efficiency, electrification, renewables, energy storage and EVs. Programs like Greenergy, SolarShares®, Shade Trees and a variety of incentives

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[16] CARB. *Short-Lived Climate Pollutant Reduction Strategy.* March 2017. Available Online: https://ww2.arb.ca.gov/sites/default/files/2018-12/final_slcp_report%20Final%202017.pdf. Last accessed: 4 March 2021.
[17] https://www.placer.ca.gov/1810/Biomass. Last accessed 3 March 2021.
[18] https://www.regionalsan.com/biogas-recycling. Last accessed 23 February 2021.
[19] Based on 750 kWh/month average household electricity use.

support sustainable growth within our region by offering customers a choice of energy solutions that fit their unique needs.

Our workforce outreach programs help our community learn about and prepare for careers at SMUD. Programs include Career Ambassadors, paid high school and college internships and college scholarships. With an increased emphasis on zero carbon technologies, it's even more important that the workforce of the future is prepared for these new careers.

Finally, influencing the private sector to develop clean energy goals involves educating them about the impacts of climate change and highlighting opportunities to partner with SMUD in order to reach their goals. Through our Sustainable Communities program, we're facilitating collaborations by leveraging our entire partnership portfolio. Collective action is key to our success as climate change cannot be solved by any one stakeholder acting alone. Cross-sector collaboration is essential to holistically address systemic challenges, and partnerships are vital to incentivize businesses to take action to address this climate emergency.

Energy efficiency and electrification

SMUD has been offering programs to help our customers save energy for more than 50 years, delivering significant carbon reduction and billions of dollars of savings to SMUD and our customers. In the 1990's, we launched an initiative to fund and promote energy efficiency savings equivalent to the amount that could be produced by a 500 MW power plant annually, and we were recognized nationally for our energy efficiency leadership. In 2006, we adopted a goal of getting 1.5% of our annual retail sales forecast from energy efficiency programs and exceeded the resulting annual targets each year from 2009 through 2020. Recent efforts have helped our customers become more energy efficient. These programs include:

- **Express Energy Solutions:** Provides incentives to qualified contractors for high-efficiency equipment across a variety of end-uses: lighting; heating, ventilation, and air conditioning (HVAC); refrigeration and food-service equipment as well as supporting the conversion from gas to electric equipment.
- **Complete Energy Solutions:** Comprehensive energy audits of small- and medium-sized businesses with a customized report recommending energy improvements, estimated savings, estimated cost and payback. Then an administrator assists the customer in hiring a contractor to complete the project. The program also supports the conversion from gas to electric equipment.
- **Savings by Design:** Provides incentives to avoid natural gas consumption through electrification, along with incentives for classic energy efficiency measures. The program incentivizes efficient construction via two participation methods: A performance approach tailored to the customer's unique building or a simple prescriptive approach.
- **Residential new construction of all-electric homes:** Provides incentives to builders and their design teams for residential developments of all-electric homes and neighborhoods.
- **Advanced Home Solutions:** Encourages homeowners to improve their home's performance through insulation, sealing and conversion to all-electric, efficient equipment. Implemented as a contractor-driven program, customers are eligible to received incentives for HVAC, water heating and insulation improvements.
- **Appliance efficiency:** Our retail partnership program works with big box retailers to pay retailer incentives for all the energy efficiency items they sell in their stores.

- **Refrigerator/freezer recycling:** This program provides free pick-up and environmental recycling of old refrigerators and freezers.

In 2020, SMUD was the first utility in the country to adopt a carbon-metric for measuring in the impact of our efficiency programs, allowing us to define our success by the GHGs these programs reduce and embracing the use of energy during low GHG emission times. Our focus on electrification means we'll nearly triple the carbon savings impact of our energy efficiency programs by 2030, relative to an electricity efficiency-only framework.

Greenergy

Recognizing many of our customers wanted to power their homes with green energy, SMUD launched Greenergy in 1997. This first-of-its-kind program gave our residential customers the option of buying renewable energy to serve their home energy needs, up to 100% of their use, by adding a flat fee to their standard electricity bill. As one of the most successful utility green pricing programs, 13% of our customers participated in 2020.

SolarShares – a new model to expand access to solar energy

As we worked to develop a robust rooftop solar energy market in Sacramento, we recognized that some customers could not install solar on their homes, due to cost, home ownership, orientation of their home, tree shading or other factors. We also recognized that despite its high price, utility-scale solar was still far less expensive than rooftop solar. That's why in 2007, SMUD launched SolarShares. Initially, our SolarShares program was served by a 1 MW PV project located in Sacramento. Within 6 months, the program was fully subscribed, resulting in a waiting list for those customers who were interested in future opportunities to subscribe. In 2016, SMUD expanded SolarShares to commercial customers who were looking for new options to meet their sustainability goals. In 2019, our original residential SolarShares program closed to new participants.

Following our SolarShares program, in 2019, SMUD created a new community solar program that provides new home builders with an alternative option to meet California's mandate that new homes include solar. This program, Neighborhood SolarShares®, was approved by the CEC in 2020 as an alternative to rooftop solar systems in areas with dense trees or limited rooftop space.

Sacramento Shade Tree program

Beyond electricity, we've invested in carbon sequestration through our 30-year partnership with the Sacramento Tree Foundation. Not only do trees cool homes naturally and beautify our neighborhoods, they also produce oxygen and store carbon. Since 1990, the program has resulted in planting more than 600,000 trees, helping Sacramento maintain one of the leading urban tree canopies in the world. Our Sacramento Shade Tree program has evolved to address climate change and the need for sustainable urban and community forests by expanding both the number and types of trees offered, including evergreen trees. Additionally, the program supports environmental equity by planting and stewarding trees in under-resourced communities.

Electric transportation incentive programs

SMUD has long been committed to the advancement of electric transportation and we currently offer incentives, expert advice and assistance to customers to help them transition to electric transportation. Our residential programs have been expanded to include online EV purchasing tools for our customers looking to purchase an EV. Customers also continue to receive an EV rate discount, which incentivizes them to charge their vehicles during off peak hours. Through the California Clean Fuel rewards program, we support customers in receiving up to $1,500 for the purchase or lease of a new Battery Electric or Plug-in-Hybrid vehicle.[20] Our commercial EV program offers workplace and multi-family customers incentives for EVs and charging equipment. Additionally, we are partnering with the CEC to offer incentives for the purchase and installation of fast charger infrastructure.

Customer engagement programs

We engage with our customers and community to inform them about our programs, rebates and incentives and other initiatives such as our 2030 Clean Energy Vision and 2030 Zero Carbon Plan, while encouraging their involvement and partnership. Our educational and awareness communications are critical to informing and including our customers in new programs and initiatives.

SMUD's Community Education and Technology Center provides energy efficiency and sustainability education, along with new energy technology evaluation, to areas students and our residential and commercial customers. Through workshops, events, videos and other channels, SMUD supports our commercial, residential and kindergarten through university students with the knowledge and ability to better control their energy expenses, be more sustainable in their energy consumption and get more value out of their energy use.

- **Residential and Commercial education**: We offer a range of seminars, webinars and other courses to educate commercial and residential customers on a variety of topics including EVs, energy efficiency, lighting, induction cooking, building standards and more.[21,22]
- **Outreach and awareness**: Annually, SMUD supports hundreds of low-income outreach and awareness presentations and education events with community partners. These events provide information about our low-income programs like our Energy Assistance Program Rate, our Medical Equipment Discount (MED) Rate and energy efficiency and electrification education.
- **Kindergarten through university education**: SMUD uses a variety tools to help train the next generation of energy leaders about sustainability and the environment. On a

[20] For more information on the Clean Fuel Rewards program, see: https://cleanfuelreward.com/
[21] Businesses can find our commercial education videos, interactive online courses and webinars on SMUD.org/Workshops.
[22] Available on SMUD.org/Learn

yearly basis, the Community Education and Technology Center offers regional science, technology, engineering and math competitions. [23]

Research and development pilots

A robust approach to research and development enables us to deliver innovative products, programs and services that provide solutions our customers care about. This allows us to test innovation in a controlled setting or with a modest number of customers, making refinements along the way as we expand the opportunity for the larger customer base. These efforts ensure that SMUD takes a measured approach at investigating viable alternatives to today's technology and business solutions in a low-risk setting. This is a core component preparing our organization for deeper decarbonization.

Our climate journey has benefited from the innovative solutions, products and services resulting from our investments in research and development projects. These projects integrate emerging technologies and new business models into our customer offerings in a way that benefits our customers and community. SMUD's research and development vision is rooted in achieving excellence and leadership in four foundational pillars.

Excellence in technology and services: Cultivate emerging technologies, advanced applications and innovative services to achieve operational excellence in delivery of products and services for our customers.

Safe and reliable grid integration: Enable safe and reliable integration, operation and visibility of DERs, grid-scale storage and large-scale renewables into the electric grid, and prepare for the migration to a distributed and transactive grid.

Leadership in sustainability: Further SMUD's environmental and sustainability leadership role in the energy industry by informing SMUD's strategy to reduce regional GHG emissions, advance sustainability technology and direct climate readiness planning.

Strength in economics and markets: Prepare for the delivery of customer products and services, enable customer participation in new energy business models and identify new approaches to SMUD's participation in energy markets to maintain financial strength.

Our research and development strategies focus our activities in areas that show the most promise for improving the delivery of our core business. This ensures our research strategies address existing goals defined by SMUD's Board of Directors as while keeping an eye on the horizon for energy industry uncertainties and technology advancements that could change the existing energy delivery paradigm. Maintaining strong research and advancement strategies that better meet customer needs has given SMUD a position of industry influence in progressive policy, advanced standards development, emerging business models and market transformation.

[23] More information can be found at SMUD.org/Education.

SMUD's commitment to research has demonstrated progress in areas once considered cutting edge that are now standard operations. We've strategically leveraged research to advance change in high-impact areas while simultaneously mitigating financial, operational and customer experience risks. For example, SMUD's Time-of-Day (TOD) rates were born out of the nation's most comprehensive time-of-use experimental research study exploring the impacts of default and opt-in time-based rates on customer engagement, peak load and customer bills.

SMUD is rethinking the systems and resources that we rely on for everything, from things like new sources of generation, building construction and how electricity-consuming devices in a building operate. We're looking at emerging technologies, alternative fuel sources and the evolution of grid operation and resource planning in a new way, creating opportunities for customers to be a partner in the grid of the future. Through our research and development, we strive to improve the efficiency of the grid and empower our customers to be active participants in an innovative, modern electric grid.

Our research and development group is home to seven technology innovation programs. The programs are highly interdependent and therefore most research efforts touch multiple programs. See our 2020 Innovation report to take a deeper look at recent projects. [24]

[24] SMUD's 2020 Innovation report can be found at https://www.smud.org/-/media/Documents/Corporate/About-Us/Energy-Research-and-Development/Innovations/Innovation-Brochure.ashx.

Building resilient customers and communities

Our customers and community are at the heart of all we do and we're recognized in our industry and by the customers as a leader in community involvement. As one of the region's largest and most influential employers, our goal is to enhance the quality of life for all our customers and improve vitality in all the communities we serve. Social, economic and environmental inequities exist in the in our region, impacting customers across our service territory. As a state, California ranks number one in power outages and rural and under-resourced communities are often at the margins of electrical grids.[25] Through strategic partnerships, focused investments, community engagement, diverse educational strategies and targeted programs that help our customers in greatest need, we'll ensure all our communities and customer households are partners with us in creating a clean energy future today, and for future generations to come.

Growing together, embracing a low-carbon future

"The nation is still in the early stages of urban environmentalism, a complex subject with intricate and important histories. The potential for unintended consequences for people, for place, and for policy is great. […] Citizens living in urban, poor, and people-of-color communities are currently threatened by gentrification, displacement and equity loss on a scale unprecedented since the Urban Renewal movement of the 1960s."[26] These communities are often the hardest hit in economic downturns and continue to be left behind in periods of economic boom. These same communities often suffer from significant environmental disparities including poor air quality and negative carbon emission impacts.

With federal policies and programs, municipalities, urban planners and developers are able to undertake "revitalization" projects. On the surface, these projects are beneficial, beautifying a sometimes-blighted area and improving the overall environmental conditions. But from the perspective of residents and small businesses, these efforts can be seen as non-inclusive and destroying what remains of the original community and neighborhood culture. In the absence of other policies (e.g., housing-based), rising property values that can accompany these "revitalization" projects can result in original residents being priced out of the market, displacing the very community the project was designed to help.[27] Often, this displacement is unintentional; the gentrification and displacement associated with federal reuse, redevelopment and revitalization programs may not be conscious or intentional, but local implementation of these programs often has that effect.[28]

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[25] League of California Cities. *Energy Resiliency and Independence for Rural Cities Webinar.* March 2020.
[26] National Environmental Justice Advisory Council. *Unintended Impacts of Redevelopment and Revitalization Efforts in Five Environmental Justice Communities.* August 2006. EPA. Available online: https://www.epa.gov/sites/production/files/2015-02/documents/redev-revital-recomm-9-27-06.pdf. Last accessed: 12 February 2021.
[27] Coppinger, Kaitlin, Douglass Lee, Sari Radin, and Catherine Taylor. *Economic Development and Highway Right-Sizing: White Paper.* November 2018. FHWA. Available Online: https://rosap.ntl.bts.gov/view/dot/38931.
[28] National Environmental Justice Advisory Council. *Unintended Impacts of Redevelopment and Revitalization Efforts in Five Environmental Justice Communities.* August 2006. EPA. Available online: https://www.epa.gov/sites/production/files/2015-02/documents/redev-revital-recomm-9-27-06.pdf. Last accessed: 12 February 2021.

A 2018 Brookings Institute Report − [Charting a Course to the Sacramento Region's Future Economic Prosperity](https://www.brookings.edu/wp-content/uploads/2018/04/sacramentoregioneconomicprosperity_fullreport.pdf) − found that between 2006 and 2016, the Sacramento metropolitan area ranked in the bottom-third of the 100 largest metro areas in composite rankings measuring improvements in growth, prosperity and inclusion, three critical elements of regional economies that work for everybody. These long-term trends reflect the downturn during the Great Recession and suggest it was deeper and more sustained in Sacramento than in other parts of the nation, particularly in our historically under-resourced areas.

In the five years after the Great Recession, we made some progress as a region; however, 34% of Sacramento's residents still live-in households that do not earn enough to cover their basic expenses. These struggling families are disproportionately made up of people without a high-school degree as well as 47% and 42% of our region's Black and Hispanic residents, respectively.[29] Moreover, households in under-resourced communities spend a significant share of their income on energy bills. Households that earn less than $50,000 annually, on average, for a family of four, spend around 16% of their income on energy costs. For families earning over $100,000, the energy-to-income share drops to 3.5%.[30]

SMUD is at the center of both the climate crisis and the search for solutions. We need to act quickly to protect and provide for all customers, especially those most impacted and least represented. SMUD is already leading the way. Our Sustainable Communities partnership and low-income customer strategies collectively meet the unique needs of our customers where they are by acknowledging the intersectionality between the need for a zero carbon future and the need for economic equity, with the goal of creating a high-quality of life for all of our customers. . We work collaboratively with community organizations to deliver concrete practices such as delivering electric car sharing programs to under-resourced communities and increase portions of zero or low carbon affordable housing.

Low-income programs, helping our neighbors

Simply stated, the objective of our low-income strategy is to help our customers most in need by providing them individualized solutions at the household-level that provide a feeling of control and a reduction to their energy burden. Our low-income strategy focuses on the distinct individual needs of our customer households by providing rate assistance and dwelling assistance programs for those customers in greatest need, as qualified based on income requirements (up to 200% of the Federal Poverty Level).

Although SMUD has been offering low-income weatherization for many years, our holistic low-income strategy launched in 2016, targeting households with high energy burdens to provide education and energy efficiency upgrades. These upgrades provide our customers greatest in need a feeling of control, reduces their energy burden and creates bill savings. We provided solar as part of an energy saver bundle in partnership Grid Alternatives where we targeted

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[29] Parilla, Joseph, Sifan Liu, and Marek Gootman. *Charting a Course to the Sacramento Region's Future Economic Prosperity.* April 2018. Brookings Institute. https://www.brookings.edu/wp-content/uploads/2018/04/sacramentoregioneconomicprosperity_fullreport.pdf. Last accessed: 3 February 2021.
[30] https://www.politico.com/news/agenda/2021/02/01/you-want-environmental-justice-look-to-energy-efficiency-463839.

households as described by Senate Bill 535.[31] Additionally, our energy assistance program rate was changed in 2018 to provide those greatest in need the appropriate discount and dwelling solutions to address energy burden disparities.

We also offer low-income energy retrofits. These are complete energy retrofits for qualifying low-income households through four offerings: Weatherization, Energy Saver Deep Retrofit, Energy Saver House Bundle and Energy Saver Apartment Bundle. Through these programs, we've provided education and energy efficiency improvements to more than 24,000 low-income households since 2016, resulting in a reduction in energy burden and savings on customer bills. Since 2019 as part of our retrofits, we've replaced over 800 natural gas appliances with efficient electric appliances, saving on customers' bills, saving carbon and reducing air pollution from natural gas combustion. This effort is ongoing and will ensure our vulnerable populations are not left behind as we work toward our overall carbon reduction goals.

Looking to the future, our approach is three pronged:

1. **Increase** program offerings that align with participants' lifestyles to address energy usage and provide them greater feeling of control over their energy usage.
2. **Improve** sustainability and integrity of the low-income program by helping those most in need
3. **Strengthen** the safety net for Sacramento's under-resourced populations through strategic partnerships to positively impact customers in a more holistic manner.

Between 2020 and 2022, we have extensive plans to continue and increase our investment our low-income communities.

- We're proactively providing carbon reduction measures (via electrification) to ensure low-income customers aren't the last ones to adopt electrification.
- We're leveraging community partners like Habitat for Humanity to expand our reach, working to bring electrification, rooftop solar and the opportunity for EV home charging to all our customer households.
- We're refining our analytic approaches to ensure we're recruiting those most in need, and those with the highest energy burdens to prevent anyone from falling through the cracks.
- We're linking our efforts with local healthcare providers, improving access to carbon reduction measures that may impact medical-related outcomes and using our MED Rate to provide discounts to those that have a qualifying medical device.

We're always looking for creative ways to partner with our communities. One example is our partnership with Sacramento Housing & Redevelopment Agency to provide energy efficient refrigerators in their affordable housing complexes. Mutual Housing is another great example where we provided capital funding for energy efficiency upgrades before the affordable housing upgrades were completed. When planning for the Mutual Housing partnership, we solicited their

[31] SB 535 requires the state to direct at least 25% of state cap-and-trade revenues to go to projects that benefit disadvantaged communities. It provides a very specific definition of disadvantaged communities as the top 25% scoring areas from CalEnviroScreen along with other areas with high amounts of pollution and low populations. For more information on this definition, see CalEPA's report on Designation of Disadvantaged Communities.

feedback on a list of properties that they wanted to upgrade. We developed load shapes for each of the buildings and identified those that were most likely to benefit from the upgrades. Based on this information, we prioritized and selected complexes that could be upgraded and deliver more of an impact, leveraging SMUD and Mutual Housing funds. This capital allowed Mutual Housing to identify matching funds and justify some significant upgrades to 168 units' HVACs and 91 units with energy star refrigerators. After the upgrades were completed at one multi-family housing unit, the average energy usage fell by 39% during peak hours.

Sustainable communities, strengthening our neighborhoods, together

The Brookings report was the catalyst for SMUD's Sustainable Communities program, launched in 2018, and builds on the significant work we've done to support under-resources communities for decades. We're bringing attention to our historically under-resourced neighborhoods through our Sustainable Communities program, which aligns our partnerships, goals and investments around supporting healthy, vibrant and economically sustainable neighborhoods for all customers. In 2020, we launched an interactive Sustainable Communities Resource Priorities Map that identifies out which areas in our region need our help the most. The map helps analyze current data to indicate the local areas most likely to be underserved or in distress due to lack of community development, income, housing, employment opportunities, transportation and more. This information helps align our region's investments toward the goal of creating and supporting healthy, vibrant and economically sustainable neighborhoods.[32]

By partnering with policy makers, transit leaders, technology companies, health care providers and other community-based organizations, SMUD can maximize its impact and collaboration with community members to solve real problems for real people. We're leveraging our existing efforts, employees' skills and expertise and partnerships across the community to maximize our collective impact to help those most in need.

To promote workforce and equitable economic and community development, SMUD has invested in programs targeting economic development, community/environmental health and neighborhood outreach activities in vulnerable and under-resourced communities throughout the Sacramento region. To date, SMUD has invested over $5 million into this effort, leveraging partnerships to increase impact in these areas of need. We have several workforce development programs and work with a variety of partners to support the development of solar and renewable energy across the greater Sacramento region.
Our Sustainable Communities program works strategically to establish long-term partnerships with community-based organizations and businesses, working together on projects helping our

[32] Learn more at smud.org/SustainableCommunities.

under-resourced communities, with the goal of increasing inclusion and closing the disparity gap in the Sacramento region. These partnerships create trusted relationships and serve as a foundation for the community outreach, engagement, collaboration and education needed to build livable, diverse and resilient communities. We've invested more than $5 million in 130 local organizations to work on projects aligned with our Sustainable Communities program, many of which are advancing historically under-resourced populations closer toward our zero carbon future goal.

One such partnership is with Habitat for Humanity, Greater Sacramento, which we support through Sustainable Communities and our low-income programs. Together, we've brought solar and new energy solutions to hundreds of new and existing homes for low-income families, which will continue over the next few years. By adding EV plug-ins at most Habitat homes, SMUD is supporting the electric transportation revolution. Through these partnerships, we can help all our communities – from rural to suburban to urban – to be part of a zero carbon future.

One of the most promising aspects of a zero carbon future is the new jobs and careers that will be generated by building electrification, advanced storage strategies, energy management and increased EV usage and infrastructure needs. Healthy communities rely on a strong workforce where residents have opportunities to thrive economically and our 2030 Zero Carbon Plan will help create jobs and ensure that all communities are included in this economic development strategy. SMUD's Sustainable Communities program has developed an inclusive Regional Workforce Development strategy that ensures that all communities have access to job training, internships and pathways to careers needed to power our zero carbon future. We're working with partners like the Greater Sacramento Urban League, La Familia and Asian Resource Inc., to understand the challenges communities face in pursuing zero carbon careers and remove such barriers with programs and organizations like the California Mobility Center training program, the Energy Careers Pathways Program with Baker Energy and Grid Alternatives and our online STEM careers curriculum.

Looking to the future, we'll identify new skills needed and partner with community organizations to develop upskill or entry level training programs to support new zero carbon technologies. We'll develop customized strategies to attract and retain residents from under-resourced communities to these stable, economically mobile careers.

Embracing zero carbon, together

The 2018 Brookings Institute Report, mentioned above, identified significant gaps in our community, prompting us to acknowledge that we have a duty to do more to intentionally address the disparities of the under-resourced communities we serve. By investing in under-resourced neighborhoods and working with community partners, SMUD is part of a larger regional mission to deliver energy, health, housing, transportation, education, workforce and economic development solutions to support sustainable communities.

As we implement our plan, we will be nimble and flexible while working to support customized solutions for all customers and communities. Our processes will be rooted in genuine engagement with a broad and diverse set of stakeholders, particularly those suffering from *inequality and the impacts of climate change. We will adopt policies actively designed with people, fairness and justice at the center of decision-making. Finally, we will work to ensure clear mechanisms exist – or can be put in place – for measuring, monitoring and evaluating the direct impacts of our 2030 Zero Carbon Plan.*

We have a history of partnering with our community, but with our 2030 Zero Carbon Plan, it’s time to build on what we we’re already doing – leading by example and engaging members of our community–and together we can create and work toward a shared vision for the future. We don’t want to just “bring others along” with us, rather we want to empower our communities to work with us and take the lead in developing place-based strategies –to make sure that Sacramento communities are livable, resilient and ready to embrace a low carbon future. This can only be achieved by recognizing that our communities are diverse, and we need to develop strategies that respect and build upon our local, unique qualities and listen to the input of our communities.

A history of planning for the future

SMUD's long history of affordable rates, reliable power and environmental leadership stems from innovation and our communities' desire to be cleaner and greener than the rest of California. When we plan for the future, SMUD must balance environmental considerations, customer rates and safety and reliability impacts. Like other utilities, we rely on an integrated resource planning (IRP) process to develop our long-term strategic environmental objectives to create resources and programs.

Charting our future

Our low-carbon future is not limited to electricity supply, it also includes decarbonizing homes, businesses and transportation. This will take a coordinated effort, including our local partners, to decarbonize the region. To achieve our ambitious goals, we must work on the leading edge as we conduct research, deploy new technologies and develop innovative programs to consistently reduce GHGs in Sacramento.

As we look ahead, we must consider the role that solar, wind and other renewables will play in decarbonizing our power grid. These resources provide opportunities and some risks. We embrace these opportunities and will develop new strategies to mitigate the risks and achieve our goals. Some possible strategies include, storing energy, developing renewable fuels and aggregating customer devices to mimic a power plant.

In preparation for new DERs, we're working to develop a Distributed Energy Resource Management System (DERMS) to enable us to aggregate distributed resources like solar and storage to provide grid services and enhance shared benefits of these resources with all customers.

We're rolling out several energy storage programs for residential customers aimed at maximizing shared value between system owners and the broader SMUD customer base. Programs like our Smart Energy Optimizer program that launched in 2019 offer up-front and ongoing incentives in exchange for access to a portion of a customer's battery to provide these grid services. Our commercial customers will see new shared investment programs like StorageShares that give participating commercial customers financial benefits similar to onsite storage, but the storage will be located in areas where our transmission and distribution systems are nearly at maximum capacity. This could displace investments we might otherwise need to make to increase grid capacity, and can provide additional value by participating in energy markets whenever transmission and distribution support is not needed.

We're expanding and further aligning our SolarShares and Greenergy programs to reduce carbon emissions in Sacramento in the most cost-effective way. These programs have the potential to scale quickly without financially impacting other SMUD customers. We're also developing programs to increase access to solar and renewable energy at a reasonable cost for all residential customers.

As we look to the future, we're considering the successor to our net energy metering (NEM) rate for customers with rooftop solar, which is now our largest annual customer program expense, exceeding the combined cost of our entire portfolio of energy efficiency programs. In 2020, we completed a Value of Solar and Solar + Storage Study as a precursor to proposing more equitable rates that balance our collective desire to reduce carbon with the imperative that we do so in the most cost-effective manner possible for all customers.

2040 Clean Energy Plan

In 2018, the Board adopted our latest IRP, also referred to as the 2040 Clean Energy Plan, which put SMUD on an aggressive path to decarbonizing the greater Sacramento region with the ultimate goal of achieving net-zero GHG emissions electricity by 2040. As part of this plan, our GHG emissions strategy embraced supply and demand-side solutions and accelerated GHG reduction targets, including net-zero by 2040.[33]

This 2030 Zero Carbon Plan builds on the strategies in our 2040 Clean Energy Plan, our commitment to community-wide decarbonization and continued investment in electrification, energy efficiency and DERs. The 2040 Clean Energy Plan was, and still is, an aggressive and diverse investment strategy to minimize local GHG emissions while keeping our system reliable and our rates affordable.

Electrification plan

Our 2040 Clean Energy Plan includes goals for electrifying buildings and transportation, and was one of the most ambitious and holistic carbon reduction pathways considered at the time. These goals called for electrifying approximately 80% of natural gas end uses and 70% of transportation end uses by 2040. For buildings, with these goals, SMUD would achieve carbon reductions by 2030 that were three times more than that of an equivalent plan focused only on energy efficiency.

Despite the many benefits of electrification – cleaner, cheaper, healthier, safer, better performing appliances – customer awareness remains relatively low. As we look to our 2030 Zero Carbon Plan, boosting awareness is critical to achieving both our IRP and zero carbon goals. To this end, SMUD will bolster communications about electrification to our customers through a comprehensive outreach and education program over the next several years that will last for decades. This includes introducing more online tools, expanding experiential "behind the wheel" events and launching more sophisticated direct, digital and broadcast marketing campaigns.

[33] https://www.smud.org/-/media/Documents/Corporate/Environmental-Leadership/Integrated-Resource-Plan.ashx

Energy system overview

SMUD delivers clean, reliable power to our customers thanks to our renewable energy portfolio, GHG-free hydro resources, efficient power plants and innovative customer-focused programs.

Our power is delivered via an integrated electric system that SMUD owns and operates, which includes generation, transmission and distribution facilities. We supply energy to our bulk power substations through a 230 kilovolt (kV) and 115 kV transmission system. This system transmits power from our generation plants and interconnects with Pacific Gas & Electric and the Western Area Power Administration (WAPA). Power is distributed throughout Sacramento and the entire SMUD territory with overhead and underground sub-transmission and distribution lines.

The following is a snapshot of our current energy delivery system, which is the starting point for our zero carbon journey. Understanding this system provides context to the challenges, complexities and opportunities in achieving a zero carbon future.

Participating in external markets: Imports and exports

Imports are the energy that we purchase from other entities to help serve our customer demand. Exports are the energy that we sell to other utilities or system operators. We get power from various sources within the SMUD territory and the rest is imported from elsewhere in California or the Western U.S. Currently, we have a scheduling import limit at a given time of over 1,300 MW with the California Independent System Operator (CAISO) and own and have access to over 500 MW of transmission rights from California-Oregon border on the California-Oregon Transmission Project. We receive additional transmission services from the WAPA, providing access to in-state hydro resources and additional energy from the California-Oregon border.

SMUD is one of several members of the Balancing Authority of Northern California (BANC). As the balancing authority, BANC is responsible for matching of generation to load and coordinating system operations with other balancing authorities. BANC is a partnership between public and government entities and is an alternative platform to other balancing authorities like the CAISO. BANC provides reliable grid operation consistent with standards developed and enforced by the FERC, the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council.

Being part of BANC benefits our customers. For instance, during the summer of 2020, an extreme heat wave encompassed much of the West. This unprecedented heat storm resulted in larger than average energy use across the Western Interconnection, and power generally available to be imported into California was suddenly needed in other states. The result was an energy supply shortage that left many Californians subject to rolling blackouts. Our customers did not experience these outages. Through proactive contracting for energy supply and prudent risk management, SMUD was able to avoid rotating outages for our customers and even helped our neighboring utilities by providing them with some of our energy supply.

Our commitment to reliable service

Reliability is foundational to our business and a robust reliability framework that has guided our current system architecture. Reliability is the ability of the power system to provide the services our customers expect when they want and need them, even under difficult circumstances. Our Board sets reliability metrics to measure our success under Strategic Direction 4 – Reliability.[34]

For more than 70 years, SMUD's been delivering reliable energy to our customers, and we'll continue maintaining all aspects of reliability while transitioning to zero carbon emissions.

Reliable operation means we operate the elements of the power system within thermal, voltage and stability limits. Operating within these limits allows our system to continue to operate when an unexpected event occurs, such as a sudden unanticipated loss of a generator or transmission line. In short, if we were not operating reliably, equipment could be damaged, or system instability, uncontrolled separation or cascading failures could result in a system-wide blackout. Reliably operating our power system needs the following three critical components:

Resource adequacy

Resource adequacy is a condition in which we have acquired adequate resources to satisfy our forecasted energy needs reliably. SMUD uses the same metrics as most other California utilities, which are defined by the California Public Utilities Commission (CPUC) – that is, we maintain enough resource capacity to cover the monthly peak load forecast plus an extra 15% margin. This extra 15% resource capacity is referred to as Planning Reserve Margin (PRM). With the recent system challenges, the CPUC is evaluating possible increases the PRM.

System adequacy

For system adequacy, we ensure we're capable of serving our load under extreme weather conditions and identify our system's energy import limits. Our load serving capability describes the maximum load that our transmission system can serve reliably. Our import limit is the maximum simultaneous energy that we can import from external entities without exceeding any operating limits. Together, these studies make sure that we have sufficient transmission and distribution infrastructure to reliably deliver energy to our customers under even extreme circumstances.

Reliability adequacy

Reliability adequacy means that we have adequate grid reliability services to keep the electricity flowing. These services are sometimes referred to as ancillary services and include additional generation capacity and generator capabilities that we need to respond to sudden changes in system conditions and system disturbances, frequency response, generation and load balancing and voltage control.

[34] https://www.smud.org/-/media/Documents/Corporate/About-Us/Directives/Strategic-Direction/SD-4.ashx Last accessed 2-9-2021.

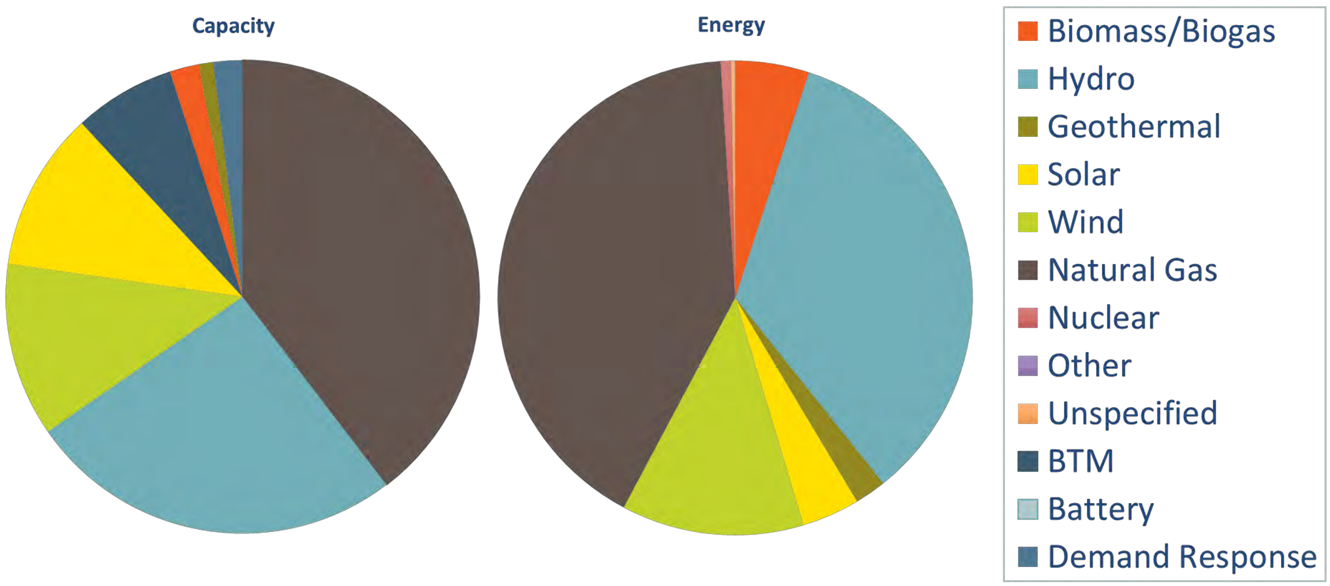
North America Electric Reliability Corporation (NERC) Reliability Standards

The Energy Policy Act, passed by U.S. Congress in 2005, authorized FERC to oversee the development and enforcement of the Reliability Standards with the purpose of improving reliability of the U.S. power system. In 2006, the NERC was approved by FERC to develop the Reliability Standards. In 2007, FERC approved the first 83 Reliability Standards developed by NERC and began to enforce them. To date, there are approximately 110 mandatory and enforceable NERC Reliability Standards.

Power supply

SMUD is a steward for our local community and economy. Unlike investor-owned utilities, we aren't driven by profits or investors. We're driven by our desire to offer our customers the most cost-effective energy with the lowest impact on our environment. This is evident in how we operate our thermal power plants and maximize zero emission procurement from hydro and renewables. For a full list of our current operating power plants, see Appendix A: Existing SMUD resources.

Figure 3. Capacity and energy of resources in the SMUD portfolio (current data)[35]



Thermal gas power plants

Today, gas power plants are an important part of the reliable foundation of SMUD's power supply. Our 1,103 MW of thermal generation are vital to maintaining our electric system reliability and to serving our growing system load. Integral to SMUD's long-range resource plan, Cosumnes Power Plant provides customers with a stable, cost-effective power supply. It can generate enough electricity to power more than 450,000 single-family homes per year. It's the

[35] Capacity is the maximum output an electrical generator can produce (i.e., MW), while energy is the amount of electricity a generator produces over a specific period of time (i.e., one hour – MWh).

most efficient combined cycle power plant in California[36] and, on average, 5% more efficient than similar power plants.[37] This also makes it one of the most inexpensive plants to operate, and the cleanest – less fuel burned per unit energy also means less GHGs emitted per unit energy. We maximize the economic operation of this power plant, which means that when solar energy is setting market prices, our Cosumnes Power Plant is operating at a minimum. When other less efficient resources are bidding into the market, we're displacing their emissions. Even with its notable efficiency, nearly two-thirds of our GHGs come from our Cosumnes Power Plant.

Our least economical resources are our peaking power plant units. We run them less often, which results in these units having a much smaller GHG footprint. As the name implies, our peaking units run in the few hours of the year when renewables, hydro, combined cycle and market power cannot meet our expected load without risking reliability. These plants generally run for a few hours at a time. Although these plants are often not running, being operational and grid connected allows them to provide needed ancillary services, resource adequacy and other energy and capacity reserves.[38]

Cogeneration is a part of SMUD's reliable power formula. The Carson, Procter and Campbell cogeneration plants add over 400 MW to our resource portfolio, brought one new manufacturing facility to the region and have reduced operating costs for the three-existing thermal "hosts." Natural gas-fired cogeneration plants produce electricity and steam. The electricity is fed into SMUD's power grid while steam is fed into a factory for manufacturing use, often replacing steam produced by a less-efficient boiler plant at the facility. The low-cost steam helps keep manufacturing expenses low, providing an incentive for firms to keep their plants in Sacramento, and air quality improves relative to non-cogeneration factory operation due to use of advanced air pollution abatement technologies.

Hydroelectric power

SMUD owns and operates over 688 MW of large and small hydroelectric resources as part of the UARP. The UARP consists of 11 reservoirs and nine powerhouses. In a normal water year, the UARP provides roughly 16% of our electricity – enough to power about 180,000 homes per year. The UARP is able to provide operational flexibility, system reliability and economical power. The value of the UARP also extends beyond the boundaries of SMUD's service territory by helping to maintain the integrity of the Northern California electric transmission system.

We also contract for additional hydro electricity from the U.S. government through a long-term contract with the WAPA for 336 MW of small and large hydro capacity. While this generation is not as flexible as our UARP, it does provide consistent GHG-free electricity.

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[36] Analysis of publicly available data from the CEC-1304 Power Plant Owner Reporting Database. https://ww2.energy.ca.gov/almanac/electricity_data/web_qfer/Heat_Rates_cms.php. Last accessed 23 March 2021.
[37] Nyberg, Michael. 2020. Thermal Efficiency of Natural Gas-Fired Generation in California: 2019 Update. California Energy Commission. Publication Number: CEC-200-2020-03. Average heat rate 7.3, CPP, 6.9.
[38] Capacity is the maximum output an electrical generator can produce (i.e., MW), while energy is the amount of electricity a generator produces over a specific period of time (i.e., MWh). Generators typically do not produce their full capacity 100% of the time.

Renewable resources

Our existing renewable energy portfolio includes projects we own as well as contracted resources. Currently, we have a good balance between baseload and intermittent renewables. By the end of 2021, we'll have 285 MW of local solar and 160 MW of regional solar in operation. SMUD owns and operates a significant amount of wind generation in Solano County near Rio Vista. Energy from these wind resources is delivered into the CAISO and occasionally wheeled to SMUD. For a detailed list of our renewable portfolio, see Appendix A: Existing SMUD resources.

Load forecast

Our energy delivery system relies on internally developed forecasts of future electricity sales and demand. We don't rely on external forecasts, such as the CEC's electric demand forecast. Internally, we have a better understanding of our customer base and long-term growth potential. Use of internal forecasts also allows us to maintain consistency across the various planning and operational departments at SMUD.

Our demand model is based on expected (or normal) weather conditions, also known as a 1-in-2 load forecast. It includes economic impacts to the region and changes in customer end uses because of building code and technology changes. The forecast includes system energy, system peak, customer accounts and energy sales for SMUD's service territory. In the long term, our forecasts include affects from our outreach and other customer programs, electrification of buildings and transportation, customer-owned DERs (such as solar and energy storage) and energy efficiency improvements, all of which will change our energy demand.

Table 2 and Table 3 provide the annual energy and peak load forecast used in this Plan.

Table 2: SMUD's 10-year planning demand forecast (GWh)[39]

Year	Electric Demand Forecast	Energy Efficiency	Electric Vehicles	Building Electrification	Rooftop Solar	Customer Battery	Managed Electricity Demand[40]
2021	11,123	-94	16	7	-479	0.2	10,573
2022	11,268	-159	34	18	-524	0.4	10,637
2023	11,309	-215	61	33	-568	0.7	10,621
2024	11,410	-274	96	53	-610	1.0	10,676
2025	11,417	-334	158	80	-649	1.4	10,673
2026	11,472	-391	243	118	-688	1.9	10,756
2027	11,538	-451	355	169	-725	2.4	10,888
2028	11,643	-514	500	232	-762	2.6	11,102
2029	11,700	-556	676	315	-795	2.9	11,343
2030	11,747	-608	883	405	-828	3.0	11,602

Table 3: SMUD's 10-year planning demand forecast of peak load (MW)[41]

Year	Peak Demand Forecast	Energy Efficiency	Electric Vehicles	Building Electrification	Rooftop Solar	Customer Battery	Managed Peak Demand[42]
2021	3,036	-15	0.9	0.4	-149	-0.7	2,873
2022	3,068	-22	1.9	0.9	-165	-1.4	2,882
2023	3,075	-30	3.6	1.6	-179	-2.3	2,869
2024	3,100	-44	5.8	2.6	-192	-3.4	2,869
2025	3,107	-54	11.0	4.0	-200	-4.5	2,863
2026	3,114	-62	18.0	6.0	-198	-5.9	2,872
2027	3,140	-71	26.5	8.6	-226	-7.6	2,870
2028	3,151	-69	37.4	11.9	-241	-8.4	2,882
2029	3,173	-75	50.6	16.2	-251	-9.1	2,905
2030	3,201	-98	66.0	21.0	-262	-9.3	2,919

[39] The average household in Sacramento uses 9-megawatt hour (MWh) per year. 1,000 MWh = 1 gigawatt hour (GWh).
[40] Managed electricity demand is the total of the electricity demand forecast and contributions from new energy efficiency, EVs, building electrification, rooftop solar and customer battery.
[41] The average peak household load in Sacramento is 4.8 kilowatt (kW). 1,000 kW = 1 megawatt (MW).
[42] Managed peak demand is the total of the peak demand forecast and contributions from new energy efficiency, EVs, building electrification, rooftop solar and customer battery.

Within Sacramento, our electricity demand is expected to grow slowly over the next 10 years. This is due to expected local economic conditions, energy efficiency requirements for new homes, business activity in the region, SMUD's energy efficiency programs and the installation of customer-sited solar power and battery storage. While the region is building new homes, they are much more energy efficient than older homes, plus due to the zero net energy requirement, they are required to have rooftop solar so the net impact to load is smaller than in the past. The expected increase in the market penetration of EVs and an increased focus on building electrification are expected to increase electricity demand and offset the impact of otherwise slow load growth.

Long-term climate change impacts are not directly factored into this long-term forecast, but a climate trend is included to reflect changes in high and low temperatures, which increases energy use in the summer and decreases demand in the winter. Additional or accelerated climate changes could further increase long-term demand for electricity and impact daily and seasonal demand patterns. Extreme heat and storm events, which are projected to become more frequent, add additional uncertainty.

Distributed energy resources (DER)

DERs are energy solutions where customers implement technology that change how they use energy. DERs can include, among many others, rooftop solar, energy efficiency improvements, demand response and batteries. Energy efficiency, load flexibility and electrification are essential for our long-term mission to use energy more effectively and reduce GHG emissions. The importance of these resources is reflected in our existing programs as well as plans to expand these programs. Our demand-side programs help our customers manage energy use or generate their own energy through incentives, rate design and communication. We're also working to increase the electrification of transportation and buildings in our service territory, which is essential to achieving air quality and GHG reduction objectives in our community.

Energy storage

In 2016, SMUD adopted a DER strategy that included recommendations on battery storage. As part of that strategy, SMUD evaluated the value of energy storage dispatch under different control schemes as well as expected customer adoption of energy storage to gain a better understanding of the implications of the technology on our system. This strategy also calls for developing behind-the-meter business models and corresponding rate plans that can enhance the shared value of distributed energy storage between customer participants, the rest of the grid and non-participating customers.

In September 2017, the SMUD Board adopted a target of 9 MW of energy storage procurement by December 31, 2020, which we achieved. This target was largely met by residential and commercial energy storage pilots and a utility scale battery procurement coupled with a commercial energy StorageShares program.

We expect solar adoption will continue to grow in our service territory because of continued cost declines and regulatory mandates, such as Title 24, which requires rooftop solar for new buildings permitted under the 2019 Title 24 building standards. We also expect an increasing portion of these solar installations to include battery storage as battery costs decline. Through 2020, our customers have installed a total of over 260 MW of behind-the-meter solar.

Long-term success of energy storage and grid modernization in SMUD's service territory will continue to rely on external factors such as battery cost reduction and technology innovation from 3rd party businesses, but SMUD also recognizes that to maximize the potential of energy storage, proactive engagement from the utility, in advance of financial viability, is needed. We also need more information and field testing to evaluate the impact of extreme heat conditions on battery performance in our region. With SMUD being a member of BANC, we have a greater level of independence with grid operations, which uniquely positions SMUD to develop programs, incentives and partnerships in our service territory that will enable access to a broader set of benefits. Access to these system level economic or reliability services will enable further 3rd party innovation, allow SMUD to collaborate with innovators to align grid needs with technology solutions and help us provide products that create value for our customers.[43]

EVs and load flexibility

EVs will likely be one of the most flexible resources of our electrification efforts. In addition to EVs, there is also a proliferation of smaller devices being adopted today, including batteries, smart thermostats, water heaters and home management systems. The number and types of these devices is growing independently of utility support and represents a significant load flexibility opportunity for SMUD to partner with customers to improve overall system utilization and minimize costs associated with new infrastructure.

Through passive rate instruments like SMUD's nighttime plug-in EV discount, customers have been shown to be effective at changing seasonal system-wide load shapes. These load shape modifications could also be achieved with actively managed charging technologies. However, these technologies have only been piloted and demonstrated at small scale to date, largely due to relatively low EV adoption and a lack of standardized hardware and software interfaces for integrating between grid management systems and the vehicle charger. In an attempt to bring some standardization to the market, aggregator business models are emerging to pool different vehicles and chargers for utility access, entering custom integration agreements with many 3rd party systems working towards a single interface for utility integration. The aggregation model may be inefficient for the long-term, but is a near-term necessity as standardized programs, business models and communications pathways are slowly being developed and advocated for by utilities.

Demand response

Our system is developed to operate under the most stringent and difficult operating conditions. In practice, this means we strive to meet our customers' needs during all hours of the year. There are times when paying or otherwise signaling our customers to reduce usage is less expensive than turning on an additional power plant. Demand response initiatives are one kind of load flexibility program at SMUD and are primarily used for contributing toward our capacity reserves and reserve margin needs.

Peak Corps Program is a residential air conditioning load management program that provides a summertime resource for emergency situations if the need arises. Currently,

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[43] For a more detailed discussion of SMUD's energy storage goals, please see https://www.energy.ca.gov/sites/default/files/2019-05/AB_2514_Oct_1_2017_Report_UPDATED_91517.pdf. Last accessed: 11 December 2020.

the program has the capacity to reduce demand by 59 MW. The technology supporting this program is reaching the end of its technical life and the program is expected to end before 2030. A new NextGeneration Air Conditioning Load Management program is being planned to replace Peak Corp with updated technology for a launch as early as 2023.

PowerDirect Program is an automated demand response program for commercial customers available for use between June and September from 2 to 6 p.m. It's an operational resource for reliability and economic purposes. The program is planned to grow over the next few years reaching 30 MW by 2027 and is expected to maintain that level going forward.

Individual commercial customer agreements are comprised of individual curtailment agreements with some of our largest industrial customers that allow us to curtail load for reliability or economic purposes with the potential for up to 6.5 MW within 10 minutes' notice. SMUD can call on these customers throughout the year.

Our 2015 Demand Response Potential Study looked out over a 10-year period and estimated the capacity expected to be available during the peak hour of system demand as ranging from 189 MW to 471 MW across four scenarios considered, with the base scenario predicting 368 MW. This equates to 11.3% of SMUD's peak load. The load reduction potential would come from three sources: programs, dispatchable pricing and non-dispatchable pricing. Variation in the peak capacity across the various scenarios can be attributed to differences in pricing enrollment policy, technology cost forecasts and the degree of marketing and incentive levels. This study was key contributor to our load flexibility strategy.

Table 4. Dispatchable load flexibility programs 2021-2030 (MW)

Year	Peak Corps	PowerDirect	Curtailment Agreements	New Planned[44]	Total
2021	58	15.2	6.5	0.0	79.7
2022	57	17.7	6.5	1.0	82.2
2023	56	20.2	6.5	11.1	93.8
2024	55	22.7	6.5	26.0	110.2
2025	54	25.5	6.5	41.7	127.4
2026	53	27.7	6.5	58.1	145.3
2027	52	30	6.5	75.9	164.4
2028	51	30	6.5	94.5	182.0
2029	50	30	6.5	115.5	202.0
2030	0	30	6.5	128.2	164.7

[44] In addition to expanding on these existing programs, our 2030 Zero Carbon Plan will also focus on new programs and strategies for flexible loads.

Over the next few years, we're planning to launch new load flexibility initiatives, which have been informed by the results of SMUD's Demand Response Potential Study. These new programs are planned to be flexible and available to respond with very short notice. This will be helpful when we're trying to balance supply and load due to increasing amounts of intermittent renewable generation on the system.

Enhanced electricity rates

SMUD encourages energy efficiency and conservation through time and temperature dependent rate structures. These rates provide signals to our customers when energy costs are at their highest, and generally coming from the most polluting sources. These rates include our residential and commercial TOD and temperature dependent rates.

The TOD rate structure encourages customers to conserve energy by rewarding them for reducing their usage during peak hours. To encourage residential EV adoption, our TOD rate offers a plug-in EV discount of $0.0150/kWh on all electricity used between the hours of midnight and 6 a.m.

We also have industrial customers on our Temperature Dependent Rate, equivalent to 15 MW of capacity. During the summer when outdoor air temperatures exceed 100°F for a certain period, we can notify customers and provide them the option of curtailment or continued service at a higher cost.

2030 Zero Carbon Plan approach and overview

SMUD's carbon reduction journey has entered a critical juncture as we look toward to the next decade and plan to achieve our aggressive goal of eliminating GHG emissions from our power supply by 2030. The remainder of this Plan provides the foundation for our next steps as we address the challenge laid before us, to:

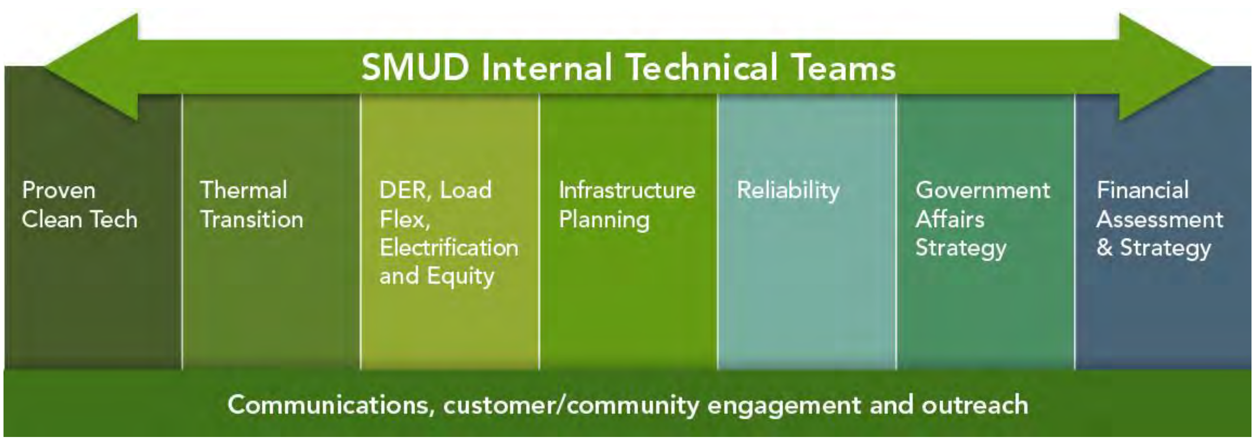
Reduce our stationary source carbon emissions to zero by 2030 while continuing to offer reliable electricity at affordable rates and maintaining our commitments to our community.

This Plan was developed in consultation with our community, experts in the utility industry and energy field and SMUD staff subject matter experts. To inform our Plan, we consulted with the engineering firms Black & Veatch, Energy + Environmental Economics (E3) and IEC Corporation. These firms conducted detailed analysis and studies on the status of proven clean technologies and the expected performance and costs of new and emerging clean technologies.

SMUD technical teams

Beginning in October 2020, eight technical teams of nearly 100 SMUD employees mobilized to investigate various methods to completely decarbonize our electricity supply. Developing a plan of this scope and magnitude is generally a process that is undertaken over years, not months. Our teams were formed quickly and worked collaboratively and creatively to develop a robust, fact-based plan to achieve zero carbon emissions by 2030. Each team had a specific focus, though constant coordination was required across all teams to develop a comprehensive and cohesive plan. Figure 4, below, shows the eight technical teams that contributed to developing the 2030 Zero Carbon Plan.

Figure 4. Technical teams contributing to 2030 Zero Carbon Plan development



Public consultation process

A key theme in the development of our 2030 Zero Carbon Plan is collaboration and public outreach. We know we cannot achieve ambitious climate goals alone and need to partner with our entire community to make sure we deliver solutions that are attractive, affordable and beneficial to our entire region, leaving no community behind.

While developing the 2030 Zero Carbon Plan, we engaged in extensive outreach to seek input from our customers, communities and other stakeholders. Our outreach process included four principal paths:

- **Three virtual presentations** to our customers and community organizations in December 2020.
- **An online survey** to collect feedback and views from our customers and community organizations on the development of the 2030 Zero Carbon Plan and their sentiments about their own climate investment plans and willingness to partner with SMUD.
- **Seven virtual stakeholder workshops** with selected groups and organizations. These workshops included participants from community organizations and nonprofits, environmental groups, the solar + storage industry and local business leaders.
- **Three industry expert panel discussions** to help our Board, SMUD staff and the public learn more about the latest technologies and ideas for decarbonizing our power supply.
- **Seven Board meetings** where members of the public had opportunities to learn about the progress of the 2030 Zero Carbon Plan and provide comments. All of SMUD's Board and Board Committee meetings are public and our customers and other members of the public will have ongoing opportunities to provide public comment on our 2030 Zero Carbon Plan and other topics.

The vast majority of people who attended our meetings expressed strong support for our 2030 Clean Energy Vision. While some expressed concerns over potential cost increases and emphasized the need for all communities and customers to be part of the solutions (including under-represented or under-resourced communities), most were enthusiastic and expressed interest in partnering with SMUD to support our goals.

In parallel with the meetings mentioned above, we developed a webpage, smud.org/ZeroCarbon, where interested participants could register for the meetings, learn more about our 2030 Zero Carbon Vision, sign up for future notifications, get answers to frequently asked questions and give SMUD input for the 2030 Zero Carbon Plan. The meeting recordings are posted on this webpage.

Figure 7. Community benefits of a zero carbon future

The interest from our customers and our communities has been outstanding. During our accelerated timeline of only about 3 months to develop the Plan, more than 500 participants provided their inputs and comments representing customers, businesses and community organizations in the region as well as national organizations. We have also received many comments and suggestions through our zero carbon webpage and our dedicated email ZeroCarbon@smud.org.

Customer and community presentations

In December 2020, we held two virtual meetings for residential customers and one meeting for community organizations. The objective was to introduce the 2030 Zero Carbon Plan and collect feedback. We sent email invitations to the meeting to a representative cross-section of our residential customers. We also invited every not-for-profit organization we are connected to in the Sacramento region, as well as subscribers to our listservs, and we announced the meetings via social media. This outreach resulted in 415 participants in the two residential customer meetings and 82 participants in the community meeting.

Online survey results and insights

Customers who participated in our customer and community meetings in December 2020 were also invited to provide their views and input through an online survey. A full summary of the survey results is posted on smud.org/ZeroCarbon. Table 5 provides a high-level summary of the survey results.

During the sessions, customers asked many questions about our energy resource mix, our investment plans and what the 2030 Zero Carbon Plan means for our communities. These questions, many of which were answered directly during the customer and community meetings, have been converted into a frequently asked questions (or FAQ) section that's available at smud.org/ZeroCarbon.

Table 5: Summary of online survey results

	The vast majority of residential and community group attendees feel that it's extremely or very important to improve air quality in the Sacramento area.
	The majority of residential and community group attendees indicated that they "loved" SMUD's Zero Carbon goal.
	The top 3 ways attendees felt SMUD should support the community were to provide: 1) Affordable electricity options 2) Reliable energy 3) Achieve zero carbon in a way that benefits all communities.
	60% of residential and 77% of community group attendees indicated that they are very willing to partner with SMUD by personally taking action to reduce Sacramento GHG.
	39% of residential customer attendees say they are very likely to purchase smart home technologies in the next 12 months. Almost one-fourth are very likely to purchase/lease EVs or rooftop solar, while slightly fewer (17%) are very likely to purchase/lease a battery.
	When asked how much they would be pay voluntarily, almost half of residential customer attendees claimed they are **willing to pay up to $10 more per month** to support the 2030 Zero Carbon plan. However, almost one-fourth were not willing to pay any more.
	Almost 6 of 10 residential customer attendees claimed they are very likely to respond to tips from SMUD to reduce their GHG emissions. 43% said they are very likely to participate in a Demand Response program and 30% to replace their gas appliances with electric.

Stakeholder meetings

We organized meetings to solicit input from a wide range of key stakeholders. Each group met twice – once at the beginning of our 2030 Zero Carbon Plan development process in mid-December 2020 and once at the end of February 2021 to learn about the results of our studies and key recommendations we intended to include in the Plan. Meetings were held targeting four stakeholder groups: solar + storage industry, environmental organizations, community organizations and business leaders.

Each meeting was scheduled for 90-120 minutes and included a brief presentation from SMUD followed by a discussion session with the participating stakeholder groups with the objective for SMUD to learn as much as possible about these groups' views on our 2030 Zero Carbon Plan. The meetings were facilitated by the Smart Electric Power Alliance (SEPA), a not-for profit organization focused on helping utilities and other energy companies decarbonize their energy supply chain and work with their communities and stakeholders to achieve those goals. As a result of these meetings, the following key themes emerged:

Support. Across all sessions and groups, strong support was expressed for SMUD's goals. All groups indicated interest in partnering with SMUD, ranging from offering to communicate our 2030 Clean Energy Vision to their respective communities to expressing interest in new customer incentives. Several stakeholders also emphasized the need to partner with technology and solutions providers to find innovative solutions. Some stakeholders also expressed support for specific technologies, in particular support for rooftop solar, batteries and EVs.

Costs. Concerns over the costs for eliminating carbon emissions were raised by multiple stakeholders, particularly community organizations and business leaders. Community organizations also highlighted the importance of all communities getting access to clean energy options and that no communities are left behind in the process.

Outreach and education. All stakeholder groups expressed the need for education and outreach about how our 2030 Zero Carbon Plan will help address climate change. Several community organizations also offered to provide outreach on these efforts in their communities.

Repowering gas plants. Several, but not all groups, expressed support for repowering or re-purposing our gas plants to carbon free alternatives to avoid costs associated with prematurely retiring our gas-fired plants, which would result in stranded costs.

Stakeholders also provided general appreciation for the opportunity to be involved in the development of the 2030 Zero Carbon Plan and provided support for the preliminary draft that was presented at the second set of meetings in February 2021. While supportive, several stakeholder organizations and groups reiterated their continued emphasis on key issues, such as community involvement, the value of electrification, cost concerns and their willingness to partner with SMUD to help support our zero carbon goals.

Industry expert panels

With the support of SEPA, we convened leading experts from around the nation to help inform the SMUD Board and our staff of the latest technology developments, research, products and services that should be considered when aiming to be a zero carbon utility by 2030. We hosted a total of three industry expert panels over the course of three Board meetings that included 11 experts. These meetings were open to the public and some members of the public also provided comments during the process. Each panel meeting had a specific theme.

- **January 12, 2021: Vision, solutions and technology for a carbon free future.** In this panel, experts from Vibrant Clean Energy, Rocky Mountain Institute (RMI), Electric Power Research Institute and National Renewable Energy Lab provided an overview of the latest developments and research, including the future role of customer-located generation and storage and the potential of a closely coordinated and operated electric distribution grid to reduce the cost of renewable integration.
- **January 26, 2021: DERs and the edge of the grid.** Experts from Lawrence Berkeley National Lab, Sunrun, Olivine and Schneider Electric provided their views on the role of DERs in a zero carbon future. Panelists highlighted the potential for virtual power plants (VPPs) to supplement grid resources and reduce costs. The panel also emphasized the importance when power is used, suggesting that initiatives and technologies capable of changing when energy is used can contribute to a more stable and reliable grid. Panelists suggested that the aim is not perfection, but to test and improve technology to find solutions that work best for communities.
- **February 9, 2021: Grid scale solutions for a carbon free SMUD.** Experts from General Electric, Ameresco and Green Hydrogen Coalition focused on large-scale zero carbon supply options that could be available by 2030. The experts highlighted that

today, there are already many options for energy and alternative fuels. Hydrogen was identified as a fuel with the potential to provide long-duration storage options and support reliability in an otherwise mostly renewable energy powered grid, noting that we're still some time away from having a reliable supply of affordable hydrogen or other biofuels in volumes that are sufficient to fully replace SMUD's natural gas use.

SMUD Board and committee meetings

SMUD staff has provided updates to the Board and its committees at virtual meetings from December 2020 through March 2021. At these meetings, we presented the status of work performed and next steps. We also received guidance from the Board on their desired direction of our work as well as inputs from the public through public comments during the meetings. The views expressed in this forum have helped to shape the scope and the analysis of our work on this 2030 Zero Carbon Plan.

Innovation Leadership Team (ILT)

SMUD solicited innovative ideas from the public and our employees to help develop this Plan. Our ILT reviewed and prioritized ideas to into the Plan. The most promising opportunities were studied further. Information and analysis from our contractors and vendors, along with staff expertise were used to prioritize options for inclusion in the 2030 Zero Carbon Plan. Table 6 highlights key factors used to prioritize ideas. For a list of non-confidential submissions from the public, see Appendix C:

Table 6. Key factors for considering innovations

Category	Criteria
Benefits	Helps meet 2030 goal
	Fills portfolio need
	Flexible/Adaptable to changes
	Innovation prospects
	Opportunities for collaboration
Costs	Projected costs (capital, operations & maintenance, procurement)
	Certainty of cost projection
Risks	Public safety
	Siting, permitting, and environmental impact
	Political/regulatory
	Technology maturity, commercialization, scalability for deployment
	Dependency on other projects and investment climate

Carbon accounting

There are many valid methods for accounting for GHG emissions, however, they don't all measure the same thing, which makes comparison difficult. In framing our 2030 Zero Carbon Plan, it's important to recognize that a 100% renewable generation procurement target does not guarantee corresponding GHG emissions reductions.[45] At its most basic level, carbon accounting is challenging to reach consensus on the application of valid approaches. Complicating this is the fact that once electricity enters the grid, it's impossible to distinguish the source, making it difficult to estimate our emissions footprint if one generation source is indistinguishable from the next. Generally, accounting methods can be broadly grouped in terms of timescales, such as annual and hourly accounting. For this Plan, we used an hourly accounting framework.

Annual accounting methods are the basis for many GHG accounting frameworks and disclosure regulations in California.[46] In this approach, we count as ours all zero-emission energy we buy or generate, generally at a higher price or cost, and we consider the energy we sell to be from our GHG-emitting sources. This methodology is widely accepted because it appropriately attributes the extra cost of zero emission resources to the purchaser. It also acknowledges that power bought in the open market is indistinguishable from other electrons, therefore market power purchases are treated as carbon emitting resources unless the buyer can show otherwise.

The drawback of annual accounting is that, as we're seeing today, the value of renewable energy can exceed the market value. This can cause market inefficiencies and negative energy prices during high solar producing periods. One method to guarantee the most emissions reductions from renewable energy is to match power consumption with renewable generation on an hourly basis. [47] In practice, this means whenever we draw power from the grid, we need to be simultaneously injecting or buying an equal amount of renewable power. As more information becomes available and increasingly accurate, consumers can shift flexible consumption to portions of the day where grid power is cleanest, further reducing emissions. With a 100% renewable energy supply, customers can reduce the carbon footprint of the entire grid in addition to their own footprint.[48] A summary on these methods, as used by SMUD, is in Table 7.

For this Plan, we used an hourly accounting methodology. This accounting framework is more stringent than most mainstream utility and regulatory programs and, more importantly, it's also most closely aligned with our Board's direction and SMUD's 2030 Clean Energy Vision.

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[45] de Chalendar, Jacques and Sally M. Benson. *Why 100% Renewable Energy Is Not Enough.* June 2019. Joule 3, 1389-1393. Available Online: https://www.cell.com/action/showPdf?pii=S2542-4351%2819%2930214-4. Last accessed: 25 January 2021.
[46] Our 2040 Clean Energy Plan also layered on an additional accounting framework to measure programmatic successes for our energy efficiency and electrification strategy, and identified GHG reduction from electrification to include in our net-zero accounting.
[47] de Chalendar, Jacques and Sally M. Benson. Why 100% Renewable Energy Is Not Enough. June 2019. Joule 3, 1389-1393. Available Online: https://www.cell.com/action/showPdf?pii=S2542-4351%2819%2930214-4. Last accessed: 25 January 2021.
[48] Ibid.

Table 7. Accounting methodology

	Annual Accounting	Hourly Accounting
SMUD Thermal Sales – Credit for exports/sales	Emission Intensity (EI): 0.39t/MWh or linked to the average EI of operating thermals	
Undelivered Renewable Energy (Sold into the CAISO)	Energy displaces unspecified imports (on an energy basis) one-for-one, in terms of annual accounting. Renewable sales in excess of this value provide no additional GHG value.	Energy displaces unspecified imports (on an energy basis) one-for-one, in terms of hourly accounting. Renewable sales in excess of this value provide no additional GHG value.
Unspecified Imports	EI: 0.428t/MWh	EI: 0.428t/MWh
	Only applied to import in excess of renewables in the CAISO (under annual accounting)	Only applied to import in excess of renewables in the CAISO (under hourly accounting)
Specified purchases and imports	EI of the known resource. If unavailable, assume all are gas resources emitting 0.428 t/MWh. Renewable procurement should not be able to displace specified contracts.	

System modeling

The industry standard practice for planning studies is to develop and analyze several options that are capable of offering reliable electric service, subject to our policy, environmental, physical and economic limits. We conduct these studies using a series of computer simulations that model building new resources, operate the system over several years and test the system's ability to meet our needs in the most difficult circumstances. Although these models are powerful tools, they're time-consuming data-intensive processes. To assist our efforts, we hired E3 to support the modeling for this Plan.

This Plan relies upon two resource planning models developed by E3 and tailored towards analysis of electric systems at high penetrations of renewable generation to develop and analyze a range of scenarios to explore potential options for carbon reductions in the SMUD system portfolio:

- ***E3's Renewable Energy Capacity (RECAP) model***: A loss-of-load-probability model that provides a detailed and statistically robust perspective on electric systems that rely on a combination of conventional, renewable, storage and demand-side resources.
- ***E3's Renewable Energy Solutions (RESOLVE) model***: A capacity expansion model that uses optimization techniques to identify a least-cost portfolio of resource investments to meet future reliability and clean energy objectives.

These two tools complement one another in their application, together providing a strong foundation to analyze and understand implications of long-term transitions towards low carbon and carbon free portfolios. These models are used together: first, the Plan uses RECAP to characterize potential contributions of different technologies toward system resource adequacy needs; this, in turn, serves as an input to RESOLVE, to ensure that the least-cost portfolio outcome meets reliability goals.

The following sections will address key questions and considerations for achieving zero carbon by 2030. Our goal in this report is to provide data and information to answer the following questions:

- What role can our thermal assets play in this Plan?
- How close can we come to meeting our goals using currently available proven clean technologies?
- What new and emerging technologies show promise for filling the remaining gap to zero carbon?
- What are possible scenarios for achieving these goals? How will these scenario results later inform our strategy discussion as elements of our plan become more concrete?

The 2030 Zero Carbon Plan

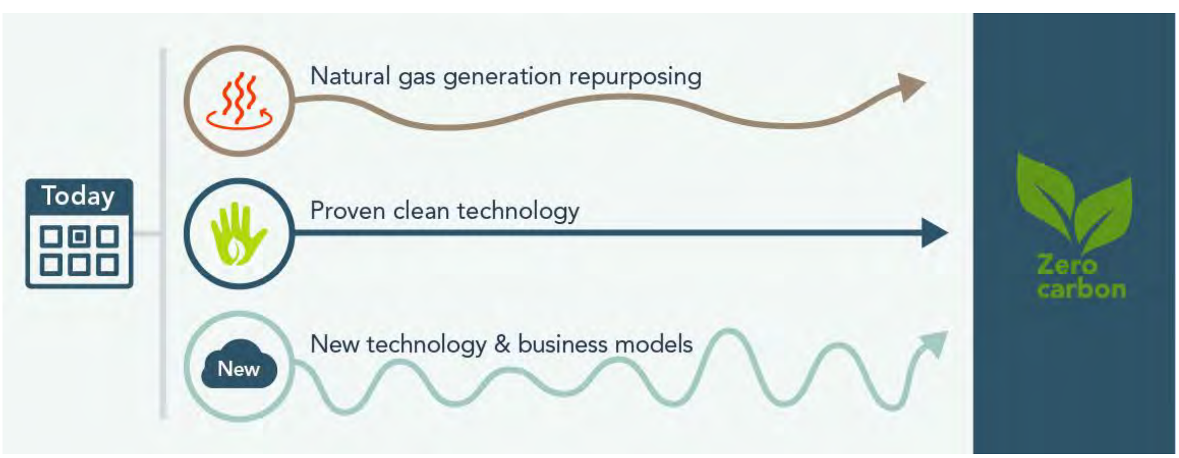
Achieving our goals requires eliminating fossil fuel GHG emissions, either by displacing natural gas use from our power plants or capturing our emissions before they reach the atmosphere. Informed by expert consultations, system modeling and supplemental studies, we've developed four strategies to guide our initial decisions on our journey toward eliminating carbon emissions from our power supply. Each group is comprised of options and decision points. Although there is not a single path to achieve our objective, this Plan has helped identify strategies that will help us along the way. We'll continually revisit our strategies and planned path along the way and course correct as needed. In the end, we'll have traveled our unique pathway to reach the end of our 2030 zero carbon journey.

SMUD's 2030 Zero Carbon Plan is a flexible pathway to eliminating carbon emissions from our power supply by 2030.

Developing our flexible pathway to zero carbon

Each strategy addresses distinct challenges. The decisions we make will take us one step closer to our goal but may also require that we reassess our next decision. Our flexible pathway to zero carbon is based on what we know today, and our pathway will evolve as new technologies are developed and we learn from our experiences. Some strategies, like proven clean technologies, are more straightforward, and we have a clear understanding of the risks and the costs. Other strategies are not as well understood and are more complex. As technology and business models evolve, we may reevaluate previous decisions and reconsider our decarbonization plan to align with new information. These strategies are interdependent, but each element of our plan will require a unique strategy complete with different resources, milestones and risks. In our flexible pathway, we'll need all three strategies to contribute, and understanding how each will ultimately contribute by 2030 will be refined over time.

Figure 5. Illustrative flexible plan



Natural gas generation repurposing: The future of our natural gas-fired thermal power plants is a critical component of our energy delivery system. These power plants are economic and reliable sources of both energy and non-energy services to the system. This strategy challenges us to consider what role these units could play in our zero carbon future. Elements considered include retirement or retooling of thermals, using alternative fuels such as renewable hydrogen, RNG, or renewable diesel or developing new technologies, such as carbon capture and long-duration storage.

Proven clean technologies: These are mature zero emission technologies available in the market today. Mature technologies, such as solar and wind, are economical resources with a known track record for performance. Coupled with storage and DERs (rooftop solar and customer-owned batteries), proven clean technologies are expected to form the foundation for our clean energy goals. This strategy also provides the replacement attributes needed to support our natural gas generation repurposing strategy. As part of this strategy, we considered technologies such as wind, solar, lithium-ion batteries, hydroelectric power, biomass and geothermal.

New technology and business models: There are exciting technology advancements that are currently evolving in the electricity market. Building on the alternative fuels studied as part of our natural gas generation repurposing strategy, we're also exploring how our customer relationship can evolve as we work to integrate additional distributed energy and demand response resources into our system. As we achieve greater success in this strategy, our strategies above would be less necessary, possibly allowing us to achieve our goals at lower costs.

Financial impacts and options: We're committed to achieving the 2030 Zero Carbon Plan while keeping rates affordable. While the plan represents significant new investments, there are several opportunities to manage the impact to customer bills. This strategy depends on regional, national and international partnerships to share the costs of common goals and fund the development and acceleration of new technologies. We'll continue to expand new revenue sources, such as Low Carbon Fuel Standard (LCFS) credits, U.S. EPA electric Renewable Identification Number and carbon credits. This strategy also focuses on leveraging use of our low-cost of capital, mechanisms such as green bonds and commodity prepays that may lower costs and improving efficiency in delivery of our core services. As technologies progress, we'll regularly review the financial impact and manage our finances to keep rate increases low and stable.

In the following sections, we'll explore the pathway options of our road map to decarbonization and discuss plausible implementation scenarios that will allow us to realize our 2030 Clean Energy Vision. Our previous studies have shown that renewables are an economical resource; however, all of our studies to date show that renewables, even with today's battery technologies, cannot get us to zero carbon reliably and affordably. To keep our commitments to our customers, we'll need to embrace the leading edge of technology, innovation, research and development, and deploy groundbreaking and sometimes counter-intuitive solutions.

Natural gas generation repurposing strategy

Natural gas generation repurposing

- Reimagine thermal fleet as peaking plants.
- Study the retirement of McClellan in 2024.
- Study the retirement Campbell in 2025.
- Retool Carson and Procter & Gamble from combined cycle operations to simple cycle peaking units.
- Eliminate carbon emissions and minimize operating hours.
- Research and scale alternatives to natural gas.

Our Plan starts with our thermal power plants, which currently depend on natural gas for generation. This section takes a detailed look at our thermal fleet and our commitments in this area. This includes our electricity delivery system, which for decades has been built and maintained around the continued operation of our natural gas power plants. In this analysis, we look to these resources not as an impediment to our 2030 goals, but as an opportunity. These thermal power plants represent existing assets that can be leveraged to achieve our goals at lower cost and greater reliability, while considering neighboring communities, particularly under-resourced areas.

To study how our existing thermal power plants can play a role in our carbon reduction journey, we scanned the industry for technologies and strategies that could decarbonize SMUD's natural gas-fired thermal fleet. For this analysis, we assessed the following topics.

- Technology options for their maturity and future potential.
- The cost and availability of alternative fuel sources.
- Location of thermal power plants to under-resourced communities.

Our goal of this analysis was to find tools that can be used to:

- Protect grid reliability during the transition to zero carbon.
- Provide a baseline reference point for comparison of replacement options.
- Minimize the adverse impacts on under-resourced and sensitive communities.

As we studied this strategy, we considered our under-resourced communities, health impacts and reliability of our system. We looked at three broad options for our thermal plants, including retirement, retooling or a hybrid approach.

Thermal power plants and our communities

When considering the future of our natural gas power plants, we must understand how these plants operate and acknowledge that these resources provide more than energy to our system. These plants are also fixtures in our communities, for better or worse, and we must consider and include our neighbors in these decisions, to fully weigh the impacts of retiring or changing the operations of these power plants.

SMUD owns and operates five power plants within Sacramento. Our power plants are fueled by using natural gas and two locations are also supplemented by RNG. Excluding McClellan, our power plants are designed as either combined cycled or cogeneration power plants. These systems allow each power plant to capture the waste heat from the combustion turbine in energy efficient ways. In general, our thermal power plants operate like this:

- A gas turbine burns fuel and air is compressed and mixed with gas that is heated to a very high temperature. The hot gas mixture exhausts through the gas turbine blades, making them spin, rotating a generator and producing electricity.
- In combined cycle and cogeneration plants, a heat recovery system captures the gas turbine exhaust waste heat that would otherwise escape through the exhaust stack and instead creates steam.
    - In a combined cycle power plant, the steam is delivered to a steam turbine that makes additional electricity. As shown in the table below, a steam turbine can generate about 50% more electricity from the turbine’s captured waste heat.
    - In a cogeneration power plant, the steam is delivered to a neighboring facility for use in their production. Our steam deliveries are regulated via formal “Steam Sales Agreements” with our steam customers.

Historically, we’ve operated our power plants as baseload plants, designed to be online for long periods of time, operating at a consistent level, with little downtime for annual maintenance and repairs. As larger amounts of low-cost solar power have become available, we now find ourselves “cycling” the power plants from high load to minimum load and in some cases even shutting units down for extended periods. Although combine cycle power plants are very efficient when running, the internal mechanics and thermodynamics of the system restrict how quickly and how often the plant can start up and shut down. In many cases, if we expect to need the plant the next day, it’s more efficient and economical to keep it running. These engineering and economic factors drive operations at the Cosumnes and Campbell power plants.

We’ve also operated cogeneration power plants that use the exhaust heat to produce steam for industrial customers. In particular, our steam host obligations are one of many factors we must consider as we operate the Procter & Gamble and Carson power plants. Similar to combined cycle plants, these steam turbines take time to warm up and cannot be shut down quickly. We must also consider our obligations to our steam customers when considering daily operations.

Table 8 provides an overview or the current configurations of our thermal power plants.

Table 8. SMUD thermal power plant overview today

Power Plant	Generator Type	Unit	Capacity Rating (MW)	Fuel Source
Sacramento Power Authority (SPA) at Campbell Soup	Combustion Turbine	1	116	Natural Gas
	Steam Turbine	2	62	Waste Heat
McClellan Gas Turbine	Combustion Turbine	1	72	Natural Gas
Central Valley Financing Authority (CVFA) at Carson Ice	Combustion Turbine	1	48	Natural Gas and Biogas
	Steam Turbine	2	20.6	Waste Heat
	Combustion Turbine	3	42.5	Natural Gas and Biogas
Sacramento Cogeneration Authority (SCA) at Procter & Gamble	Combustion Turbine	1	52.4	Natural Gas
	Steam Turbine	2	42.5	Waste Heat
	Combustion Turbine	3	48.3	Natural Gas
	Simple Cycle Peaking	4	50	Natural Gas
SMUD Financing Authority at the Cosumnes Power Plant (CPP)	Steam Turbine	1	207	Waste Heat
	Combustion Turbine	2	207	Natural Gas and Biogas
	Combustion Turbine	3	207	Natural Gas and Biogas

Reliability considerations

As noted earlier, reliability services are needed to maintain a reliable grid. Some of these services can be provided by proven clean technologies, like batteries or hydro, but during expected compounded weather events such as multiple days of adverse conditions like low-wind, cloudy days, heavy fog, heavy smoke and long periods of drought, our operational experience has shown that renewables struggle to meet our immediate needs consistently and reliably. As part of developing this Plan and during the next steps to implement it, we'll keep reliability at the forefront of our decision-making. The following operational characteristics are currently provided by our thermals and must also be provided in our 2030 Zero Carbon Plan.

- **Fast and flexible dispatchability:** Dispatched by Automatic Generation Control every 4-seconds over a wide output range.
- **Sustained operating reserves:** Operating reserves are required to be fully deployable in 10 minutes and can sustain for 60 minutes.
- **Quick frequency response following a disturbance:** Respond to system frequency deviation within 10 seconds and sustained for at least a few minutes.
- **Dynamic voltage control:** Dynamically adjust reactive power[49] based on system voltage swings.

[49] Reactive power isn't used for mechanical work and is relationship between the phases of AC current and voltage. The more out-of-phase current and voltage are the less efficiently power is being transmitted.

- **Inertia:** Physical resistance to frequency changes in the first few seconds following a system disturbance before generator frequency response kicks in. This resistance to change (typically from large rotating generators) gives automated control devices needed time to respond.
- **System oscillation damping:** Stabilize generator oscillation quickly within 10- to 20-seconds by providing additional damping through generator control.
- **Black-start capability:** Capability of a generator to start up without support from external power sources, which is needed in the event of a system blackout to energize other equipment and restore the system.

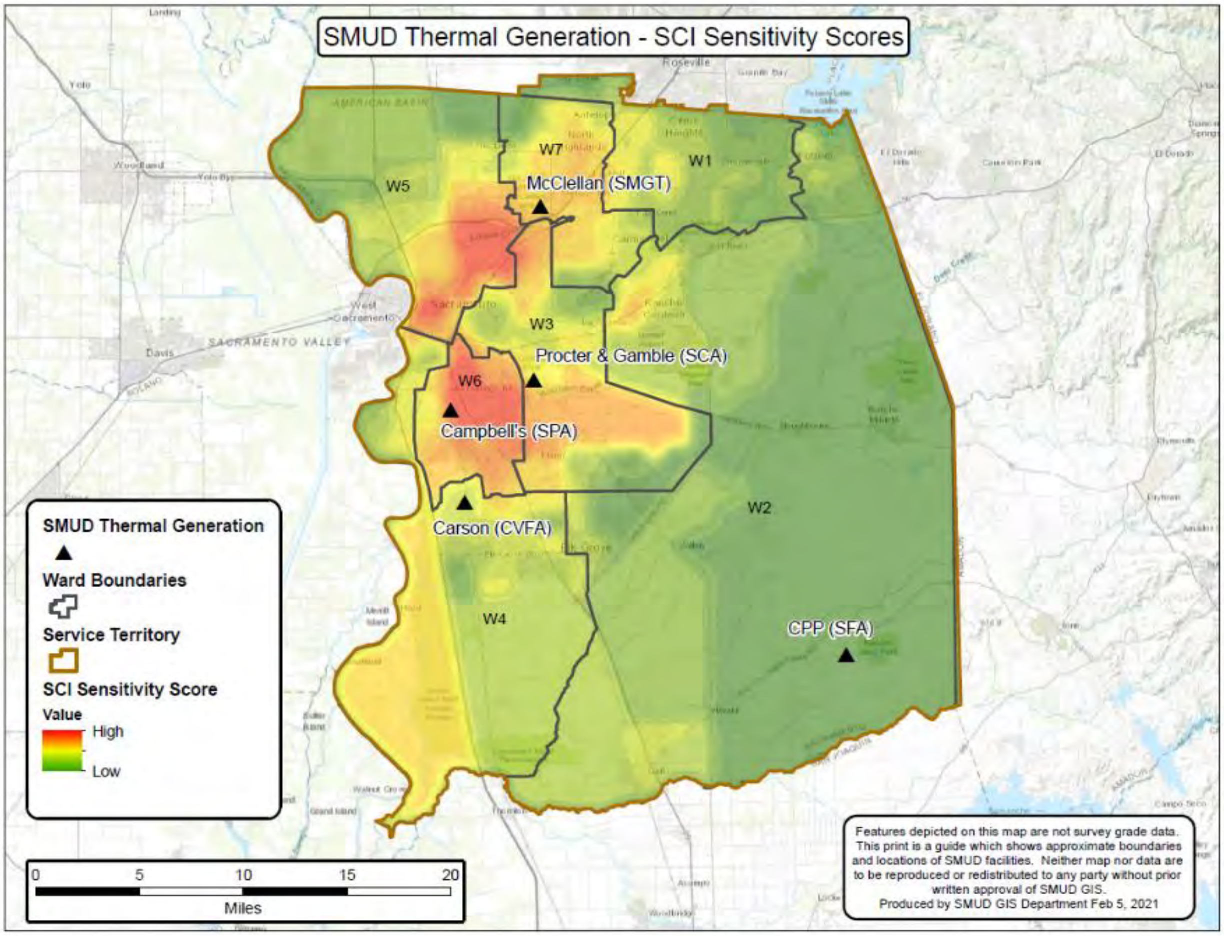
Thermal power plants have been integrated into our grid for decades and our electrical system has been built around them. As we change how these plants operate, we need to analyze all aspects of our system, including our ability to import power. While this Plan provides a high-level look at import and load serving capabilities, additional studies are required to examine each resource option and their capabilities and shortfalls. In terms of reliability, our preliminary analysis suggest that retirement of a power plant may be possible if initial steps can be taken to add generation and dispatchable capacity where needed before retiring a thermal unit. These considerations are plant- and solution-specific and must be evaluated at each location.

One particular challenge exists at our Carson (CVFA) power plant. This facility directly serves a portion of our 69kV sub-transmission system that is expected to see significant load growth over the next five years and beyond. Without this generator, the sub-transmission system will no longer be adequate to serve existing and forecasted demands in the area. Detailed studies need to be performed to fully assess the impacts of CVFA's retirement on the adequacy and reliability of the local sub-transmission system. These detailed studies will include an assessment of mitigation options such as infrastructure upgrades, utility-scale renewable generation, DERs, demand response or a combination of these options. It's important to note that the combined solutions must provide the same services this power plant currently offers.

Under-resourced communities

Our Campbell plant (SPA) and the McClellan Gas Turbine thermal power plants are located in areas with a sensitivity score of high or moderately high on our Sustainable Communities Priority Map. In terms of our community, modifying or retiring McClellan and Campbell would have the greatest impact on our under-resourced communities relative to our other thermal plants because they're located in areas of SMUD territory with some of the highest sustainable communities' sensitivity scores, see Figure 6. Decisions about the future of these plants will include discussions and engagement with the community.

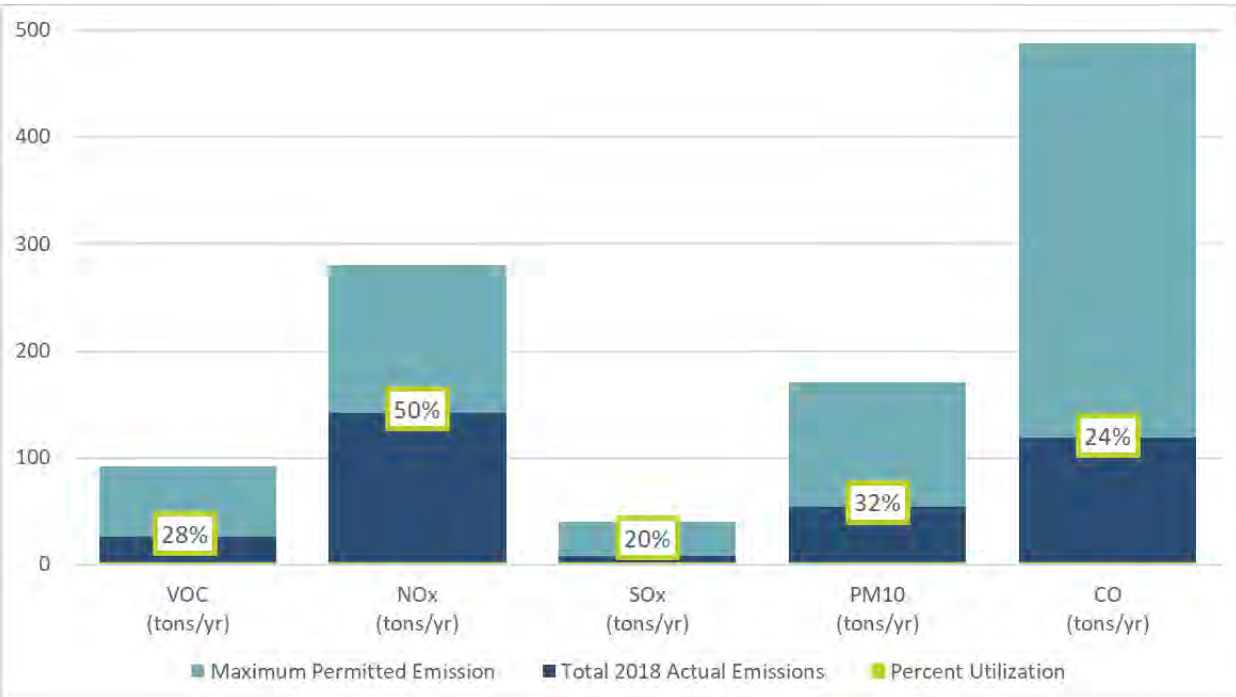
Figure 6. Thermal power plant locations



Air quality considerations

Currently, we operate our thermal power plants far below their permit limits and will continue to look for opportunities to reduce our emissions. Our utilization rates are shown in the boxes below in Figure 7, a comparison of the power plants' maximum permitted emissions and their actual 2018 emissions as regulated by the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the U.S. EPA. Studies show that criteria pollutant emissions, such as Nitrogen Oxide (NOx), from fuel combustion in buildings and light-duty passenger vehicles present higher health risk concerns in Sacramento than SMUD's power plants. Electrifying homes and buildings will result in significantly improved regional air quality.

Figure 7. Comparison of maximum permitted emissions and 2018 actual emissions



The best way to determine the impact of air pollutant emissions on nearby communities is to perform a refined health risk assessment of each thermal power plant. Health risk assessments calculate the potential health risk to individuals over time using various real-life data, such as the height of the power plant's stack, temperature of the pollution release and proximity of neighborhoods, schools, hospitals and other work sites. Impacts on health risk can be looked at in terms of the potential to increase one's cancer risk[50].

In 2018, SMUD submitted to SMAQMD separate health risk assessments for the Carson Ice, Proctor & Gamble and Campbell cogeneration power plants. The assessments were based on individual facility 2016 operating data. We found the cancer and non-cancer risks associated with each power plant are below the thresholds indicating any significant health impacts to our neighboring communities. This includes the South Sacramento/Florin Community, which is actively working with SMAQMD to implement a Community Air Monitoring Plan under Assembly Bill 617 (Community Air Protection Program).

In 2018, SMUD submitted a separate health risk assessment for the Cosumnes Power Plant. While the plant's cancer risk is above the 1.0 threshold limit, the risk level is determined based on the plant's maximum *permitted* emissions rather than *actual* emissions, and is mitigated because the power plant is in a sparsely populated area with no sensitive receptors, such as K-12 schools or hospitals.

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[50] Cancer Risk is the theoretical probability of contracting cancer when continually exposed for a lifetime (70 years) to a given concentration of a substance. The risk is presented as the number of chances in a million of contracting cancer.

For comparison, the SMAQMD lists several types of facilities with cancer risks well above our assessed risks. These other facilities include a dry cleaner, two chrome plating shops and over 200 diesel-fired internal combustion engines. Although not updated by the Air District since 2004, it's expected that a majority of retail gas stations will continue to have cancer risks above the one in a million-cancer risk threshold.

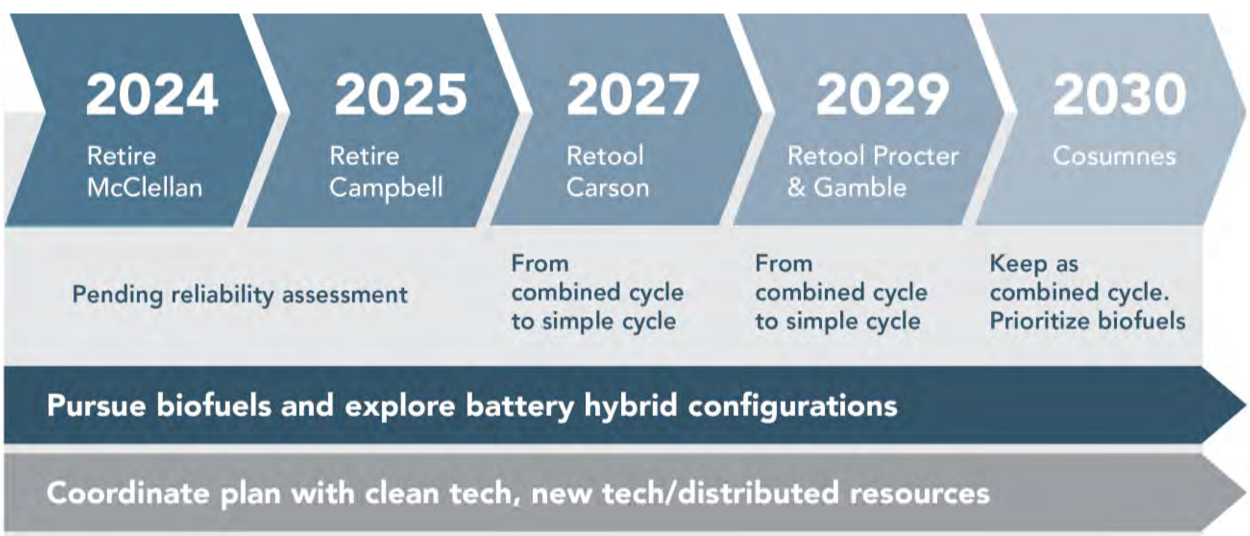
Thermal transition options considered

To inform our Plan, we consulted with IEC Corporation to identify the latest technologies available for our thermal power plants and Black & Veatch to provide the status of new resources and alternative fuels. Listed below, our study focuses on three broad options for decarbonizing our thermal power plants by 2030.

1. **Thermal power plant retirement:** Under this scenario, by 2030 we'll retire our thermal fleet and completely eliminate our reliance on fossil-fuel derived energy and reliability services from neighboring markets, including all energy purchased and sold.
2. **Refueling with zero carbon fuels:** As part of this scenario, we'll evaluate the technology landscape and feasibility of replacing all fossil fuel used at our thermal power plants with renewable or carbon-free fuels by 2030.
3. **Reimaging our thermal fleet:** We'll continue to leverage the reliability and cost-effectiveness of our thermal fleet and reimagine operations under fuel and emissions constraints. The thermal power plants would become flexible peaking units, providing short runs with lower capacity factors and ancillary services thereby eliminating their cogeneration status and greatly reducing their GHG footprints to absolute minimums.

Each of these options were considered under similar assumptions, included any steam sales obligations with our neighboring manufacturing facilities, and the schedule shown below in Figure 8. As we make and implement decisions, this Plan will be revised and expanded to account for on-the-ground conditions and advancements in technology and infrastructure.

Figure 8. Thermal retooling schedule



Evaluation of thermal power plant retirement

We also studied retiring our thermal units and relying solely on proven clean technologies to provide reliability services and energy for our customers. What's challenging under this option is replacing reliability services with non-carbon emitting resources in all hours throughout the year. The results of our analysis were similar to our previous studies: Retiring our thermal power plants and relying completely on proven clean technologies is possible, but it's an expensive option that may not be reliable under every weather scenario.

Beyond building for annual energy needs, our updated analysis of this option found the need to build over 3,000 MW of 4-hour duration batteries coupled with 5,000 MW of additional local solar generation (total resource build calls for 8,000 MW of solar).[51] These additional 8,000 MW of resources, beyond our base resource build in this scenario, are needed to minimize risks that could result in local blackouts similar to the outages faced by California customers during the heat storm of 2020. Again, these resources are needed to achieve only minimum reliability standards in 2030. If this option is considered further, we'll need to do an intra-hour analysis to identify additional firming resources such as batteries to address intra-hour variability, where momentary cloud cover can reduce the output of a solar field by over 50% in a matter of seconds.

This scenario also requires over 3,200 MW of resources to be built and operated outside our service territory. This means, an increased reliance on energy imports. There are significant economic risks to developing energy within a neighboring balancing authority such as CAISO. In particular, within California, solar is already dominating the market and flooding solar generating hours with low-cost energy. This is currently causing the market price for energy to be negative, meaning we must pay someone to take the energy if we cannot deliver it to our customers. This flood of generation is also starting to fill up available transmission lines, meaning there are times when we may not be able to access the generation we need. Our most economic decision during these instances could be to curtail our utility-operated solar and wind generators, essentially paying our generators to stop generating. In the study of this option, solar and wind were curtailed 7.5%. Batteries and other storage technologies mitigate this issue, somewhat. Lastly, additional analyses will also be needed to assess the impacts to our transmission and distribution system under this continuous high-import scenario.

Long-duration energy storage

To help overcome reliability challenges associated with high penetrations of renewables and make thermal retirement more viable, long-duration energy storage (LDES) is one potential opportunity worth continued exploration. While still an emerging market, long-duration storage such as flow batteries and thermal storage may one day be available to help us overcome multi-day weather events impacting renewable generation, as identified in our 2040 Clean Energy Plan and our studies to support this Plan.

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[51] Longer duration, 8-hour, batteries could be used to meet this need, but for consistency, this measure uses equivalent 4-hour batteries.

Although many consider batteries with a duration longer than 4-hours as “long-duration,” we use the following classifications to differentiate our LDES needs.

- Short-duration: 4-hours or less
- Intra-day duration: 5 to 12-hours
- Inter-day duration:13 to less than 48 hours
- Multi-day duration: 48 hours to 168 hours (1 week)
- Long-term or seasonal energy storage: beyond 168 hours (For example, technologies that can store energy for use in a later “season” such as from summer to winter.)

In this Plan’s technology selection and evaluation, we explored “multi-day duration.” However, existing and proven technologies do not meet the 48-hour minimum.

- Compressed Air Energy Storage has a proven duration of 3-24 hours.
- Flow batteries have a proven duration of 2-12 hours.
- Lithium-ion batteries have a proven duration of 0.5-8 hours.
- Molten salt thermal storage has a proven duration of 6-7 hours.
- Pumped hydro storage has a proven duration of 6-24 hours.

Black & Veatch concluded that, while short-duration energy storage is a well-established equipment supply area, multi-day LDES is not. The largest gap for these technologies is the successful integration and sub-sequence control of the minimally required demonstration prototype that’s capable of being scaled up. At this time, the development of these technologies is not assured and there are questions about their performance in extreme weather conditions. Therefore, they were not included as a specified element in our plan. With additional research, development and commercialization, these emerging technologies may be feasible for inclusion in our resource portfolio by 2030. We must also allow for flexibility in the implementation of our plan to allow for breakthroughs in these and other viable technologies before 2030.

Evaluation of refueling with zero-carbon fuels

We also considered augmenting, or fully replacing, fuels with renewable fuels. There is a wide-range of fuel options and levels available. Given the nature of this Plan, we did not attempt to model every permutation of the resources. We did however, set some benchmarks for additional analyses based on our evaluation of the most promising fuel sources. We considered the viability, availability and cost of the options and the technical feasibility of using each fuel at our power plants, including the need to switch out generation equipment.

Renewable hydrogen

Hydrogen is one of the most abundant elements in the universe and can be found in the fuels we use as well as our air and water, making it an attractive resource option. Hydrogen can be used as a fuel source either through direct combustion or non-combustion technologies. For the Plan, we considered using renewable hydrogen at our existing power plants or building new facilities. Our evaluation included an assessment of the hydrogen in natural gas blending limits at each site as well as the technical performance, cost considerations and the market availability of renewable hydrogen. We did not consider options to blend hydrogen with fossil natural gas as these are carbon *reduction* strategies and would not *eliminate* our GHG emissions.

Hydrogen use

With IEC Corporation, we began by analyzing the current technology configurations and turbines at our existing power plants. Unfortunately, the turbines available today cannot burn 100% hydrogen. We also explored using hydrogen as a fuel supplement, where hydrogen is co-fired with natural gas or RNG. Some of our turbine models can currently use a fuel blend of up to 50% hydrogen.

We're proactively reaching out to others in the industry to assess their efforts in advancing hydrogen technology and seeking opportunities to potentially partner on hydrogen demonstration projects. Some of the turbine manufacturers, such as General Electric, Siemens and others are studying the future potential of direct hydrogen combustion within their turbines. We'll stay active in this space to ensure that any technology developments that make this option feasible by 2030 are considered and will updates our plan as needed.

Market availability, storage and transport

The most promising process for renewable hydrogen is electrolysis, which is the process of splitting water into hydrogen and oxygen using electricity. Most hydrogen today is produced by a steam methane reforming process using fossil natural gas. RNG may also be used, but the costs and technical challenges will be compounded with that fuel option.

Electrolysis produces a zero carbon fuel when the electricity used for the process is renewable or zero carbon. Excess solar may be the ideal candidate for hydrogen production, resulting in hydrogen stored for later use.

Currently, the hydrogen fuel market is highly dependent on a small number of distribution facilities. In 2019, a Northern California plant was down for several months, reducing the available supply by nearly half for the San Francisco Bay and Sacramento regions.[52] This challenge may also be an opportunity to explore partnerships or joint ventures for local development of a hydrogen infrastructure. Currently, large-scale renewable hydrogen production is not available in our region. As such, the fuel would need to be either shipped via trucks or freight trains. The amount of hydrogen required would also require semi-constant deliveries of the fuel to each affected power plant.

Since hydrogen is the lightest element, it can be challenging to store large quantities because of the need for higher pressures or lower temperatures than natural gas. Intermediate storage of hydrogen could also become a blight on neighboring communities. Cosumnes, as a remote site, could host a possible pilot hydrogen production facility and storage tanks. Some storage options for hydrogen are described below.

> **Compressed hydrogen storage** is the most common method used by industrial hydrogen consumers. Depending on the amount of hydrogen being stored, pressures can range from 2,000 to 10,000 psia (pounds per square inch absolute) with the high end of this range more suitable for small cylinders used in transportation rather than large bulk tanks.

[52] California Energy Commission staff. 2020. Final 2019 Integrated Energy Policy Report. California Energy Commission. Publication Number: CEC-100-2019-001-CMF. Page 99.

Hydrogen liquefaction may be a feasible option, depending on the amount of hydrogen storage needed. Storing hydrogen in this fashion requires energy, more complicated auxiliary equipment, and extremely cold temperatures (i.e. -423°F) need to be maintained. The storage volumes for liquefied hydrogen would be much smaller than that for compressed storage and depending on the scale of storage required, therefore liquefaction can still be more economical than compressed hydrogen storage, particularly at large scales. An additional consideration with the liquefaction equipment is the thermal cycling and ramp time. Cycling from ambient to the extremely low temperature thermally stresses the equipment.

Geophysical hydrogen storage takes advantage of existing geological formations such as salt caverns, rock caverns, and depleted gas fields. These formations are an opportunity to store large volumes of hydrogen. Conceptually, hydrogen is compressed and stored in an existing geological formation and then withdrawn for later use. The details of this concept are extremely site specific and would require extensive geological study to locate an appropriate site.

Pipeline hydrogen storage may also be feasible as pipelines are the most cost-efficient way to transport large quantities of hydrogen over long distances. There are currently approximately 1,600 miles of hydrogen pipelines installed in the U.S., primarily in the Gulf Coast region, which are predominantly operated by major industrial gas companies. Hydrogen pipelines are considered mature technologies and can typically cost up to 10% more than a traditional natural gas transmission pipeline. Hydrogen will tend to permeate through metal over time, resulting in gas loss and pipeline embrittlement.

Potential role in SMUD's future portfolio

We found that while hydrogen production and storage is technically feasible using commercially available technology, renewable hydrogen has many challenges and definitive use before 2030 cannot be assured. The Black & Veatch study also found that blending 50% renewable hydrogen with 50% natural gas would yield only a 20% reduction in GHG emissions. This is due to the combustion characteristics of hydrogen where molecules are too small and flame speed is too high to properly consume all fuel within the turbine. Similarly, NOx emissions from our turbines would also increase requiring additional emission controls and mitigation.

While this strategy is valid to reduce our carbon emissions, it will not get us to zero by 2030 on its own. We believe that this is an option to keep in consideration for possible use with RNG. For our 2030 Zero Carbon Plan, renewable hydrogen should be considered an emerging fuel, with the potential option of utilizing one of our thermal power plants as a demonstration site. In the long-term, our Cosumnes Power Plant may be a reasonable site to consider fully replacing with hydrogen production coupled with a combustion power plant.

RNG: Biogas and biomethane options

Of particular interest, RNG can be used as direct replacement for the fossil natural gas we currently use. Although RNG is relatively common, the production of these fuels is generally much more expensive and less accessible than fossil fuels. There are regional sources of biogas and it can also be sourced from landfills and municipal wastewater treatment plants, which can be refined into RNG. As part of our studies, we evaluated the current production levels and the resource potential for future local production.

RNG is a term used to describe biogas that has been conditioned and purified to become pipeline quality to replace fossil natural gas. RNG can be produced via biochemical means like anaerobic digestion of dairy wastes, food wastes, wastewater, landfill wastes and other organic wastes. RNG can also be produced thermochemically via gasification (partial combustion) and methanation processes. Natural gas in the interstate pipeline system is generally 85% to 95% methane, the predominant energy carrying molecule in natural gas. Raw biogas typically has a methane content between 45% and 65% and must go through a series of refining steps to replace natural gas. Refinement includes removing moisture, carbon dioxide and trace-level contaminants and other impurities. Once purified, the gas can be injected into a natural gas pipeline or used as a substitute for fossil natural gas.[53] We currently have a long-term contract to buy RNG.

Black & Veatch found that the most accessible local sources of biogas resources are from landfills and wastewater treatment plants in the broader Sacramento region. Their assessment found that while the local supply is too limited to replace the *full* fuel use of our power plants, we identified opportunities to develop an additional supply of local biogas that could be used at our power plants. Further study is needed to quantify the gas potential available, assess the viability and develop these resources.

RNG: Emerging solid-fuel biomass conversion opportunities

The conversion of woody biomass to biogas via thermochemical conversion technologies is an emerging energy conversion pathway to produce RNG. We expect that biogas production could act as an energy supply and a viable disposal option of wood waste from forest thinning or wildfire mitigation projects, like in our UARP transmission corridor. Although the economic viability and total resource availability of this option is currently uncertain and complex due to inherent nature of catastrophic wildfires, the availability and pricing of woody biomass from wildfire thinning activities could improve over the next 10 years. With new wildfire management initiatives in California, Black & Veatch expects the amount of wood fuel available in the broader Sacramento region, when compared to the supply of sustainable forest-based wood estimates in prior studies, to increase significantly. This biomass is anticipated to be partly used by existing biomass power plants competing for this resource. There are three biomass power plants in the Sacramento region that are strong candidates for use of this “high hazard zone” woody biomass to meet contract opportunities.

Renewable diesel

We studied the technological specification of our existing power plants and found that most of our turbines are already capable of firing “#2 Fuel Oil,” which is essentially diesel fuel. Following air quality permitting and licensing approvals, our power plants would then need minor physical modifications to allow them to burn renewable diesel.

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[53] For more background information on sources for RNG, see: An Overview of Renewable Natural Gas from Biogas. U.S. EPA, July 2020. EPA 456-R-20-001. https://www.epa.gov/sites/production/files/2020-07/documents/lmop_rng_document.pdf. Last accessed 2-9-2021.

Renewable diesel is fuel that is made from plant oils and animal fats. Renewable diesel is currently being developed commercially for some truck transport applications. IEC Corporation and SMUD staff have reached out to several renewable diesel producers to gauge the feasibility of this approach. We were not able to identify sufficient supply at an affordable cost for power generation. This option will continue to be evaluated in the future as the production technologies mature and additional supply is available in the market.

Reimagining the operations of our thermal fleet option

Our analyses repeatedly show that the most expensive hours to deliver energy are during our peak hours and during low solar and wind production periods. These periods are generally constrained to a few hundred hours a year. Additionally, high-level analyses indicate that most large electricity systems can support up to 80% to 90% proven clean technologies if existing gas resources are left online.[54] Within this option, we consider reimagining operations at our thermal power plants such that we do not emit GHGs.

Carbon capture and sequestration

One option for eliminating carbon reduction at our thermal power plants is to capture the carbon before it's released into the atmosphere. The main post-combustion carbon dioxide separation techniques and technologies considered include amine-based chemical absorption, solid sorbents and membranes. Although solid sorbents and membrane technologies hold great potential and are promising for the future, the team found that post-combustion capture technique based on chemical absorption using amine-based absorbents is the most proven technology and commercially available at this time to effectively remove carbon dioxide from flue gas emissions.

Black & Veatch found that carbon capture technology could be integrated into our system. However, there are challenges including cost, implementation and viable storage options. The carbon capture technology alone will require a substantial capital commitment of over $800 million for our Cosumnes Power Plant. However, the technology could reduce our carbon dioxide emissions by over 90%, and coupling it with renewable fuels, could help us realize carbon free operation. Although capturing our thermal GHG emissions is technically possible, we must consider this option holistically. This option will require locating permanent geological storage and a commitment to long-term debt that ties us to natural gas.

We're currently evaluating NET Power's power plant design, which have no stacks. Instead, they use the Allam-Fetvedt Cycle.[55] These plants burn fossil fuel with oxygen instead of air to generate electricity without emitting any carbon dioxide or NOx, the main atmospheric and health contaminant emitted from gas plants. This is a new, high-pressure, oxy-fuel, supercritical carbon dioxide cycle that generates low-cost electricity from fossil fuels while producing near-zero air emissions. All carbon dioxide that is generated by the cycle is produced as a high-pressure, pipeline-ready by-product for use in industrial processes, or that can be sequestered

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[54] California Energy Commission. *SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future.* March 2021. Available online: https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349. Last accessed: 16 March 2021.

[55] https://netpower.com/technology/. Last accessed 23 March 2021.

underground in tight geologic formations. The challenge of determining how to dispose of the carbon is unsolved.

The technologies we studied do capture carbon dioxide, but for this technology to be zero carbon, we must find approaches to sequester the carbon such as long-term geological storage where carbon is stored in permanent geologic formations, for instance, a deep saline reservoir. There is a growing body of research regarding sequestration in the greater Sacramento area. Industry research has found that there is space in California to store carbon dioxide underground safely and permanently.[56] Thinking about SMUD assets, one study from Lawrence Livermore National Laboratory found a potential carbon dioxide sink just over 16 miles away from our Cosumnes Power Plant. This sink is near a saline aquifer in the Sacramento Basin, one of California's larger marine basis with potential sequestration opportunities.[57] As our 2030 Zero Carbon Plan continues to evolve, we'll seek opportunities to partner with industry to further explore carbon capture and sequestration potential in the greater Sacramento area.

Retooling and RNG

As we studied the options, interestingly and somewhat counter intuitively, it became obvious that the very things that made most of our power plants so efficient was limiting their ability to integrate into our zero carbon future. Due to start up and shut down restrictions and steam host obligations, many of our plants are held online even during the most expensive hours to deliver energy or during high-solar and wind production periods. With that in mind, we reimagined our thermal fleet operations to be as flexible as possible, generating power when needed for shorter durations and thus significantly reducing GHG emissions. This option was shown to be the most viable way forward and was studied in depth.

As previously discussed, the heat recovery systems make these plants efficient and valuable resources, but these systems can also be damaged if cycled too quickly. Disconnecting our power plants from their heat recovery systems will make them less efficient, but it'll also make them incredibly flexible, able to be turned on and off quickly and able to sit idle for long-periods of time. In this configuration, batteries can also be added to the peaking plants making the gas turbine appear to be online without burning any fuel. Understanding that solar and wind energy resources need flexible power plants that respond in seconds, it seems to follow that making these plants more flexible would allow for greater adoption of proven clean technologies. One tool to achieve this is to retool our thermals to make them as flexible as possible.

When we look through our past studies, we find that the periods we most need our thermals are usually constrained to a few hundred hours a year. This may make it possible to leverage our existing RNG contracts to fuel our gas plants. We currently have a long-term agreement in place for RNG at a maximum limit of 12,800 dekatherms (dth) per day. This gas is currently nominated/delivered to the Cosumnes Power Plant for RPS credit. Foregoing RPS credit, we can renominate this gas to any of our power plants. In this case, we're using RNG that is produced to pipeline specifications and delivered via intrastate pipeline and is a drop-in replacement that all our existing power plants can use without modification. The next challenge

[56] https://www.smud.org/-/media/Documents/Corporate/About-Us/Board-Meetings-and-Agendas/2020/July/1-Dr-George-Peridas--Achieving-Carbon-Neutrality-in-California.ashx
[57] https://www.westcarb.org/pdfs/geologic_co2_sequestration%20_potential_hq.pdf

is that RNG, including our current agreements, is injected into the pipeline as soon as it is produced. For this option to work, we need to store the gas until it's needed.

We currently have contracts with two natural gas storage fields capable of storing 2 million dth of natural gas. These contracts are set to expire within the next couple of years. Our daily burn averages approximately 110,000 dth per day. Between both storage contracts, we're able to withdraw up to a maximum of 40,000 dth per day. Our storage arrangements allow us to balance supply and demand during operational challenges as well as help mitigate financial risks from periods of extreme price fluctuation. A large part of our storage capacity is set aside to support running our plants during event where natural gas becomes scarce. This, and other storage options, may be useful as we consider relying less on natural gas.

Operationally this would mean managing our thermal units like our hydroelectric system. We manage our hydro system to ensure that we meet minimum flow requirements for fish and recreation. Additionally, we must manage our water releases to ensure we have adequate water for generation during the late summer and early fall, before reservoirs are refilled. In essence, we manage a limited fuel source for maximum benefit to our system. For our RNG, we'd need to adopt a similar strategy where we store our gas in offsite storage fields and only use this gas when we need it.

As briefly mentioned above, General Electric has developed a battery designed to augment the operations of their engines and intended to reduce the need to turn on the power plant during short duration peak energy needs. These batteries would increase the flexibility and operability of our power plants, reduce our need for spinning reserves, and most importantly, reduce the need for RNG.

Our thermal transition plan

Following the studies, we prepared the following strategy to transition our natural gas generators to flexible renewable peaking plants. We've drawn on many different studies and data for this Plan and note that other options may prove more viable in the future. As we move to implementation, we'll need to remain flexible and open to new ideas and strategies. The following recommended natural gas generation repurposing strategy, coupled with the proven clean technologies and new technologies and business models strategies, will help us achieve our 2030 Zero Carbon Plan.

Preliminary analysis shows that McClellan and Campbell plants could be retired in 2024 and 2025, respectively. Prior to committing to retirement, we'll perform a detailed reliability assessment in 2021. Carson Ice and Procter & Gamble will be converted to simple cycle peaking plants in 2027 and 2029, respectively, and considering steam host obligations and staggering the time between retooling efforts. Cosumnes, while the most efficient and largest of the thermal plants, is not as nimble. Currently, we plan to keep Cosumnes as a combined cycle plant and locate additional sources of RNG to buy and store. Our reimagined power plants in 2030 are shown in Table 9.

Table 9. SMUD thermal power plant overview in 2030

Power Plant	Generator Type	Unit	Capacity (MW)	Fuel Source
Sacramento Power Authority at Campbell Soup	**Retired***			
McClellan Gas Turbine	**Retired***			
Central Valley Financing Authority at Carson Ice	Combustion Turbine	1	50	Biofuels and TBD**
	Steam Turbine	2	**Retired**	
	Combustion Turbine	3	50	Biofuels and TBD**
Sacramento Cogeneration Authority at Procter & Gamble	Combustion Turbine	1	50	Biofuels and TBD**
	Steam Turbine	2	**Retired**	
	Combustion Turbine	3	50	Biofuels and TBD**
	Simple Cycle Peaking	4	50	Biofuels and TBD**
SMUD Financing Authority at the Cosumnes Power Plant	Steam Turbine	1	207	Waste Heat
	Combustion Turbine	2	207	Biofuels and TBD**
	Combustion Turbine	3	207	Biofuels and TBD**

**Pending reliability assessment.*
***Final 2030 fuel mix is to be determined. Dependent on options available and may include one or more of the following: hydrogen, biogas, RNG, biofuels.*

Planning for a possible retirement

Ultimately, we may choose to refuel some plants, retire others, or retool them all. As we transition toward our zero carbon goal, we'll carefully evaluate all possible options and will retire units only when we can do so reliably. Before making any decisions, thorough analysis and thoughtful planning will be needed with robust testing and additional studies completed. We may also consider cases where the solution or replacement generator is operated in parallel until we have confidence that the replacement system is reliable. When we commit to retire a power plant, we may opt to have the plant remain in place unused until the replacement generator demonstrates reliability over several years before deciding to fully decommission the plant.

Researching grid-scale solutions

As part of our analysis, we identified several tools that we can use as part of our 2030 Zero Carbon Plan. These include retirement, refueling and reimagining as well as new technologies such as alternative biofuels, long duration storage, renewable hydrogen and carbon capture. As we implement this plan, we may find that the tool we employ for one thermal asset may not be the right tool for another. We'll focus on place-based strategies and work with our communities where these assets are located to design solutions that ensures Sacramento communities are livable, resilient, and ready to embrace a low carbon future.

While retiring and retooling our gas plants will drastically reduce emissions, the use of natural gas will not be completely eliminated unless we identify sufficient amounts of renewable fuels or develop alternative generation sources. Initial studies indicate about half of our fuel needs after retooling can be met with RNG that we already have under contract. Additional fuel sources or technical advancements are necessary to close the remaining gap and fully eliminate the use of natural gas. We're looking at several options to address this:

- Biofuels and other clean fuels, including RNG, green hydrogen, biodiesel and ethanol.
- Long duration storage which could include technologies such as flow batteries, thermal storage and liquid air energy storage.
- Carbon capture and storage, including the Allam-Fetvedt cycle to assess the feasibility of this and similar technologies in the Sacramento region.
- Pumped storage hydro using our existing UARP dams and hydroelectric facilities.

This research and the ability to secure sufficient volumes of biofuels will allow us to scale up the most promising technologies. We'll continue to evaluate and seek innovative options as new technologies emerge.

As we approach 2030, it'll be important that we remain nimble and ready to integrate these new technology models as they become available ready over the next decade.

Proven clean technologies strategy

Proven clean technologies

- This strategy, when implemented with the natural gas generation repurposing strategy, will reduce our emissions by at least 90% of 2020 levels by 2030.
  - We'll exceed the State 60% RPS target by 30%.
- Continue aggressive customer DER programs.
  - Demand response and flexible load
  - Rooftop solar
  - Customer batteries
  - Transportation electrification
  - Building electrification
  - Energy efficiency
- Develop a robust portfolio of local and regional utility-scale renewables and batteries to complement our thermal retooling plan.
  - Local utility-scale solar 1,100 to 1,500 MW
  - Local 4-hour batteries 700 to 1,100 MW
  - Regional wind 300 to 500 MW
  - Regional geothermal 100 to 200 MW
  - Regional solar 100 MW

As our next strategy, we explored the landscape of proven clean technologies. These are additional zero carbon emission resources that can be developed by 2030 using proven, commercially available technologies. Our 2030 Zero Carbon Plan will rely heavily on proven clean technologies, such as solar and wind.

As we continue to rely more on resources whose output are dependent on weather conditions, there will be increases in variability and uncertainty related to available supply. This will require us to carry more reserves or backup resources to maintain the same level of reliability.

This challenge exists when we have either too much or not enough supply. For example, we must account for how much our solar and wind generation could vary from forecasts within the hour, and ensure that we're carrying enough supply that has the flexibility to increase to meet shortfalls and decrease in order to accommodate excess generation at any given time.

Although these challenges cannot be solved with today's available technology, some of the things that can help alleviate them include:

1) **Diversification of resources**: To avoid over-reliance on any one fuel source, it'll be important to build our portfolio of resources from different technologies. Together, resources from various technologies and geographic locations can complement each other and mitigate some of the weather, timing and over/under-supply risks. To accomplish this, we must continue to research and explore the different resource types and be thoughtful about how we formulate our supply portfolio.
2) **Evolution of energy markets**: Depending on how energy markets continue to evolve, they may be an important to helping us meet carbon reduction goals. Grid

regionalization could accelerate expansion of planning and operations over a larger footprint, which would enhance the grid's ability to efficiently match supply and demand and reduce curtailment of renewable energy. Some of these benefits can be seen in market re-designs such as the Energy Imbalance Market and potentially in initiatives like Enhanced Day Ahead Market. It'll be important for us to monitor these changes and act to influence them accordingly.

3) **Demand side management**: Historically, supply has been responsible for chasing demand and it is our responsibility at SMUD to ensure that this balance is maintained continuously. As the cost to maintain the same level of reliability increases as the proportion of variable and intermittent resources rise, it may make more sense for customers to have a more proactive choice in how this balance is maintained and how costs are allocated. This means understanding customer preferences and staying engaged with our customers will be critical.

The resource build expands SMUD's current resource portfolio and achieves all current environmental commitments and internal directions. The following resources were considered as additions to our portfolio by 2030.

- **Short-term reliability resources**: Short-term market contracts for capacity are generally from gas generators. However, by 2030, batteries may be a market option.
- **Energy storage:** Short duration (4 hours or less) energy storage batteries and pumped hydro.
- **Non-local renewable resources**: Renewable resources outside of SMUD's territory (solar, onshore wind, offshore wind, biogas/biomass and geothermal).
- **Local renewable resources**: Renewable resources inside of SMUD's territory, limited by resource availability (solar and biogas/biomass).

Our proven clean technology scenarios were layered onto the thermal transition options, exploring the limitations of the technologies over the full range of available technologies. Below is a more technical discussion of our findings and includes detailed information on our proven clean technology strategy, information on why we considered prospective technologies, as well as specific information on the technology considered as part of our 2030 portfolio and some potential locations.

Capabilities of today's proven clean technologies

Achieving our ambitious carbon reduction goals without sacrificing reliability and affordability will be challenging. We need to understand how far these technologies can get us. In this section, we highlight the status of mature zero emission technologies available today and comparatively analyze how far these technologies have come since our 2040 Clean Energy Plan.

Our natural gas generators have characteristics that provide valuable energy and reliability services to our power grid. For many of our customers, our natural gas plants are synonymous with energy delivery, but our gas plants do more to keep the lights on than deliver electricity. They're also dispatchable by power system operators and associated real-time control systems to provide grid reliability services. Our gas resource, coupled with our robust hydroelectric system, is why we've been able to deliver energy to our customers at some of the lowest rates in the state with a strong reliability record.

Transitioning to zero carbon emission does not change the need for a reliable grid (see the section on Our commitment to reliable service). As we reimagine our energy system, we must also consider how to replace non-energy products provided by the gas plants such as, capacity, voltage support and reactive power. While there is a wide variety of clean resources, solar and wind are the most economic and abundant resources in California today. However, these resources are highly dependent on the weather. On most days, we can be reasonably confident they'll produce at least some energy, but sometimes thick fog, cloud cover, too little or too much wind or smoke and ash from wildfires unexpectedly reduce energy production. Additionally, generation from these resources do not *precisely* match the timing and shaping of our customer's demand for electricity.

Knowing that there are times when we cannot count on solar and wind like we do our traditional generation resources creates uncertainty. This uncertainty and the underlying intermittency make it difficult to balance our energy supply with demand. The strategies to address these limitations are limited by available technologies. Proven technologies currently require that we build more resources than we need, make sure there is sufficient supply, use energy storage to shift the energy to other times or some combination there between.

Thinking about the average household, most of their electricity use is in the morning when we are getting ready for work and kids ready for school, and in the early evening when we've finished work, are cooking dinner and heating or cooling the house. But in the early morning hours and evening, the sun is low on the horizon or completely set. Also, there are many occasions when the wind isn't blowing during these times. Currently, we fill these "gaps" when solar and wind aren't available with traditional generation resources (such as our gas plants or hydroelectric resources), but as we move toward zero carbon, we'll need to have other options.

Resources included as proven clean technology

The following are the known proven clean technologies. Not all of these technologies are currently accessible due to limitations on development, cost and geographic considerations. With each section, we discuss the technology and the ability of these resources for our plan. The resource potential, or the amount of developable resource, was estimated using SMUD's internal expertise and consultation with Black & Veatch and E3.

Black & Veatch performed a variety of resource assessments, primarily focused on specific geographical areas. E3's analyses were informed by the 2019-2020 CPUC IRP process, and more specifically, the adopted Reference System Plan. Assumptions for the first available year of candidate renewables resource types in the 2019-2020 IRP cycle reflect feasible timelines for bringing resources online based on the current interconnection queue and typical development timelines.

The CPUC IRP assumptions on the technical potential of candidate renewable resources were based on data developed by Black & Veatch for the CPUC's RPS Calculator v.6.3.[58] The Black

[58] Black & Veatch, *RPS Calculator V6.3 Data Updates*. Available at: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Electric_Power_Procurement_and_Generation/LTPP/RPSCalc_CostPotentialUpdate_2016.pdf. Note that although the data was developed with the intention of incorporating it into a new version of the RPS Calculator, no version 6.3 was

& Veatch study includes an assessment of potentially viable sites and resource potential within those sites to determine an overall technical potential for each renewable technology. The Black & Veatch study uses geospatial analysis to identify potential sites for renewable development in California and throughout the Western Interconnection. Table 10 summarizes the potentials by region, which in some cases may change depending on new transmission, resource preference, or our assumed willingness to pay more for new resources.

Table 10. Summary of proven clean technology resource potential ranges (MW)

Resource	Location	Potential (MW)
Hydro	N/A	0
Biomass	Sacramento and surrounding	270-900
Solar PV	Sacramento	1,500-3,764
	Southern CA	22,800
	Northern CA	1,900
Onshore Wind	Sacramento	0
	California	468
	Out-of-state	1,054-1,554
Off-shore Wind	California	1,600
Geothermal	California	41-92
	Out-of-state	183
Storage – Battery	Sacramento	Not limited
	California	

Hydro

SMUD's existing hydro resources will be an integral part of the zero carbon plan as carbon free and flexible assets that are capable of mitigating some intermittency from solar and wind. Although hydro will continue to be a vital part of our system, we did not include new resource potential in this Plan. In our experience, new hydro resources, including pumped hydro, are not likely to be built in California due to the cost, permitting challenges and environmental concerns. We also see a broader trend to reduce the number of existing dams. However, we'll continue to study options to increase efficiencies and the capabilities of our hydro resources as well as procure new small hydro projects as appropriate.

Solar photovoltaics

Solar energy has the largest potential for resource development in California and into the southwest U.S. Solar is the lowest cost proven clean technology available and has potential for local development. Advances in battery technologies make co-locating solar with battery storage a cost-effective option for most projects.

developed. This is because the IRP system plan development process replaced the function previously served by the RPS Calculator.

Through years of development efforts and feasibility studies, we've identified local areas best suited for solar development considering available land, environmental impacts, transmission access and system reliability. Within Sacramento, we estimate nearly 1,500 MW of utility scale solar could be developed with little or no major system upgrades and environmental impacts. Up to 3,764 MW of solar development may be developed locally, at higher cost. More studies are needed to assess the precision of this added cost, including land-use concerns, transmission and electricity system studies.

We also considered the procurement of solar energy resources from other balancing authority areas, including the CAISO. Given the large resource potential available in Southern California, additional out-of-state resources were not considered in this study. E3 assumed we could access to 5% of the CA statewide development potential for solar, yielding access to 22,800 MW of solar in Southern California and 1,900 MW of solar in Northern California, not including SMUD's service territory.

Rooftop solar was also considered as a proven clean technology. Capital costs to build or install these resources exceed three times the price of utility solar. Additionally, SMUD's energy purchase costs for rooftop solar are much greater that the power purchase price of utility-scale solar. In many cases, utility-scale solar can take advantage of scaling for labor and material costs, resulting in a unit cost of nearly $1 per watt (direct current). However, in most residential applications, this cost can exceed $3 per watt (direct current).[59] In addition, utility-scale projects can be oriented to maximize production, whereas rooftop systems are generally limited to the orientation of the house and roof. For example, a 50 MW utility scale PV project could power 15,000 homes, whereas the equivalent rooftop system would only power about 9,500 homes.

Onshore wind

Wind was once the commercially dominant renewable resource in California. However, wind development in California has slowed to a trickle as many prime wind resource areas have already been developed, have new transmission needs or, increasingly, state or local prohibitions are restricting new development. There are no viable locations for wind development within SMUD's service territory.

Solano wind resource area

Typically, during the summer, our Solano area wind resources produce generation that is complementary to our solar generation. As the sun is setting in July, most evenings the Delta Breeze comes through the region, increasing wind generation. As such, our Solano wind resources are especially valuable to SMUD. These resources have the potential to be fully delivered to our service territory and studies on repowering showed the new larger turbines have a complementary shape to our solar resources. Even though delivery of Solano wind resources to SMUD's territory has not been fully studied as part of this analysis, this potential will be a great option for our zero carbon future.

Black & Veatch reviewed the potential of fully repowering all turbines within Solano County, California. Solano County has been heavily developed with wind for several years. Many turbines are of sufficient age to be worth repowering given advances in technology. Black &

[59] https://eta-publications.lbl.gov/sites/default/files/tracking_the_sun_2019_report.pdf

Veatch reviewed existing wind project locations across the county. Sites already developed were assumed to be available for repower. They concluded that repowering and replacing older operating projects in the region could increase energy production in the region with fewer turbines.

California wind resource potential

E3 assumed we could access nearly 10% of the remaining wind resource potential throughout California, in addition to the wind potential identified in Solano, as estimated for the latest CPUC IRP modeling effort. This results in the potential for an additional 468 MW of wind, located within the CAISO.

Out-of-state wind potential

There is vast untapped wind potential in Wyoming and New Mexico. However, much of this potential remains undeveloped due to a lack of existing transmission. E3 assumed we could gain access for up to 1,000 MW of wind in those regions, provided we would be willing to develop new transmission.

Additionally, there is still undeveloped wind potential in Oregon, southern Washington and parts of Idaho. E3 assumed we could access 5% of the remaining potential, as identified in the latest CPUC IRP proceeding. This results in the potential for 554 MW of wind resources.

Offshore wind

The wind potential off the Pacific coast is an untapped and valuable resource. The depth of the sea floor makes developing these resources challenging, which would necessitate floating applications. Many of these areas lack adequate transmission. Despite these challenges, offshore wind is expected to be a viable future resource. Black & Veatch studied offshore wind development off of Humboldt Bay and identified the potential for 1,600 MW of developable wind with the earliest operational year estimated to be 2030. Black & Veatch studied two options, one with new transmission to deliver power to SMUD (a higher cost option) and the other relying on CAISO transmission to access the power.

Geothermal

Geothermal is a baseload resource operating at an 80% to 90% capacity factor. As one of the few resources that is both essentially GHG-free and available to serve baseload needs, geothermal resources can be an attractive future resource option. E3 estimated that we could have access to 10% of California's potential as calculated for the CPUC IRP, or 364 MW. Known locations with geothermal potential include Salton Sea, areas of Nevada and the Wilbur Hot Springs area. The geothermal resources in our 2030 Zero Carbon Plan include existing and new projects located in Northern and Southern California and Nevada. Black & Veatch's assessment indicated there is up to 50 MW of developable locations in Northern California, at higher cost than the resources identified by E3.

Biomass, RNG and biogas

Biomass resources within Sacramento County and the other 15 surrounding counties could generate 270 MW to 900 MW, with the high end of this range costing more because it will cost more to collect and deliver that biomass to a power plant. Black & Veatch identified several challenges limiting the long-term viability of biomass resources. These include lack of long-term feedstock supply contracts for woody biomass resources, opposition from environmental groups regarding existing biomass power plants and competition and pricing of biomass supplies in the Sacramento region. Despite some of these issues and challenges, significant progress has been made in evaluating and documenting carbon intensity issues and benefits for a variety of high-moisture waste biomass feedstocks, particularly in the case of animal manure such as dairy manure.

Research and development activities focused on lowering the cost of biogas upgrading equipment, biomass gasification and synthesis gas cleaning/methanation equipment are needed to make RNG costs competitive with fossil-based natural gas. These focus areas may provide some opportunities for SMUD to obtain research funding.

RNG derived from landfills and wastewater treatment plants appears to be economically feasible for use at our thermal power plants. Black & Veatch estimated that the resource potential for this gas is about 270 MW. However, future study will be needed to identify these locations and assess the viability of collecting the gas.

Energy storage

Today's proven energy storage technologies can address many of our short-term balancing needs. These technologies help store energy for later use improving the flexibility and resiliency of our grid. Excess solar power produced on a particularly sunny day could be stored for use later in the evening when the sun isn't shining. Alternatively, energy storage can help less flexible baseload resources respond to changes in demand, by quickly injecting or extracting energy to match supply to demand.

The current limitations of lithium-ion based battery storage include lower duration, initial cost, lack of tax incentives, battery degradation and state of charge limitations. Many of these limitations such as cost, or lack of tax incentives could change in the near future. These limitations may be offset by avoidance of fuels cost exposure, simple maintenance and operations costs from fewer mechanical parts and the ability to arbitrage negative prices in the energy market or reduce curtailment of renewable generation.

For this Plan, we assumed that our potential for current battery storage is effectively unlimited.

Proven clean technologies complement thermal transition

The most economical proven clean technologies are solar and wind, which are variable and weather-dependent. Generally, on their own, these technologies can provide only limited grid reliability services. Repeatedly, our past studies show that reliance on only current proven clean technologies would be very expensive and would not pass basic reliability tests.

Our studies showed the same results. Aside from the cost, there could be physical impacts and blight on our local communities from the development of thousands of MW of local batteries plus thousands of additional MW of solar PV. That's the 8,000+ MW mentioned as part of our earlier Evaluation of thermal power plant retirement section. A 100% proven clean technology option is untenable with today's technologies. That said, our analyses also repeatedly showed that renewable development costs continue to decline, and in fact, solar PV has declined by more than 30% since we last studied these resource costs as part of our 2040 Clean Energy Plan.

The takeaway is, we need to find a complementary balance of proven clean technologies with the other resource strategies.

With significant reliance upon variable energy resources (VERs), strategies for both periods of abundant and insufficient energy supply will continue to be evaluated and mitigated to ensure sufficient operational flexibility. Part of this analysis will include further enhancements of forecasting technology for VERs as well as the control systems to manage the variability of their power output.

One of our zero carbon solutions will be energy storage. However, while today's storage technology is capable of addressing some of the short-term energy or variability needs, we'll need other solutions to ensure we can maintain reliability. Hydro resources will continue providing support, while being mindful of water supply, as well as environmental and licensing requirements. Continued exploration into the options of LDES will help us identify ways to maintain reliability and reach zero carbon emissions.

Initial reliability assessment

We ensure the long-term ability to serve our customers under all conditions by following federal, state and NERC requirements for reliability and operations. For planning purposes, we plan to have the resource capability to meet load plus a 15% PRM. We conducted a series of studies to evaluate our ability to serve load with only proven clean technologies.

Currently, we rely on 1,380 MW of thermal generation (some imported) to serve load and ensure sufficient capacity reserves are available at all times. We evaluated the impact of removing all thermal generation during the summer peak. Our initial assessment indicated that without SMUD's internal thermal generation, our capability to serve load would be reduced by approximately 1,000 MW (equivalent to peak energy needs of 200,000 homes). In addition, our capability to import power could also be reduced by approximately 200 MW (or 10,000 homes). We also found an opportunity where adding 1,000 MW of proven clean technology at the location of our thermals could increase our load serving and import capability to the current levels, allowing us to continue meeting system demands and ensure reliability and adequacy for our customers. It's important to note that this 1,000 MW must be capable of delivering during summer peak to maintain the load serving capability and import capability required to meet the summer peak demand in year 2030.

Our flexible proven clean technology study informs our plan

Proven clean technologies will be instrumental to achieving our zero carbon goal, especially because energy from solar and wind have become relatively inexpensive. We can easily imagine a world where we can buy enough energy from renewables to meet our load. The challenge is, too much of this energy will come when we do not need it, and conversely, not enough when we do. The tools identified in this scenario analysis will help up address this challenge.

Energy storage looks like it will be the economic choice to shift this generation around so that, on average, we'll have enough energy. We can also build our portfolio with a variety of proven clean tech resources to take advantage of diversity benefits. For example, solar and wind are complementary with wind ramping up in the early evening as solar drops off. The scenario presented here is one of many plausible ways to achieve our objectives. We'll need to explore the reliability of the resources proposed in this Plan within the context of our plans and objectives for our thermal generators.

Under this study scenario, the portfolio build, in terms of nameplate capacity rating (the maximum instantaneous generation rating) is expected to represent nearly 6,400 MW.

Table 11. Proven clean technology resource selection (nameplate capacity MW by 2030)

Resource	Type	Location	Capacity (MW)
Solar PV	Customer	Sacramento	250-500
	Utility	Sacramento	1,100-1,500
	Utility	CAISO	100
On-Shore Wind	Utility	Solano	90
	Utility	CAISO and PNW	300-500
Off-Shore Wind	Utility	CAISO	-
Biomass/biogas	Utility	Sacramento	-
Geothermal	Utility	CAISO/NV	100-220
Battery Storage 4-hour or less	Customer	Sacramento	50-250
	Utility	Sacramento	700-1,100

Scenario modeling results

Our studies found that thermal retooling has a dramatic positive impact on reliability and costs when compared to similar high-renewable energy scenarios. Without the retooled resources, we were only able to develop a resource portfolio that, on average, serve our retail sales with 80% carbon-free resources and reduce our GHG emissions 25% lower than our SD-9 goal (and adopted IRP) by 2030. When the retooling scenario is included, our zero carbon generation (including RPS-eligible renewables, hydro generation and thermal generation from RNG) is approximately 105% of our retail energy sales. RPS-eligible renewables is 90% of our retail sales, 30% more than the current state mandate is 60% in 2030.

This scenario requires a portfolio that generates more energy than we use, mostly excess solar that can be sold to neighboring utilities or curtailed. Our thermal generation has been reduced to only the hours vitally needed for reliability. Although we're currently assuming that the market will be able to absorb or purchase most of this generation from us, our modeling indicates that by 2030, over 15% of the solar PV generation we need to purchase must be curtailed due to the lack of available buyers when the solar is generating. If batteries or alternative storage costs decline faster than expected, additional batteries may mitigate the need for curtailment.

To maintain reliability, our existing RNG contracts must be supplemented by other fuels. Assuming we continue using natural gas for this, our carbon footprint under this scenario is reduced by 90% from today's level. In terms of generation, natural gas comprises under 6% of the total generation we procure. In fact, we are expecting to curtail more solar power than is generated by natural gas in 2030. This does not mean that we can use the solar energy with today's proven clean technologies to displace our gas use. However, this does indicate that there are opportunities for new technologies, such as long-duration storage or renewable hydrogen production, that could absorb our excess solar energy and store it until we need it later in the year.

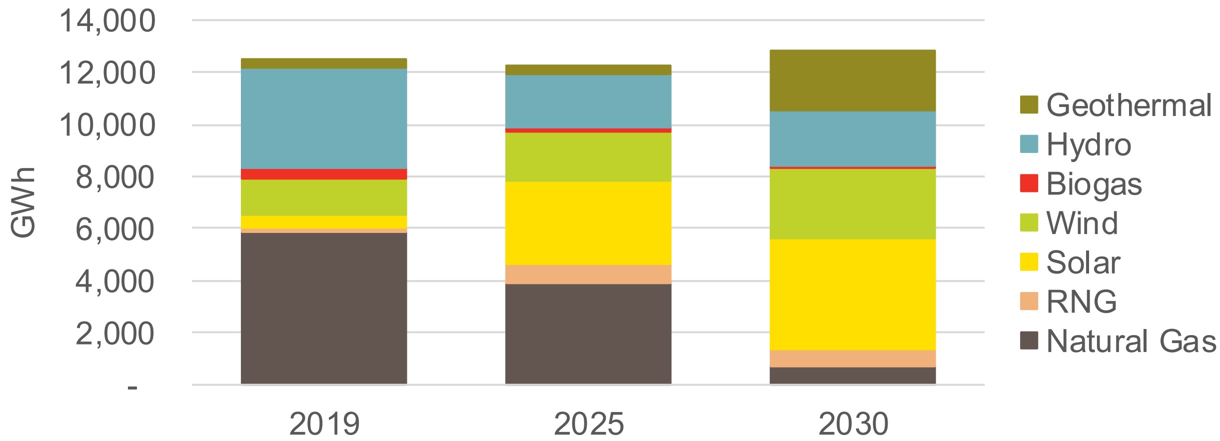
Our reliance on natural gas, compared to 2019, is reduced by nearly 90%. This is the result of retooling of our gas plants, limiting fuel use, and procuring proven clean technologies. In terms of capacity factor (a percentage measure how much a power plant is used), the thermal retooling scenario reduces the average capacity factor from 60% in 2019 to 21% in 2030. Of the 21% capacity factor, 8% is from RNG.

The resource mix that makes up our annual energy use is highly dependent on fluctuations in hydro availability. In 2019, our hydro resources performed above average and we were also able to procure additional zero carbon resources under short-term agreements from the Pacific Northwest. For our 2030 Zero Carbon Plan, we assumed hydro would generate according to average conditions and that we would not have long-term access to short-term agreements from the Pacific Northwest. Future analysis is needed to determine the resource mix needed under low hydro conditions and the impact to renewable curtailment during high hydro years. Additional zero carbon fuels will need to be procured and stored for use during low-hydro years to avoid the need to procure GHG emitting market power.

Figure 9 summarizes the annual generation from the modeling scenario compared to the latest generation data available, 2019. This generation mix includes generation used for retail sales, transmission and distribution losses, and sales to external utilities. This detail is consistent with our hourly carbon accounting methodology, which essentially requires that we eliminate all carbon emissions from our generation mix, whether sold into the market or used locally.

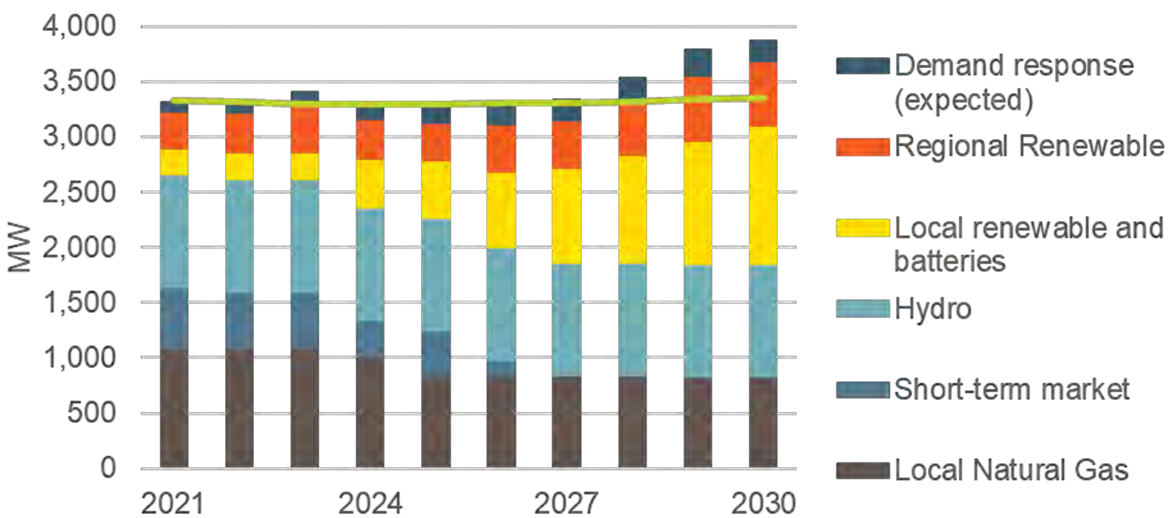
Additionally, this option preserves our power plants in the scenario where our solar is minimum, wind is low and we are in a drought. Even under these conditions, we have an obligation to meet customer electricity needs. If the weather persists, batteries will quickly get depleted and our dams will quickly empty.

Figure 9. Annual generation scenario results compared to actual 2019



The RESOLVE model selected 620 MW of 4-hour duration batteries, for a total of 724 MW of operating batteries in 2030. These batteries, with our flexible thermal and hydro system, will meet most reliability concerns longer than one hour in duration. Figure 10 shows the resource adequacy of the build compared to the PRM. However, intermittent resources, like solar and wind, can vary greatly over a few minutes (or even seconds), something which this model does not solve for.

Figure 10. Resource adequacy and PRM

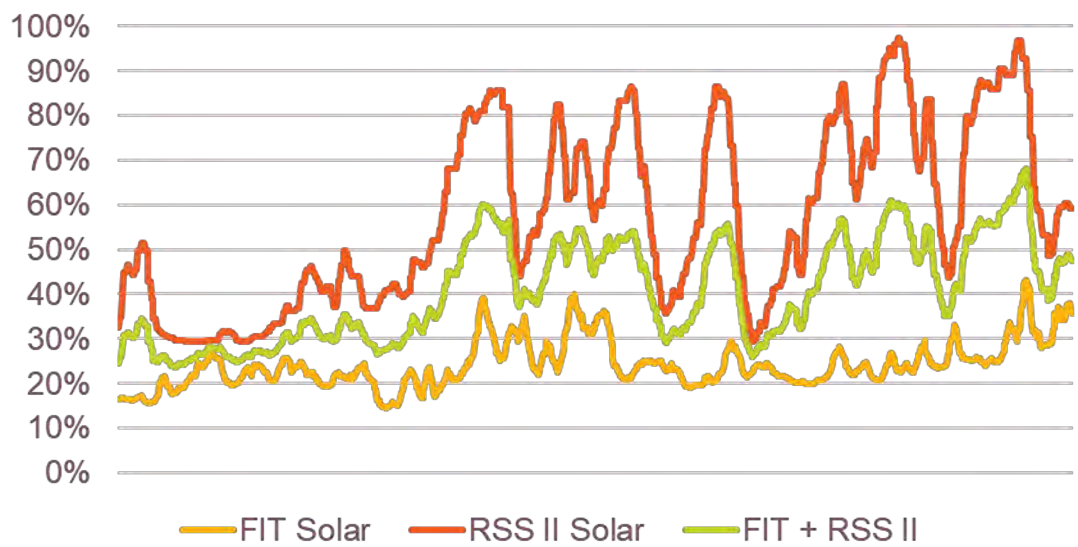


Intra-hour variability

Earlier this year, we began operating our new 160 MW solar power plant at Rancho Seco. This project gave us an opportunity to observe real-time fluctuations on a cloudy day for a large local solar project. Figure 11 shows actual output over a one hour period for our Rancho Seco 2 (RS2) solar project (red line). During this hour, RS2 experienced numerous significant output fluctuations over several minutes with the maximum fluctuation of more than 55%. Each time this occurs, other power plants must either generate more or less to accommodate these changes. As we build more solar within our service territory, we expect to see this occur more and at a greater magnitude.

To mitigate some of these intra-hour variations, we can ensure that there is enough geographic diversity, meaning projects are not located in close proximity. This allows for a time delay as clouds pass over each array. To demonstrate this, we also plotted our FIT projects, which is comprised of several smaller PV systems with some geographic diversity (yellow line). These projects, FIT with RS2, plotted together (green line), represents a possible scenario for solar in 2030, where there is good geographic diversity among most plants, but we have a couple of large projects grouped together. Under this scenario, we still expect to see regular intra-hour variability of 30% to 40% of the total rated capacity.

Figure 11. RS2 and FIT projects output over one hour[60]



Within our natural gas generation repurposing strategy, we identified the location of 400 MW of 1-hour battery storage. The intent is to further reduce the reliance on thermals for sub-hourly needs, such as the solar variation we expect on cloudy days. This, with the resource build identified by RESOLVE, results in a battery capacity of 1,124 MW by 2040. This capacity is on the low-end of what we expect to need to cover intra-hour variability. We'll need a more detailed analysis of the impacts of solar PV deployment on the larger system and the benefits of geographic diversity.

Takeaway for evolving our Plan

Our transition away from natural gas generation with proven clean technologies is the foundation of our 2030 Zero Carbon Plan. These two strategies alone can eliminate 90% of our GHG emissions, possibly more with the development of new technologies. The final 10% will be

[60] Data represent actual metered output in February 2021 between 10:00-11:00 am

challenging to eliminate and will require leveraging partnerships and collaboration with local government, industry and academia as we explore new technologies and business models. These two strategies cannot meet the 2030 Clean Energy Vision on their own. Combined with advanced DER programs and successes in emerging technologies and business models, SMUD has charted a plausible and flexible pathway to being 100% carbon free.

Takeaway: Our 2030 carbon goal is achievable with flexible strategies and innovations in DERs, fuels and technology.

New technology and business models strategy

New technology and business models

- Identify and scale cost-effective DER solutions.
- Develop tools, programs and partnerships that align customer benefits with grid needs.
- Accelerate DER reliability and grid integration to establish operational confidence in advance of major thermal plant transitions.
- Enable DERs to become a standard grid service solution.
- Develop a customer-partner strategy for Virtual Power Plants (VPP).
- Continue providing support to our low-income customer-households and explore additional programs as our DER and electrification efforts evolve.

In the preceding sections, we shared a flexible strategy for a reimagined and highly flexible thermal fleet allowing for maximum integration of proven clean technologies, based on extensive studies. Using these strategies, we found that today's technologies can reduce about 90% of our carbon emissions while maintaining our commitment to providing reliable service to our customers. Also identified in these strategies are new utility-scale technologies and opportunities to reduce carbon further, addressing the remaining 10% of emissions. We've also found that additional DERs will play a critical role in reducing the remaining carbon emissions, provide capacity, help integrate renewables, lowering implementation costs and engaging our customers as partners in achieving zero carbon for the benefit of our entire region.

In the past DERs has mainly focused on rooftop solar and heating and cooling technologies, but as technology advances, this classification group now includes EVs, water heaters, solar panels with smart inverters, batteries and more. Customers are making significant investments in these technologies to enhance their lifestyles, reduce monthly expenses and reduce their carbon footprint. The opportunity for SMUD, our customers and Sacramento is to align the investments in technology and DERs with grid needs so the benefits of DERs can scale beyond the individual to have a community-level impact.

To help meet our aggressive carbon goals we'll need to embrace new technology options by 2030 in concert with the reimagined thermal fleet and robust proven clean technology buildout. To be successful, this will require large-scale customer adoption of DERs, high customer program engagement and advancement in the visibility and reliability of these technologies as a flexible resource. We simply can't do it alone and will need to establish partnerships to accelerate success. We'll focus on collaboration with local government, industry, academia and others to explore and pilot new technology and business models.

Finally, in considering the implementation of any new technology or business model, we must consider the impact on our communities, including the cost of service, environmental impacts and new clean energy job opportunities. We want our communities and customers to be first in line to realize the local job creation and clean energy benefits from our 2030 Zero Carbon Plan, which is why developing community partnerships is so important to our implementation.

Customer-partner plan and other opportunities with DERs

DERs have benefits beyond generating power or reducing load. They can also empower our customers to take charge of their energy use and join us as partners on our carbon reduction journey. New DERs and technologies give us the opportunity to work directly with customers to maximize the benefits of these devices on SMUD's system.

This strategy is our customer-partner plan, which brings SMUD and our customers together as active participants to study and learn from new technology and proactively reduce carbon.

Customer investment in DERs can create considerable opportunities to support the electrical grid, but most often helping our grid services is not the primary reason customers get DER-related devices. For example, smart thermostat settings can be managed by SMUD to control when energy is consumed from the grid, but customer comfort may be impacted. EV charging can be curtailed by SMUD to minimize grid impacts from coincident EV charging within a community, but the time required to charge the vehicle to full is increased. Accessing the potential of DERs requires balancing customer comfort and choice with economic benefit and reliable performance.

The new technology and business model strategy envisions a suite of solutions that engage with customers at a level they are comfortable with.

- **Electrification and energy efficiency**
  - Ongoing efforts, aligned with the 2018 IRP, to accelerate electrification and energy efficiency. Engagement with all customers to provide a seamless transition into an all-electric future.

Behavioral demand desponse
- Education and behavior based opportunities that empower customers to be informed energy consumers.

Bring your own device (BYOD) VPP
- Solutions that encourage customers to utilize the load flexibility of household devices to provide grid services through aggregation.

Contracted capacity VPP
- Suite of DER program offerings that deliver wholesale and location based system services such as energy, RA and ancillary services with powerplant-equivalent reliability.

Electrification and energy efficiency

One of the foundational elements of our 2030 Zero Carbon Plan is our continued focus on and investments in electrification. Recognizing the paramount importance of equity, we will also continue to prioritize under-resourced communities to help reduce the energy bill burdens of our low-income customers and ensure they aren't left shouldering the legacy costs of stranded fossil fuel infrastructure.

New all-electric program offerings that address lack of funds and other issues faced by renters will be critical to achieving our goal of helping low-income customers and under-resourced communities early. We'll expand our partnerships with local agencies and community-based organizations to raise awareness, bring in new sources of funds and accelerate adoption. In addition to bill savings, these electrification programs bring immediate public health benefits by reducing the significant indoor and outdoor air pollution from gas appliances that lack any emissions controls.

When considering electrification of transportation, scaling the charging infrastructure to meet fleet, workplace and multi-unit residential needs presents significant challenges. Large upfront investment is required for charging equipment and it'll take time for them to be used on a regular basis to get a return on investment. Additionally, transportation electrification may require costly upgrades to utility infrastructure.

To address these challenges, the Plan calls for ramping up our program investments in these spaces as well as engaging our business customers with streamlined solutions to overcome barriers, accelerate adoption and unlock access to electric transportation benefits. We'll similarly expand solutions for residential customers to make the switch to EVs simple and easy. We'll further collaborate with our regional partners to coordinate and align efforts for maximum impact. This Plan also includes workforce development to ensure equity in community benefit from the transition to electric transportation.

As more customers electrify their homes, buildings and vehicles, they'll add to Sacramento's overall electricity needs. Because much of this electrification will happen as technologies are advancing, we'll work to ensure flexible load while at the same time, minimize negative impacts by developing DER load flexibility programs. Investments in electrification will also provide a strong foundation for enabling integration of new renewable resources and displacing the need for additional utility-scale storage to accomplish this.

Behavioral demand response

Customer and technology contributions supporting grid decarbonization are not limited to "smart devices" or cutting-edge technology. Significant benefits can come from educating customers on ways to use energy that supports higher levels of renewable generation integration. SMUD's recent transition to TOD rates for residential customers is an important step in this direction. The TOD rate provides daily guidance to customers about when electricity usage is more and less expensive. Customers can adapt their consumption patterns in ways that change the load profile of the community and helps reduce overall grid costs.

On an individual basis, behavioral demand response has a minimal impact. However, this approach is widely accessible and can allow all customers to participate regardless of technology or circumstance.

Small contributions like delaying a load of laundry or turning on a ceiling fan instead of turning down a thermostat can really add up at the community level. When the community is acting in a coordinated way and everyone is doing what they can, the small contributions of individuals have the ability to fundamentally support the grid.

Virtual power plants

DERs provide an opportunity to enhance the capabilities of the existing distribution system, which can enable more cost-effective electrification of transport and buildings. As we explore new business models involving customer DERs, we'll assess their reliability and potential for cost-effective integration. We'll also consider our ability to scale these solutions in place of planned utility-scale proven clean technology investments, such as utility-scale solar and storage.

To build confidence in DERs as equivalent options to utility-scale resources, we'll need to test the operational capabilities and ensure the solutions are cost-competitive with other zero carbon alternatives. This will require proving our ability to layer dispatch to solve distribution capacity constraints simultaneously with economic optimization and reliability constraints from the bulk electric system.

Bring your own device VPP

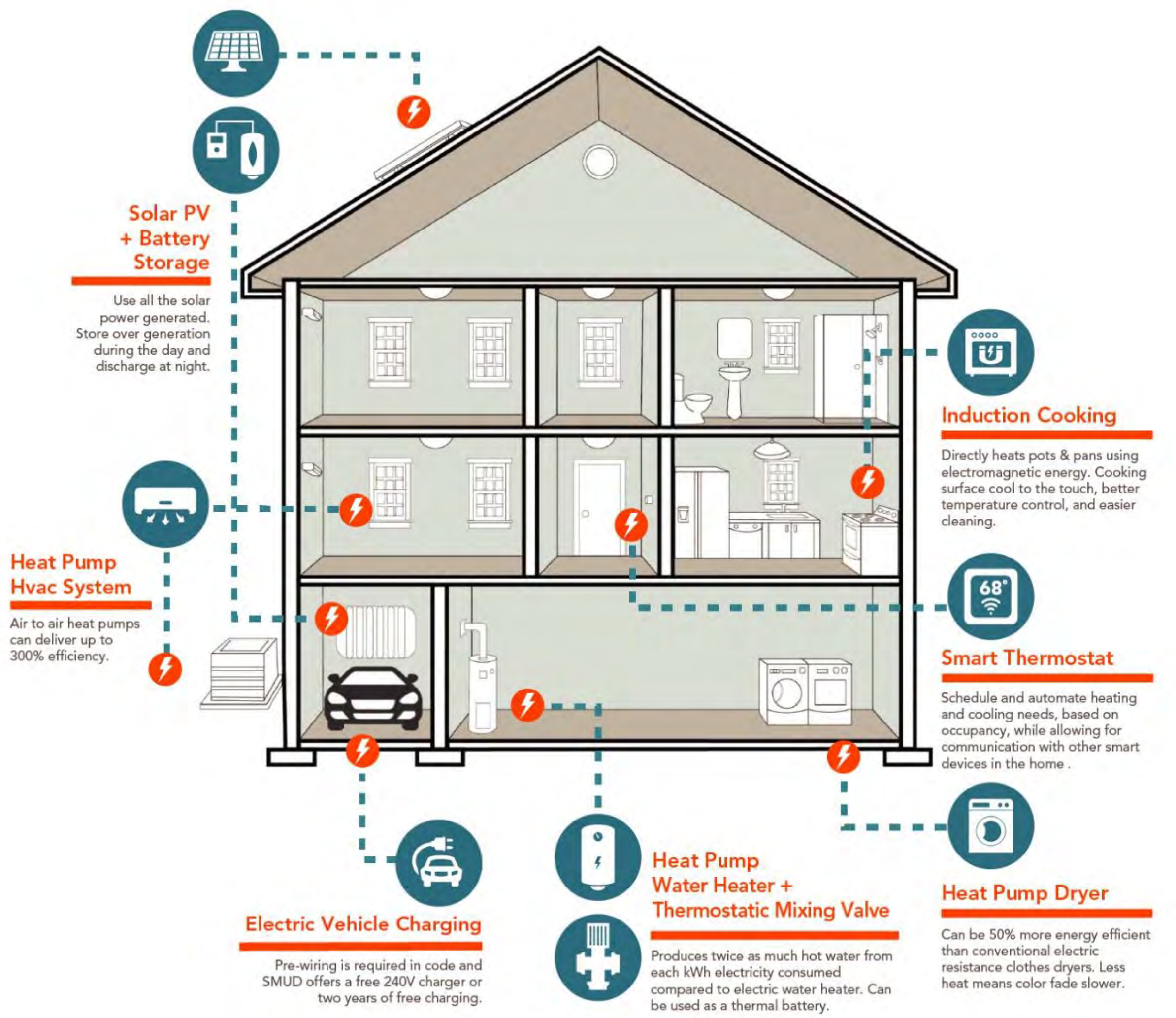
Early demand response programs depended on direct electricity load control of a customer's device, where one-way communication from the utility to the device was used to shed load. These programs were typically focused on air conditioning, but technology limitations meant it was difficult to understand the impact on individual customers. As a result, many customers experienced significant discomfort and would rightfully complain or request removal of a device when activated to support a grid reliability need on a hot day.

Since those early demand response programs, DER technology has evolved to cover a broader range of technologies capable of shifting load rather than simply curtailing it. These programs introduced two-way communication and the ability to manage events in aggregation.

More recently, utilities have started implementing "bring your own device" (BYOD) business models, which leverage the fact that customers are installing smart thermostats, water heaters and EV chargers that can be aggregated to provide energy management services to help meet grid needs.

In Sacramento, more than 85,000 smart thermostats have been installed to date, representing a significant existing potential resource. Thermostat-based programs allow standardized setbacks (e.g., 3 degrees setback from preferred setpoint), which ensures no customers are subjected to unexpected or significant discomfort. Aggregation is not limited to single types of technologies and DERs capable of participating in a BYOD VPP can now be found throughout the house.

Figure 12. Electrification and VPPs



One of the opportunities for this type of aggregation is the ability to leverage the customer's existing wi-fi connection to engage many of these devices. While dependence on this communication path can introduce connectivity risks, the overall cost is far lower than a dedicated cellular connection. This is one of the aspects of the reliability of this type of aggregation that needs to be proven out. A related challenge that we'll need to work on with partners is the fact that many lower income customers may lack both the technology and the basic internet access to be able to participate. Expanding access to both will be important from an equity standpoint.

The BYOD platform will use standardized communication and control interfaces to enable a broad range of technologies to participate. BYOD capacity will be used to provide load-shaping and other grid services as a complementary component to the reimagined thermal fleet.

Solar + storage based VPP

There is significant growth in solar in our service territory and we expect this growth to continue through 2030, much of which we anticipate being paired with storage. Thus, this VPP will look to accelerate the cost-effective deployment of storage with solar and maximize the shared benefits of this technology to both the purchasing customer and to the community.

Not all DERs will be able to provide grid services at a level comparable to a traditional power plant. Thermostats are reliant on temperature, EVs move from location-to-location and energy storage can only provide a finite amount of energy before needing to recharge. However, higher levels of operational confidence will create higher levels of grid benefits. The solar + storage contracted capacity VPP focuses on engaging with leading technologies to provide the most reliable grid services possible from DERs.

Initially, the focus of this VPP will be on solar + storage since these devices are highly reliable and their primary application is energy services. In the future, the intent is to expand into a broader set of technologies including EVs and potential home or building energy management systems.

The platform will contract with aggregators for the dispatch rights to fleets of behind the meter solar + storage systems. DER capacity contracts will be intended to mirror the structure of traditional power plant contracts in addition to consider the unique attributes of DERs. The utilization of the resources may target local grid constraints, providing seasonal capacity, absorbing excess renewable generation or any other grid services needed to support reaching zero carbon while providing reliable energy. Demonstrating success with these approaches could lead to the displacement of hundreds of MWs of future utility-scale solar + storage investments and help lower the cost of shifting away from our existing thermal plant operations.

DER progression plan

Including highly reliable load flexibility programs in our resource portfolio is key to the success of this strategy. These programs must perform similarly to a generator with performance characteristics that are known and can be planned against. This is even more critical if these programs participate in the electricity market. Realizing more value from DERs will allow the incremental value to be shared with customers through low rates and direct payments to customers for their participation. While inclusion of DERs in SMUD’s grid operations can lead to immediate operations and maintenance (O&M) benefits, there may also be times when DER services are valued higher in energy markets such as CAISO.

Figure 13. DER progression plan

For DERs to provide the envisioned benefits, they need to transition from their current promising state to a level of high operational confidence. The goal is for DERs to be fully integrated and optimized as part of normal grid operations. The 2030 Zero Carbon Plan is investigating several technology opportunities to deliver these grid benefits. A key element of the plan is evaluating the programs, determining which elements are effective and scaling those up, while stepping back from components that are not cost effective.

The overall contribution of DERs is dependent upon the types of devices enrolled and the level of collaboration between SMUD and our customers. The result is a range of potential capacity that could be enrolled into load flexibility programs. The expected trajectory will be within that range. The capacity will increase to levels that ensure we establish operational confidence by 2024. As we transition beyond operational confidence, we expect DERs to be evaluated based on cost effectiveness and performance.

Table 12. DER development trajectory

Electrification & decarbonization	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Building electrification	Implementation & pilots		Scale up & expand							
Transportation electrification	Implementation & pilots		Scale up & expand							
Cumulative equivalent all-electric homes (thousands)	54	57	60	65	71	81	93	119	131	154
Cumulative electric vehicles (thousands)	23	29	39	51	70	94	127	170	224	288

DER technology	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy education & behavioral DR	Implementation & pilots			Consolidation of offerings Behavioral DR operation						
BYOD VPP	Implementation & pilots		Scale up & expand		BYOD VPP operation					
Contracted capacity VPP	Implementation & pilots		Scale up & expand		Contracted Capacity VPP operation					
Zero Carbon Base Case Capacity (MW)	7	15	27	44	64	95	141	201	275	364
Expected Trajectory (MW)	8	26	51	80	To Be Determined Based on Cost Effectiveness.					
High DER Potential Capacity (MW)	22	74	164	254	384	529	724	919	1,114	1,325

Key DER initiatives

Rates & programs

As a community-owned-utility, SMUD's journey to a zero carbon future is a partnership with our customers and community. Utility investments in proven clean technologies and customer investments in DERs are mutually beneficial. Although proven clean technologies directly reduce carbon footprint, new customer technologies play a complementary role in the 2030 Clean Energy Vision through rate and program offerings. The following recent or new initiatives in partnership with customers are proposed as part of the 2030 Zero Carbon Plan:

Energy efficiency & electrification

As part of this Plan, SMUD is further increasing its commitment to energy efficiency and electrification programs. By leveraging a carbon metric to measure outcomes, we're realigning our portfolio to maximize its climate benefit. Some of the new program models will introduce midstream marketing/incentives and turnkey "service" offerings so that customers can adopt or transition to new technologies with a lower level of effort. Examples include a revamp of SMUD's Express Energy Solutions and Complete Energy Solutions for building technologies, a turnkey EV charging infrastructure buildout service for commercial customers for fleet and employee workplace charging and a turnkey water heater replacement program that will provide a 1-to-2-day turnaround on a heat pump water heater to replace an existing gas water heater that has failed.

Behavioral demand response - "Flex Alert" pilot

We'll pursue a behavioral demand response pilot project to evaluate load reduction opportunity using customer messaging. Participation will not be prescriptive of devices or require device automation. This is expected to be a one- to two-year project starting in 2021.

BYOD load flexibility - Smart Energy Optimizer and PowerMinder

These projects are currently active. SolarEdge batteries are eligible for enrollment in Smart Energy Optimizer and GE and Rheem controllable heat pump water heaters are eligible for enrollment into PowerMinder. In both offerings, the aggregator optimizes device response to minimize utility supply-side energy and capacity costs. Customers are billed off their existing TOD rate while the device automation courtesy of the aggregators is only responsive on event days. The program terms and conditions allow for 120 events per year. Customers receive an upfront incentive and ongoing bill credit for sharing use with the utility on event days. More than a year of data is currently available from these pilots with the evaluation in progress for Smart Energy Optimizer and soon to begin for PowerMinder. Both programs address a portion of the research needs for the BYOD VPP program model/platform.

BYOD load flexibility & Contracted Capacity VPP- multi-DERs pilot

This pilot focuses on comparing different rate and program groupings. More specifically it'll evaluate a critical peak pricing rate, dynamic pricing rate and an incentive-based aggregator-managed load shifting program (VPP). This project will encompass three DERs types – smart thermostats, EVs and residential battery storage in a BYOD fashion. A Request for Proposals is planned for 2021 targeting a system-wide scale that is relevant to economic operation of SMUD's electrical system (10s of MW). In addition to exploring rate and program models, data will be collected to build confidence on the firmness of load reduction response. This project will address research needs from both the BYOD VPP program model/platform and the Contracted Capacity VPP program model/platform.

Contracted Capacity VPP – Solar + Storage VPP

Programs for solar and battery storage systems will have to be designed with consideration of the successor rate to replace our NEM rate, which is expected to be an element in the upcoming rate process in 2021. Another VPP pilot is proposed, staggered after the multi-DERs pilot with more focused attention on the successor rate. This project will focus exclusively on the research needs of the Contracted Capacity VPP program model/platform with the intent of accelerating the benefits from behind the meter solar + storage.

Managed EV charging

One of the primary interests in utility management of EV charging is to reduce the need for service transformer upgrades due to coincident EV charging when many people are charging at the same time. Service transformer protection allows SMUD to accommodate a greater number of EVs at a lower cost. For customers to enroll in such a program and continue participation, they need assurance that their EV range confidence is not impacted. This assurance may be via a guarantee of a full charge or some minimum rate of charge is provided to the vehicle. Such a program needs to be piloted to evaluate mutual benefit and scalability. Research projects should span both the BYOD VPP and contracted capacity VPP program models/platforms.

Smart inverters

Under SMUD's Rule and Regulation 21[61] (also referred to as Rule 21), new solar interconnections are required to use smart inverters. One of the benefits to smart inverters is access to real time solar generation data which uncovers hidden behind-the-meter loads which is important for grid operations for switching and understanding contingency needs. Smart inverters also offer other functionality such as generation curtailment, reactive power and autonomous modes of operation. Further pathway analysis and modeling for the 2030 Zero Carbon Plan may uncover other priority use cases for smart inverters. Smart inverter utilization and program models are recommended for evaluation and eventual piloting.

Vehicle-to-grid

Vehicle-to-grid (V2G) involves EV batteries capable of discharging energy to the grid. This can act as a low-cost alternative to stationary battery storage. It's estimated that at scale this technology could provide over 250 MW/400 MWh of energy storage. There are two industry barriers to this technology: 1) Warrantied support today is limited to electric school buses only and 2) Vehicles and chargers are lacking hardware interoperability and compliance with utility interconnection standards.

Customer experience is a greater challenge for V2G. Customers will need assurance that utility draw/battery depletion does not impact vehicle use and range confidence. Beyond rate or incentive-based bill savings, in the future V2G could provide backup during outages, which would be an added benefit to customers. Instead of a pilot, smaller scale demonstrations are

[61] https://www.smud.org/en/Business-Solutions-and-Rebates/Interconnection-Information.

proposed. Partnering with industry leaders in demonstrations will help accelerate technology development and create pull for utility interconnection standards and EV supply equipment (EVSE) interoperability to displace stationary storage investments.

Research projects should span both the BYOD VPP and Contracted Capacity VPP program models/platforms. School districts that benefit from CEC and CARB grants are aggressively converting their bus fleet to electric and already require some V2G compatibility. The incremental cost to operationalize V2G with these school districts presents a relatively small barrier compared to other segments.

Equitable access

Bill savings from energy efficiency, building electrification and transportation electrification can benefit low-income customers and under-resourced communities that face socioeconomic challenges or are disproportionately burdened by pollution. The barriers for this segment being able to access energy efficiency, building electrification and transportation electrification are complex and individually unique. The barriers are often a combination of up-front technology cost, lack of information, lack of time or interest to invest in switching technology or a multiple party building change approval process such as tenant-property manager-owner. Variations to programs will need to be available to address this spectrum of challenges for this customer segment. Financing programs could play an important role in this portfolio of program offerings.

IT back office for customer-facing functionality

For load flexibility programs to scale, they must be convenient for customer participation. This means customer-facing functions such as program enrollment, device registration, event messaging, event opt out selection and performance-based incentives/billing all need to be automated. In small scale pilots, many of these functions are manually processed. A road map for automating functionality with determination of what will be supplied by IT partners versus SMUD back office systems needs to be established.

Grid operations

For the full value of load flexibility to be realized, it must be integrated with SMUD’s operational procedures and tools. SMUD’s implementation of our DERMS will be a significant step toward embedded DERs as part of normal grid operations. The DERMS will unleash economic value from aggregated DERs by displacing a portion of generator operation (namely utility battery storage) and energy market purchases and avoiding a portion of operational resources being reserved for transmission and distribution services or reliability.

Financial strategy and options

Financial strategy

- Explore opportunities for savings and cost reductions.
- Pursue grants, innovative financing and other funding opportunities.
- Cultivate new partnerships and collaborations.
- Connect with clean technology investors.

To maintain rate stability and access to credit markets, SMUD manages its finances to meet or exceed several target financial metrics. Some of the externally reported metrics include:

- **Days cash**: A measure of how much cash we have on hand to pay for ongoing expenses.
- **Fixed Charge Coverage Ratio**: A measure of how much cash comes in each year, compared to the principal and interest payments on debt.
- **Net Income**: SMUD's revenues less expenses.

Building the infrastructure, modifying current assets and acquiring the necessary resources to get to zero carbon will require a significant investment. It'll be important to continue meeting or exceeding our financial metric targets to ensure we have access to the capital needed to implement our 2030 Zero Carbon Plan, and protect against larger rate increases in the future.

Our financial strategy is based on taking action across many areas to help ensure that the goals of our 2030 Zero Carbon Plan can be achieved while keeping annual rate increases at or below the rate of inflation. This will require a mix of strategies, which are the focus of this section.

Proposed portfolio rate impact

The proposed resource portfolio represents a significant investment over what was planned before our commitment to zero carbon by 2030. Relative to our 2040 Clean Energy Plan, annual commodity costs are expected to increase from about $60M dollars in 2023 to more than $450M in 2030.

In the short term, these increases are driven by additional wind and solar contracts and resource development. Longer term, increases are driven by large deployments of batteries and geothermal. In addition to these commodity costs, we're planning to make significant investments in DERs and in electrification for under-resourced communities. These investments will help achieve needed changes to patterns of energy usage, while ensuring costs are born equitably among all our customers.

When evaluating these costs, keep in mind the forecast includes expected cost levels for proven technologies which are uncertain and may ultimately be higher or lower than shown here. However, there are steps we can take to reduce costs below these expected levels, such as:

- Working with staff and vendors to minimize cost increases for recurring programs and services.

- Identifying opportunities to streamline processes and reduce costs.
- Creating innovative rate structures to partner with customers on distributed energy investments and incentivize use of technology that supports adoption of renewables.
- Capturing grant funding to offset costs for innovative zero carbon R&D projects, demonstration of new technology and integration of existing technologies.
- Identifying partnerships with energy suppliers, technology companies, governments and academic institutions to create new business models that share the costs equitably and lead to a healthy marketplace.
- Identifying alternative financing mechanisms that provide for partnership funding, grants and/or lower debt service and commodity costs.

Additionally, new technologies are expected to continue improving, and as they're adopted, price and performance will become more certain. Many may achieve significant cost improvements relative to current planned assets, and therefore lower the cost of the portfolio. However, the scale and timing of these improvements are unknown, and therefore are not currently modeled.

Financial strategy

Our financial modeling results are preliminary and subject to change with fluctuations in commodity markets, changes in the economic landscape and advances in technology. As we progress towards our zero carbon goal, we'll continue to seek out opportunities to accelerate benefits by reducing commodity and borrowing costs, increasing operational efficiencies and optimizing partnership and grant funding strategies. Some strategies we may employ are:

- **Identifying priority projects, programs and technologies**: Prioritizing projects and programs across the enterprise, optimization of individual projects and monitoring technologies and costs to control spending.
- **Optimizing and seeking out partnership and investment opportunities**: Seeking Public Private Partnerships for acquiring or divesting of assets. Additionally, we can use our low cost of capital to finance projects that meet our risk profile at cheaper rates than may be included in modeled costs.
- **Identifying additional funding sources**: Seeking partnerships for grants and co-funding, as well as developing business models that leverage LCFS credits, U.S. Environmental Protection Agency (EPA) electric Renewable Identification Number and carbon credits.
- **Employing alternative financing structures and opportunities**: By employing alternative financing structures, such as renewable prepays, we could potentially lower commodity costs. Additionally, if cost effective and available, we could use direct subsidy bonds such as Clean Renewable Energy Bonds and Qualified Energy Construction Bonds. We could also implement a grant capture policy and process to influence awarding agency budgets and align with SMUD projects. All funding opportunities available to SMUD for both zero carbon and non-zero carbon grants should be explored to create as much of a positive impact on SMUD's budget as possible.
- **Managing financial metrics**: Metrics can be adjusted to manage fluctuations in costs, and to smooth out rate impacts over time.

Partnerships

Getting to zero carbon is a task that's larger than any single organization can achieve alone. As such, we're exploring ways to partner with the community at large to pool resources and mitigate risks as we explore new technologies and pursue large-scale projects. Community partners could include businesses, governments, academic institutions, financial/corporate institutions, native tribes, non-profit and philanthropic organizations, other utilities and investors. Each stakeholder brings new resources and perspectives to the challenge facing us, but together we're stronger and more capable of ushering in a zero carbon world.

We'll continue to explore opportunities to partner with others. These partnerships will likely be technology-specific. Some opportunities we're exploring include:

- **Partnering with other energy providers**: These partnerships could help facilitate construction of large-scale proven clean technology projects while achieve cost savings from economies of scale, as well as achieving regional decarbonization goals.
- **Partnering with manufacturers**: These partnerships could result in cutting-edge demonstration projects for technologies such as hydrogen fueled generators, biomass, biogas and biodiesel.
- **Enhancing investment in under-resourced communities**: By leveraging relationships with financial institutions and other businesses, we can work to enhance investment in under-resourced communities. Moreover, we can explore foundation and private investment funding to identify mission-related investments that support our goal of ensuring that no community is left behind in our 2030 Zero Carbon Plan. Examples of these possible funding sources include the Bill & Melinda Gates Foundation, William and Flora Hewlett Foundation and the MacArthur Foundation.

A key element of our partnership strategy is taking a more proactive stance towards identifying and developing potential partnerships. The "One Sacramento" initiative is a key example of this shift, bringing together local governments, academia, regional organizations, industry, under-resourced communities, healthcare organizations and investors. In the past, some of these groups have missed out on potential benefits and valuable partnership opportunities may have been overlooked. By creating a forum to discuss our shared goals, we can expand the array of potential partnerships, streamline planning processes and maximize the regional impact of expected new funding from stimulus and recovery packages and possible Green New Deal funding.

One Sacramento regional partnership

As we decarbonize, we must comb the market for strategic partners that are focused on solving the same problems. Collaboration with government, environmental agencies and private organizations will expand ideas, tackle common barriers to accelerate timelines and co-invest in solutions to lower total decarbonization costs in a coordinated and efficient way. Our grid and customer base can be a platform for innovation, where key partners can gain access to end users and a network of industry and regional collaborators.

SMUD is in the unique position to be a powerful convenor in our region to align resources to maximize our decarbonization efforts. Specifically, we will lead the formation of a "One

Sacramento" regional initiative. This initiative will mobilize a coalition of customers, researchers, civic leaders and private sector partners to advance healthy, affordable and sustainable building, mobility and community solutions and to propose and implement demonstrations of what can be implemented in the Greater Sacramento region's under-resourced communities, serving as a model for the rest of California and across the U.S.

SMUD maintains a unique leadership position in electrification for buildings and mobility, which are supported by our Sustainable Communities program, 2040 Energy Plan, recent climate emergency declaration and involvement with the California Mobility Center. We'll work to prepare the greater Sacramento region to definitively respond to the expected Biden Administration Green New Deal stimulus funding, climate adaption-focused Federal Emergency Management Agency (FEMA) funding opportunities and other opportunities likely to encompass environmental justice, infrastructure to support decarbonization and resiliency and equitable deployment of clean tech to our customers. This intersection of community vision, funding, political will and evolving policies will likely bolster our ability to attract private investment from industry stakeholders.

Our "One Sacramento" initiative will work to attract funding and resources to equitably and affordably decarbonize the current environment and mobility services, and improve community health and resiliency in the Greater Sacramento region. The goal is to achieve zero carbon by 2030 while simultaneously advancing social equity and economic prosperity for the region.

Regional partnerships supporting economic mobility

We also plan to expand partnership pilots to support the goals of our low-income and community engagement and Sustainable Communities programs. In expanding partnership pilots, we plan to:

- Leverage Sustainable Communities investments to identify opportunities to reach communities that are not already represented in the partnership portfolio and/or have limited representation.
- Incentivize current community partners to assist SMUD in achieving our 2030 Zero Carbon Plan through outreach, education, job training, etc.
- Implement additional training programs similar to Energy Careers Pathways that bring needed zero carbon job skills to under-resourced communities.

We're also looking to establish additional partnerships to leverage federal funds to invest in under-resourced communities. With these funds, we intend to ensure that under-resourced communities will have access to the new technologies that will reduce GHG emissions without increasing their energy costs. We'll also continue to work to incentivize companies to bring new companies to bring resources (e.g., new energy efficient businesses and technologies) to under-resourced communities. We're learning about models that other communities are using that can be implemented in Sacramento to bring new energy technologies to under-resourced communities, adding new job opportunities and economic development opportunities for these communities.

We'll leverage our involvement in the California Mobility Center as a conduit to potential innovation partners to accelerate managed charging and V2G technologies. It can also provide a model that could be replicated to attract and build collaboration with stakeholders in the load flexibility and VPP domains.

SMUD must invest in training and hiring to ensure that strategic alignments are formed with well-vetted strategic partners and that ongoing exchange of mutual value is negotiated tactically in order to track and realize benefits for SMUD, our partners and our customers.

Grant funding

We analyzed current and past grant opportunities to develop a forecast of grants that SMUD has a good chance of getting over the next five years. This analysis only includes grants that support the 2030 Zero Carbon Plan and primarily awarded by the Department of Energy (DOE) and CEC because those agencies would be the source for the majority of zero carbon grants. Based on our analysis, awarding agencies will provide the opportunity to capture more than $150 million in grant funding over the next five years.

SMUD has extensive experience applying for and receiving grant funding that make innovative projects and customer programs possible. The recently completed Slab Creek Powerhouse grant started with the Power Generation team responding to a DOE request for information (RFI) and subsequent discussions with DOE on the need for this and the Iowa Hill Pumped Storage projects. Our most recent example is the awarding of $750,000 from California's Department of Resources Recycling and Recovery grant for the North City Landfill where the Environmental Services team engaged with the state to allocate funding in alignment with one of our SMUD projects by educating them on our project needs and timeline. SMUD’s Research and Development department has a Grant Acquisition Management team to respond to RFI’s, engage with awarding agencies, vet opportunity announcements and respond to funding announcements with grant applications and proposals for emerging technology funding opportunities.

In a similar climate of grant funding to support presidential administration goals, the 2009 American Reinvestment and Recovery Act (ARRA) provided several significant grants for SMUD from 2010-2015. SMUD was awarded over $150 million in federal funding for the SmartSacramento® project, the Home Performance Program through the California State Energy Program, Low Income Weatherization, Community Renewable Energy Deployment, Anatolia energy storage and the General Motors and Chrysler fleet grants. These projects were considered shovel ready and immediately generated jobs in the community. These projects moved SMUD toward zero carbon and have laid the foundation and given us the experience needed for our grant work as part of the 2030 Zero Carbon Plan.

SMUD has the potential to capture grants for the 2030 Zero Carbon Plan in two ways. First, the new Biden Administration has indicated that a new recovery act will be developed soon. Second, the DOE and CEC has a history of awarding grants for development, demonstration and research and development projects similar to those discussed in the partnership section of this plan. Research into grant awards shows the history of DOE grant funding to be stable and consistent across both the Obama and Trump Administrations. This trend is expected to continue under the Biden Administration.

To capture a similar level of grant awards with a new recovery act, we'll be ready to apply with shovel ready projects that align with the administration, DOE and CEC goals. Projects identified in the 2030 Zero Carbon Plan appear to align with these goals. Our successful capture of ARRA grants was related to SMUD's great reputation that enabled us to unite our community behind our ARRA projects such as SmartSacramento®. We've worked hard to maintain our positive reputation with the local community by educating and including local organizations in the ARRA projects. Our has built a reputation of successful implementation and grant management by placing the right amount of policy and procedures with the right controls. This ensured that the many audits we received resulted in positive reports to the awarding agencies and no give back of grant funds.

Approach

In anticipation of our zero carbon grant needs, we have implemented new approaches to improve the efficiency of our internal grant identification and application process. This includes taking proactive steps to build relationships with new partners, such as establishing regional forums on shared goals, as well as internally structuring our processes and teams to have streamlined and coordinated approaches to managing grant opportunities. This will allow us to be prepared with quick, yet comprehensive, responses as new funding is announced. Because grant funding opportunities typically require a 30-to-45 day response, we must be ready with shovel ready projects defined, sub-recipients or other partners identified and vetted, and teams with the capability and capacity to build a winning proposal.

Building on this momentum, we can capture grant funding by implementing a grant capture team focused on our 2030 Zero Carbon Plan goals. This team will leverage our current capture process to do three things:

1. Leverage industry partnerships to help define and align agency funding with SMUD projects.
2. Leverage our Government Affairs team and external partners to advocate for zero carbon grant funding.

Government affairs strategy

SMUD's 2030 Zero Carbon Plan will require close coordination across multiple agencies at all levels of government to enable near-term transformation. Governments are serious about addressing climate change, and their investment in SMUD's success will inform policies and pathways for other utilities to follow.

Key objectives

Already, certain policy goals emerge as critical to the success of the 2030 Zero Carbon Plan. As specific projects and technical needs emerge, SMUD's advocacy team will be prepared to advance policies that support those changes and investments.

Partner with Governments on innovation

As the nation's leader in emissions reduction, SMUD will become the partner of choice for government investment in innovative research and commercialization of utility applications for emissions reductions, including public-private partnerships, grants and specific projects.

SMUD is well-positioned to partner with federal and state governments to receive funding for existing and planned carbon reduction projects, with an eye toward achieving shared goals. Many of the projects we'll pursue are likely to be transformative projects that have a public policy nexus, such as electrification of cars and buildings, reduced energy consumption through energy efficiency and demand response and developing additional zero emission generation resources and energy storage.

Accelerate beneficial transportation and building electrification

Building and transportation electrification projects have the ability to promote environmental equity, health and safety benefits for our customers as well as improve load factor in a cost-effective manner to ensure continued affordability. Central to this approach is achieving policy changes that encourage the electrification of buildings and transportation, which will also contribute to further emissions reductions in those sectors.

In 2018, Governor Brown signed an executive order calling for the state of California to be carbon neutral by 2045. Also that fall, the mayors of Sacramento and West Sacramento adopted a joint-city carbon zero goal by 2045. Both of these goals will require electrification of most if not all end uses in buildings and much of on-road transport. To achieve these levels of electrification, gas appliances will need to be phased out in retrofit applications by 2030, and for new construction, the state energy code will have to require all-electric buildings by 2026. On the transport side, phasing out the sale of gasoline or diesel vehicles will need to be done by 2035. These types of policies will require many years of education and promotion of the technologies and their benefits to reach acceptance, both amongst the public and policymakers.

Improve technology standards and permitting processes for infrastructure

Robust efficiency standards must play a role in ensuring the power SMUD generates is not going to waste. After years of inaction on standards at the federal level, new requirements are likely to be proposed under the new administration. SMUD will support strong standards and engage on requirements that impact grid-enabled devices.

As SMUD identifies and begins construction on key projects required to affect the transition to zero carbon, policy support for deployment of renewable generation, storage technology and transmission infrastructure will also be crucial. This may come in the form of streamlined permitting processes, monetizing credit for early action in broader emissions reductions regimes or reducing unintended barriers to deployment.

Strategies

SMUD's objectives are ambitious, so our approach must be determined and focused. The decade of transformation has already begun, and SMUD is vaulting to the forefront of change by building strong relationships with elected officials and decision-makers who will help us succeed.

Educate policymakers

Our first order of business is to tell our key government stakeholders and external partnerships about our goal and strategy for achieving it, which is already underway. In addition to introducing our 2030 Zero Carbon Plan to policymakers in 2021, we'll inform coalition partners, trade associations, environmental advocates and the public about our plans to achieve zero carbon by 2030.

We'll develop an outreach plan for direct, regular and consistent interaction with decision-makers and influencers, utilizing grass-roots mobilization to engage a strong base of supporters and organizational allies to encourage change. Through this Plan, we'll promote our work to key federal agencies that can deliver funding for demonstration and deployment projects aimed at deep decarbonization.

Working across departments, we'll develop and disseminate consistent company-wide talking points and issue papers, provide training on critical issues and execute a strategic campaign to raise awareness of the 2030 Zero Carbon Plan and associated policy initiatives.

Promote beneficial regulation

We'll be highly visible as a champion of policy efforts to reduce carbon emissions, including drawing upon and sponsoring studies, offering technical support and feedback for policy development and partnering with government agencies on physical projects. We'll endorse and support policy proposals that facilitate utility actions to reduce emissions, including government research and development programs in emerging technologies like power-to-gas technology, hydrogen and methane, long-duration batteries and compressed air storage.

We'll identify, evaluate and maintain a list of beneficial programs, projects, rulemakings and legislation that enhances and/or facilitates the clean energy transition, with the highest support for those efforts that specifically facilitate our efforts. we'll work to raise awareness of, and support for, these initiatives through briefings, social media, correspondence and other activities.

We'll also work with policymakers to provide constructive feedback on legislation and regulations, leveraging our technical expertise and engineering capabilities. We'll work individually and through coalitions and associations to shape climate and clean energy efforts, including financial support for and participation in organizations dedicated to clean energy transformation.

Actively work toward reforming outdated policy barriers

We'll proactively identify barriers to the clean energy transition that may be embedded in existing law, and work for their reform. We'll call for pragmatic changes to existing policies that inhibit a speedy transition to clean energy, such as permitting processes and requirements that do not appropriately balance the urgency of climate change against other objectives.

We'll continue to cultivate policy support for necessary reform of existing law when it becomes evident that such policy is an impediment to the 2030 Zero Carbon Plan.

In addition, we'll seek to reframe narratives from our industry and others that discourage ambitious goals or entrench the status quo. SMUD will be an advocate within advocacy groups, and counter opposition or indifference within those organizations. We'll be a voice for what's possible and will challenge assertions that policies should protect existing industries at the expense of emissions reductions.

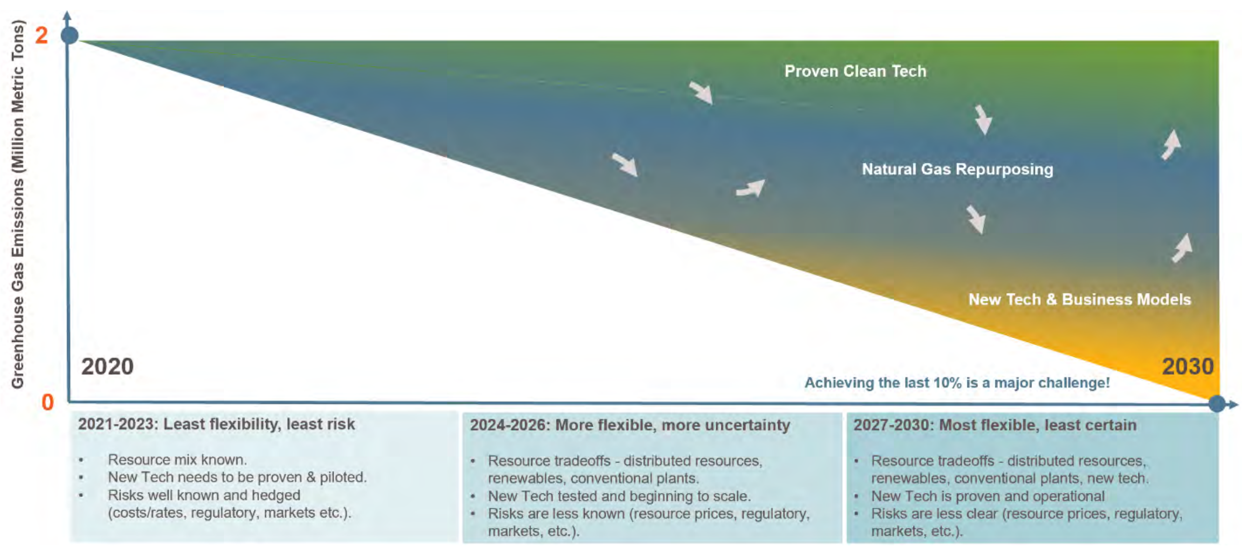
Conclusion

One of the defining features of our 2030 Zero Carbon Plan is that we're seeking to reduce emissions associated with all our electricity generation, not just our retail sales emissions. This exceeds the scope and timing of California's 2045 zero emissions goal as well as virtually all United States utility targets. Our all-encompassing goal will require removing natural gas from our portfolio, which most utilities identify as needed for reliability.

Our strategies support our core values, including maintaining reliability and affordable rates. We'll work with all our communities to ensure that Plan benefits sensitive groups and our under-resourced communities and that it's affordable for all. We'll use a thoughtful, data-based approach to study the reliability of these options before proceeding.

We've identified a broad and flexible road map to get us to zero carbon by 2030. This Plan will, and must, remain flexible to be successful. As we implement one element, we'll need to reassess the system, technology landscape and customer preferences. Clean energy technologies are evolving quickly, and we must ensure we're providing our community with the right solutions over the next decade and beyond.

Figure 14. Illustrative flexible pathway to zero carbon

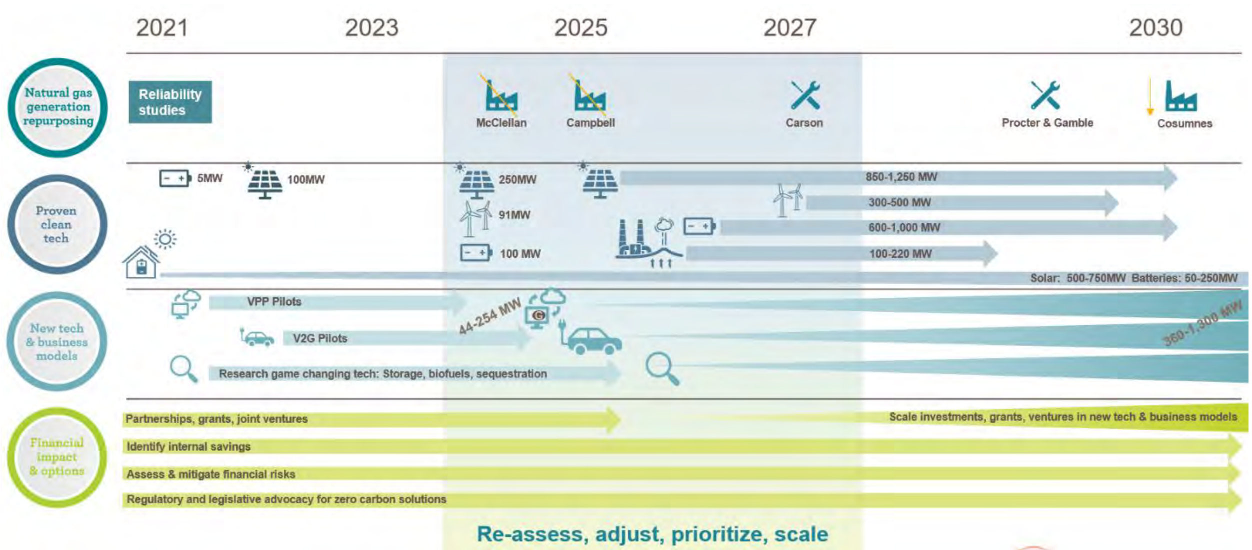


Flexible pathway to decarbonization

What we have discussed in previous sections is not a rigid plan of action, but rather an exploration of scenarios that have and will continue to inform our strategy discussion as elements of our plan become more concrete. As part of our strategy discussion, we modeled a variety of scenarios, each employing different tools available to SMUD as we continue our journey toward zero carbon. As we continue down this journey, we must approach each decision point decisively and educated with the best available information. Through the implementation of this plan, we'll define our pathway and create a comprehensive resource portfolio that, by 2030, will allow us to reach zero carbon.

There is no single portfolio that will help us achieve zero carbon and it will not be a one-time optimization task. Instead, it will be up to us to create a resource mix that balances a variety of sometimes evolving objectives – cost, reliability needs and land-use, among others. We'll revisit these tools often as our priorities evolve and new technologies or business models become commercially available. Figure 15 is illustrative and suggests several possible ways that SMUD could balance the various tools we have at our disposal to reach zero carbon by 2030.

Figure 15. Possible ways to reach zero carbon by 2030



One view of our road map to 2030

While the future is far from certain, we know our power supply in 2030 will be significantly different than it is today. More options will be available, and while we don't know exactly which ones will be in place in 2030 and to what extent, this Plan is the foundation that will get us to zero carbon, with the flexibility to adjust as circumstances change.

The Plan assumes our generating capacity will increase. Under today's technology assumptions, our portfolio, in terms of nameplate capacity rating (the maximum instantaneous generation rating), is expected to grow from around 3,500 MW today (including short-term market capacity) to nearly 6,400 MW in 2030.

Figure 16 shows the capacity break out compared with today. Figure 17 shows one potential breakout of where our renewable resources could be located (local and remote).

Figure 16. 2030 Zero Carbon Plan

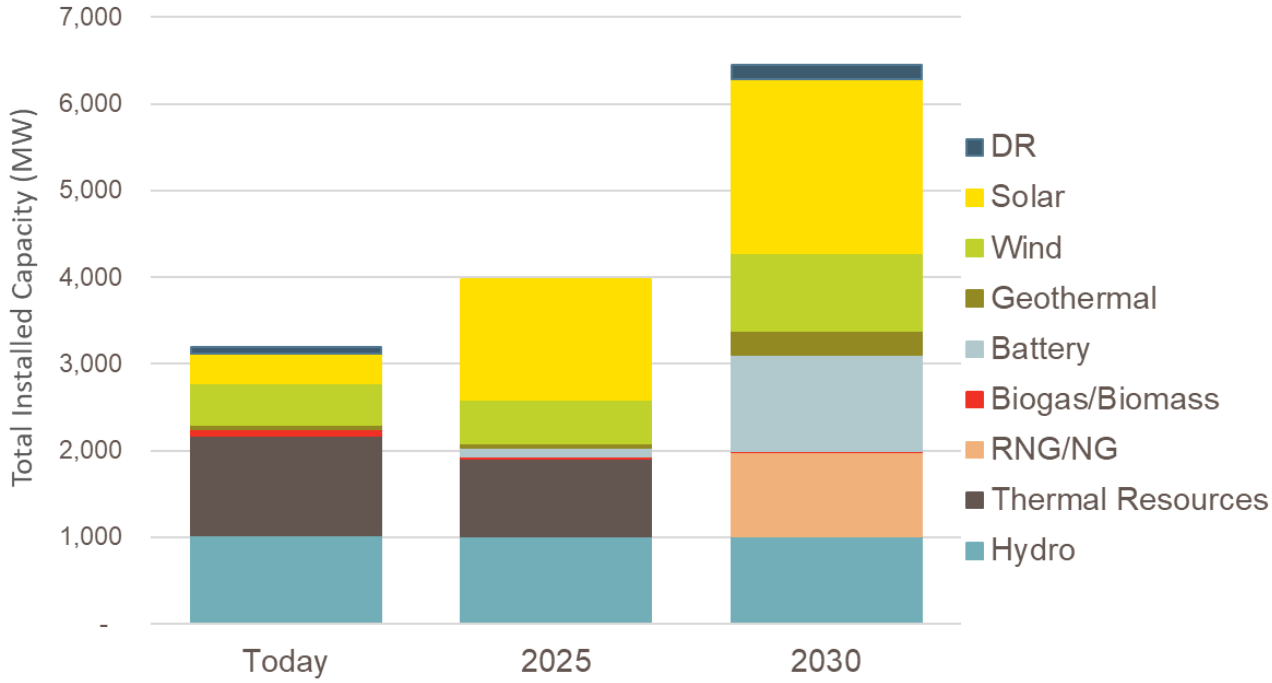
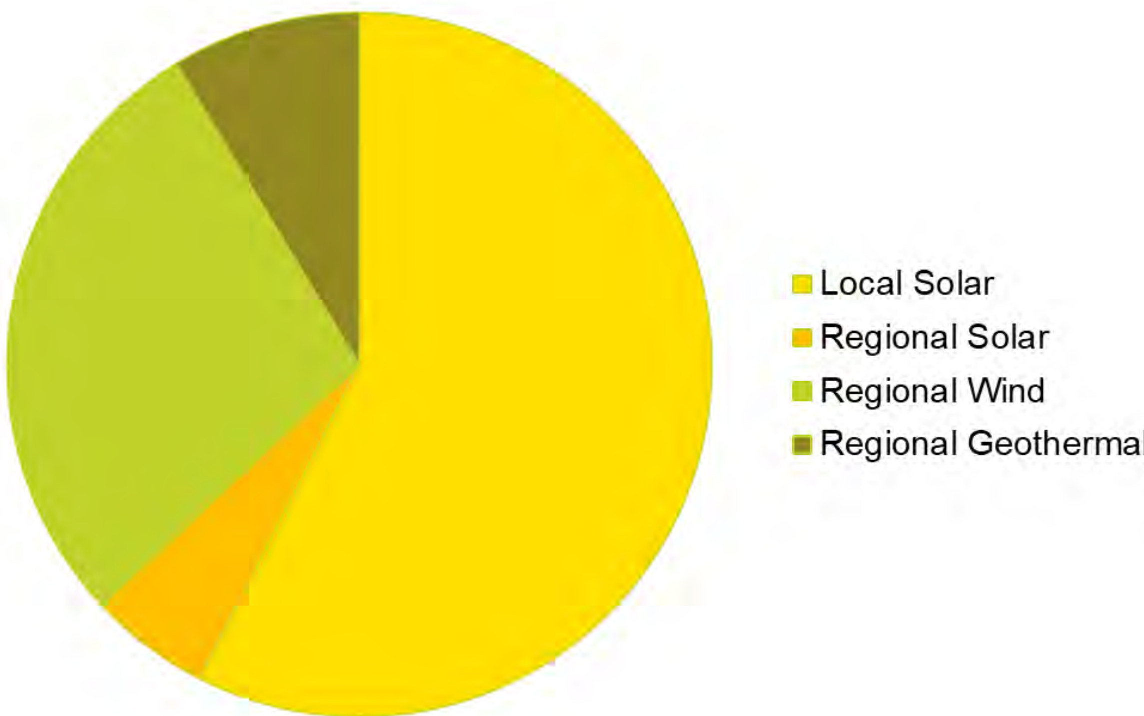


Figure 17. Where might our new renewables be located?

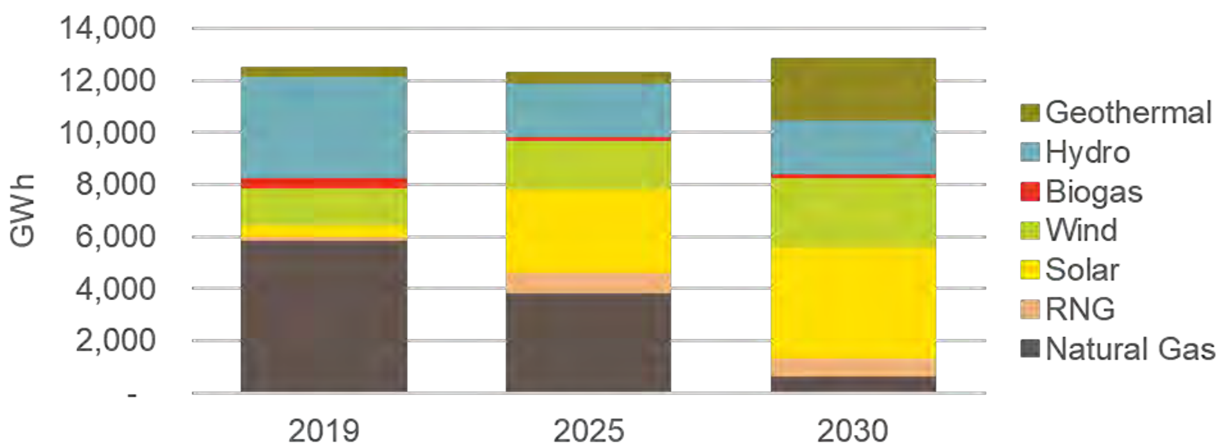


In terms of generation, natural gas comprises under 6% of the total generation. In fact, we expect to curtail more solar power (over 15%) than is generated by natural gas in 2030 in this model. While this does not mean that with today's proven clean technologies we can use the solar energy to displace our thermal assets. It does suggest that there are opportunities for new technologies, such as long-duration storage or renewable hydrogen production, that could absorb our excess solar energy and store it until we need it later in the year.

As compared to 2019, our reliance on natural gas is reduced by nearly 90%. This is mostly due to the retooling of our gas plants to operate as peakers. When used as such under the thermal retooling scenario, the average capacity factor drops from 60% in 2019 to 21% in 2030. Of the 21% capacity factor, 8% is from RNG.

The resource mix that makes up our annual energy use is highly dependent on fluctuations in hydro availability. In 2019, our hydro resource performed above average and we were also able to procure additional zero carbon resources under short-term agreements from the Pacific Northwest. For our 2030 Zero Carbon Plan, we assumed that hydro would generate under average conditions and that we would not have long-term access to short-term agreements from the Pacific Northwest. See Figure 18 for the annual generation break down by technology. Future analysis is needed to determine the resource mix needed under low-hydro conditions and the impact to renewable curtailment during high hydro years.

Figure 18. Annual generation for 2019 and 2030



Customer-partnerships: The road to VPP

Adoption and flexibility of DERs are gaining momentum and show promise as a valuable resource in our 2030 Zero Carbon Plan. Advancements in technology and declining costs are laying the foundation for promising business models that will provide customers with an opportunity to participating in resource programs and share in the benefits. Our building and vehicle electrification efforts are foundational elements to community-wide carbon reductions. Additionally, rooftop solar continues to decline in cost and batteries are reaching market parity with other capacity resources, creating an attractive financial proposition for customers interested in these types of investments. Taken together, we see great potential for technology aggregation to create a VPP.

The capabilities of such a configuration remains to be tested and refined to optimize overall performance and customer experience. We expect that aggregated DERs will have potential and capability to mimic the operations of up to 490 peak MW of the equivalent thermal power plant. The actual resource potential is uncertain until we develop the infrastructure, increase customer adoption of smart technologies and transition local vehicle sales to EVs.

Action plan and risk mitigation strategy

Based on extensive studies, we concluded there is a feasible pathway to achieve zero carbon by 2030, however, there are a number of unknowns and risks that we must be prepared to mitigate. We addressed many of these in the preceding sections, such as development risk, technology uncertainty and cost controls. Other challenges are likely to arise during implementation. Our flexible pathway allows for may mitigation efforts and complementary actions that we can undertake to achieve our goal on time.

Our plan of measurable actions is divided into near-term and mid-term. Long-term actions will be developed as we complete the near-term actions and update the plan in our mid-term review.

Below are our short- and medium-term action plans, subject to change based on new information, economics and technology readiness. These are the areas we'll focus on through March 2024, with ongoing updates to this Plan based on progress and factors that have changed since this Plan was created.

2030 Zero Carbon Action Plan

<table>
<tr><th>Near term action items, to be completed by March 31, 2022</th></tr>
<tr><td>Implement plan for the Natural Gas Generator Repurposing Strategy, including
Feasibility study of the reliability, economics and environmental impacts, focusing on solutions for McClellan and Campbell.
Community outreach, communication and engagement inclusive of all segments.
Study of new complementary utility-scale technologies, fuels and options.</td></tr>
<tr><td>Implement plan for the Proven Clean Technology Strategy, including:
Schedule and options for developing and deploying new resources.
Conduct locational analysis, system impact study and economic valuation and solicit counterparty offers.
Study strategic new technology options complementing the Natural Gas Generator Repurposing Strategy.
Explore delivery options for out-of-area renewables.
Develop and issue competitive solicitation for new proven clean technology projects.</td></tr>
<tr><td>Implement plan for New Technology and Business Models Strategy, including:
Perform information technology system upgrades to enable DERs and VPPs.
Include DERs in operations, distribution and grid planning processes.
Launch new customer-partner pilot programs for VPP Involving thermostats, EVs, rooftop solar and batteries.
Launch pilots for behavioral demand response “Flex Alert”, EV managed charging and V2G demonstrations.
Quantify co-benefits in healthcare, mass transit, construction, internet service providers, etc.</td></tr>
</table>

Near term action items, to be completed by March 31, 2022
Evaluate the 2030 Zero Carbon Plan for NERC Reliability Standards, system adequacy requirements, operational reliability requirements, and new reliability services contributions. • Transmission system studies are completed, and a mitigation strategy is proposed for any identified violations. • Operational recommendations for mitigating intra-hour variability. • Data on expected grid reliability contribution based on New Technology and Business Strategy modeling.
Perform reliability assessments • Evaluate operational reliability requirements to manage the variability of solar and wind generation. • Evaluate grid reliability services contribution from VPPs, DERs, demand response and load flexibility. • Perform detailed studies of sub-transmission system impacts from the re-tooling of the Carson Ice generation plant.
Set internal goals for operational efficiencies needed to manage risks to rate impacts.
Organize grant capture team to proactively seek opportunities for funding partnerships and research with manufacturers, vendors, government agencies, utilities and research institutions.
Engage government, agencies and policy makers • Brief policymakers on the 2030 Zero Carbon Plan. • Advocate for and support electrification policies • Support cities' and county General Plans and Climate Action Plans • Connect with federal agencies and policy makers on climate action and our 2030 Zero Carbon Plan
Identify new workforce skills needed to support zero carbon technologies. Determine if these are net new jobs or upskilling of existing workforce. Careers can span zero emission vehicles, building electrification, etc.
Develop and implement a comprehensive regional communications, marketing, outreach and educational effort.

Medium term action items, to be completed by March 31, 2024
Update and implement Natural Gas Generator Repurposing Strategy, including • Finalize solution for McClellan and Campbell replacement. • Conduct comprehensive reliability analysis and retooling (or retirement) plan for each thermal generator location and update retooling plan annually as necessary. • Update our research and development plan for new large-scale technologies. Seek expertise and opportunities to partner, research and fund projects.
Update and implement the Proven Clean Technology Strategy, including: • Identify and develop the next set of renewable resources and storage needs locally and regionally with plausible delivery options. • Identify and solicit additional clean tech resources. • Update feasibility study of the reliability, economics and environmental impacts, focusing on solutions for retooling Carson and Proctor & Gamble.

Medium term action items, to be completed by March 31, 2024
Update and implement plan for New Technology and Business Models Strategy, including: • Accomplish planned system upgrade. • Accomplish future rates development • Continue to refine new programs and pilots and nurture partnership & grant opportunities. Collaborate with utility peers to support common interfaces to technology and program innovation.
Continue to study and monitor the impact of the plan on both distribution and transmission system. Perform transmission reliability studies to comply with the NERC reliability standards, load serving capability and import capability studies.
Continue to evaluate VER impact on operational practices and system conditions.
Set 2022 budget and 2022/23 rate increases with initial plan limits. Determine optimal borrowing strategy to meet plan and make necessary adjustments as part of the biennial Rate Case process.
Focus project outreach on residents within the recommended radius of each thermal plant based on key findings from scope study and partner feedback Identify community partners to develop training programs (upskill or entry-level) to support new zero carbon technologies. Develop strategies to attract (marketing, career pathways etc.) under-resourced communities to these stable, economically mobile careers.
State-level Actions: • Maximize CARB Cap-and-Trade allowances. • Protect LCFS revenue. • Support agency implementation of Governor's Executive Order on EV-only sales. • Protect against legislation that creates barriers to implementing our 2030 Zero Carbon Plan, such as costly mandates and funding of non-zero carbon transportation fuels. • Advocate for legislation that aligns with zero carbon priorities, including transportation, building electrification and zero emission technology funding and research.
Regional and local activities: • RMI SMAQMD NOx standards campaign. • City of Sacramento Electrification Ordinance adoption and support. • City of Sacramento Climate Action Workplan. • Building electrification and EV permit data and streamlining. • City of Sacramento EV Blueprint Phase II Implementation.

Risks and mitigation strategy

As was the case with our 2040 Clean Energy Plan adopted by the Board in 2018, any long-term market outlook carries significant uncertainty and there are many factors that could cause us to re-evaluate and adjust our plans by 2030. For example, a downturn in the economy may slow load growth as well as customers' willingness to invest in new technologies or programs intended to help meet our goals. Similarly, if costs for battery storage, solar PV or other emerging technologies decline faster than currently expected, there may be cause for SMUD to accelerate investments in these technologies or add them to the solutions to meet the 2030 goals.

Key risks

We have identified the following risks and developed a high-level risk mitigation strategy to that will allow for us to adapt as challenges occur.

Technology

Even proven clean technologies may experience negative impacts to performance due to factors such as the impacts from climate change on weather or other long-term changes beyond 2030 in load or customer behavior. Given this, knowing which technology will prevail in cost and performance is impossible.

Many utilities are wary of defining an inflexible strategy too soon and limiting their options. They don't want to presume the best technology before absolutely necessary. SMUD's carbon reduction goal is the most ambitious goal of any large utility in the U.S., so these considerations are of even greater importance for us. Some utilities are choosing to defer decision-making, while others approach their goals through investments in research and development but given each utility's small size relative to the market, it's difficult to have a meaningful impact. However, paralyzing indecision is also untenable and costly.

Our strategy for overcoming these hurdles is to embrace flexible planning that regularly assesses risks and opportunities, new technology advancements and applications of new business models that advance SMUD toward zero carbon.

Climate change

In recent years climate scientists have emphasized the interrelated nature of cascading and compound events, such as years of drought followed by extreme precipitation leading to excessive vegetation, wildfire and then mud slides resulting from new storms. As climate changes progress, California's already variable climate is expected to experience even greater extremes in the years to come. SMUD's infrastructure, our outdoor employees and our customers are vulnerable to these conditions, which will likely demand system hardening and other changes to adapt to shifts in electrical demand and working conditions.

As SMUD prepares to make significant additional investments in our zero carbon pathway, we must also consider how a host of new technologies and approaches to supplying electricity could be enhanced or constrained by the projected changes in the climate, both within our region and throughout the western United States. As such, each proposed investment in new technology or service delivery included in the 2030 Zero Carbon Plan must undergo customized evaluation or stress testing with consideration of the climate projections that could impact the end user and the operational conditions, performance and the life of the asset or measure.

Additional, solution-specific and location-specific climate research will be conducted as the plan is further developed. This research must encompass not only conditions anticipated in Sacramento County but in all the regions where we may source electricity, critical equipment and supplies. And we can act on new findings related to regional urban heat island[62] and

[62] https://climatereadiness.info/uhi-project/.

actually reduce ambient temperatures by investing in cool roofs, cool pavements and walls and urban greening in targeted areas.

Facilitating the awareness and incorporation of projected climate changes into SMUD's research, planning, design, operations and emergency response efforts is essential to prolong the life of our non-emitting resources, avoid additional stranded investments, increase the likelihood of new technology performance to expectations and to minimize unnecessary cost to our customers. It'll demand broader engagement throughout SMUD's management and the organization than has been the case in the past, to better connect operational knowledge with information about likely future conditions that will continue to shift over time. Implementation of the California Public Utility Commission's recent decisions[63] related to climate adaptation, which specify cross-functional and executive involvement in addition to specific data and planning criteria, will be an important step in this direction. This is also an area of great potential for collaboration throughout the region to build or evolve social and physical infrastructure that can address immediate needs and help us prepare for the future.

Regulatory

California's environmental regulations are continually evolving as the state pursues its low carbon goals, which in turn could have a significant impact on our costs of generating and distributing power. For example, RPS goals through 2030 have been revised higher to 60% by SB 100 just after passage of an increase in RPS from 33% to 50% by 2030, set under SB350 in 2015. Currently, numerous laws have been introduced to further require decarbonization of electricity. While we support these laws in general, we'll need to watch closely as new limitations are imposed and our options are restricted.

For us to reach our 2030 goal, we will continue to target programs and infrastructure supporting electric transportation and buildings. We must also be working on the leading edge of research, experimenting and deploying new technologies and customer programs. Although we anticipate regulatory changes to support electrification, this will take time to implement.

Development and land-use concerns

Our 2030 Zero Carbon Plan relies heavily on proven clean technologies to decarbonize our energy system. Currently, the most economical resources are wind and solar. These systems have large geographic footprints that require thoughtful development strategies, including alternative technologies, like rooftop solar and bioenergy. However, the local potential for other technologies is highly limited in the Sacramento region.

Economics

Solar and wind costs have steadily decreased in recent years to historic lows. These resource costs are susceptible to land value, incentive expiration (investment tax credit/production tax credit), political climate, environmental regulations and the cost of material to create them. Resources such as battery storage used to balance renewables are projected to decrease significantly over the next 10 years, which would allow for lower cost deployment of these valuable balancing resources when needed.

[63] https://www.cpuc.ca.gov/climatechangeadaptation/.

Economic downturns, pandemics or factors that slow growth in regional jobs and population could change relative costs of goods and services that could warrant adjustments of our plan. Additionally, higher than forecasted market prices could create upward pressure on costs and rate projections and dampen the adoption of transportation and building electrification.

Infrastructure planning

We completed preliminary studies assessing the impact that removing all of our thermal generation during summer peak would have on the load serving capability and import capability for our transmission grid. The study results indicate that without SMUD's internal thermal generation, our capability to serve load would be reduced by approximately 1,000 MW (equivalent to 200,000 homes in the middle of summer). In addition, our capability to import power would also be reduced by approximately 200 MW (or 10,000 homes). The studies also indicate that 1,000 MW of renewable generation would need to be added to SMUD's transmission system at ***specific locations*** to return our load serving capability and import capability to the current levels.

When the 2030 Zero Carbon Plan is refined, additional studies will be performed to ensure the adequacy and reliability of SMUD's transmission and distribution systems.

Reliability

As our portfolio includes more solar resources, we'll need to account for the intra-hour variability and carry additional flexible resources. Solar resource output can widely swing due to local cloud cover and smoke, reducing output by over 60% in minutes. We must continue assessing this and developing our operating reserves structure to evaluate any needed changes.

Risk mitigation

This plan defines four flexible strategies to achieve our 2030 Zero Carbon Plan. We have chosen flexible approaches because a significant amount of work and additional analysis is needed to ensure we continue to provide safe, reliable and affordable power to our customers while advancing toward our ultimate goal of zero carbon.

There are methods for developing dynamic road maps to ensure achievement of the optimal strategy in the long run given changing circumstances. One such planning regime that avoids indecision is an adaptive road map utilizing a least-regrets decision analysis framework. These strategies allow us to use the information we know today to make the best possible decision, while considering all known unknowns, allowing for course correction and maintaining cost and reliability constraints.

To further address uncertainty and risks associated with changing regulatory framework, we have proposed a robust government affairs strategy. As part of this, we will work with regulators and policy makers to encourage flexible policies to support carbon reductions.

Flexible and adaptive strategies

Adaptive planning uses decision-tree analyses where each branch represents one possible version of the future and each decision node denotes where there are forks along the tree. This method can provide insight into the sequencing of actions over time, potential lock-ins and path dependencies.

An adaptive plan can be thought of as a series of possible actions optimized to achieve some objective under the given scenario conditions, where there are several scenario conditions (e.g. future technology cost uncertainty) and therefore several pathways. Each possible strategy along the plan can be linked, to a certain extent, to capture strategy interdependencies and allow for changing contributions by each strategy as needed. Initially, any strategic path can be chosen, but as one moves down a selected path, moving to another path, or adapting to changing conditions outside of the particular scenario conditions optimized for, becomes more difficult.

This challenge is known as lock-in or path dependency. Typically, the more actions taken along a particular strategy, the more difficult it will become to adapt to future changes. Central to adaptive plans are tipping points, which are the conditions under which a pathway no longer meets the clearly specified objectives which trigger an evaluation and path transition. The key point of tipping points is to avoid costly ramifications from lock-in on a non-optimal path.

Least-regrets decision analysis is a method which could be used in tandem with an adaptive road map to determine decisions at each node or fork that minimize regret-costs. This method analyzes each decision along an optimal path (e.g., plant retirement or resource investments in our 2030 Zero Carbon Plan) under a set of different future trajectories to test the robustness of each decision to changing conditions. The analysis is used immediately prior to a decision being made, or in the case of a new initiative, on the first set of initial decisions required.

The first step is to determine no-regrets decisions, which are decisions made in every possible version of the future analyzed (e.g., solar investments are made in every scenario for SMUD's carbon neutrality analysis). These are decisions which can be made immediately if need be and represent little to no risk. The next step is to determine the set of initial decisions beyond the no regrets decisions and choose the option with the least-regrets costs. To calculate regrets costs, each decision, in turn, is "made" in the model and the model is run to determine possible cost impacts of this decision given uncertain futures. The decision that minimizes cost across various versions of the future is the least-regrets decision.

Board reporting schedule and check-ins

To ensure our Plan is taking advantage of technology advancements and addressing changes in market conditions, we'll conduct biannual IRP updates, which will incorporate changes needed to meet our 2030 zero carbon goal. In addition to biannual IRP updates, the Board will be updated on progress through our annual Strategic Direction reporting.

Glossary

Ancillary services: Services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the transmission system in accordance with good utility practice. The Ancillary Services include system balancing and control, frequency response, regulating reserve, contingency reserve, energy imbalance and voltage control.

Balancing Authority Area: The generation, transmission and loads within the boundaries of a balancing authority. The balancing authority is responsible for maintaining load-resource balance within this area.

Black-start capability: Capability of a generator to start up without support from external power sources, which is needed in the event of a system blackout to energize other equipment and restore the system.

California-Oregon Border: Trading hub for the transfer of power from the Pacific Northwest and California.

California-Oregon Transmission Project: Transmission project connecting the Balancing Area of Northern California with the California-Oregon border trading hub.

Capacity: the maximum output an electrical generator can produce (i.e., MW)

Carbon accounting: the processes used to quantify the amount of carbon dioxide an entity (such as an organization or a country) emits.

Carbon sink: a reservoir able to accumulate and store carbon dioxide for an indefinite period of time; it absorbs more carbon than it releases

Days cash: A measure of how much cash we have on hand to pay for ongoing expenses.

Distributed energy resources: energy solutions where customers implement technology that change how they use energy. They can include, among many others, rooftop solar, energy efficiency improvements, demand response and batteries.

Energy: the amount of electricity a generator produces over a specific period of time (i.e., one hour – MWh).

Fixed charge coverage ratio: A measure of how much cash comes in each year, compared to the principal and interest payments on debt.

Frequency response reserve: The amount of the reserve that is online and can automatically respond to system frequency change.

Inertia: Physical resistance to frequency changes in the first few seconds following a system disturbance before generator frequency response kicks in. This resistance to change (typically from large rotating generators) gives automated control devices needed time to respond.

Market price: The price at which supply equals demand for the day-ahead or hour-ahead markets. Market-based pricing is set in open market systems of supply and demand under which prices are set solely by agreement as to what buyers will pay and sellers will accept. Such prices could recover less or more than full costs, depending upon what the buyers and sellers see as their relevant opportunities and risks.

Net income: SMUD's revenues less expenses.

Operating reserves: The total capacity above the load demand required to provide regulation and to cover the load forecasting errors, planned and unplanned equipment outages and system emergencies. It includes regulating reserve, contingency reserve, frequency response reserve and other reserves that a utility decides to preserve for unexpected situations.

Planning reserve margin (PRM): Additional reserve margin for long-term planning equal to 15% of SMUD's load.

Reliability adequacy: we have adequate grid reliability services to keep the electricity flowing. These services are sometimes referred to as ancillary services and include additional generation capacity and generator capabilities that we need to respond to sudden changes in system conditions and system disturbances, frequency response, generation and load balancing and voltage control.

Reliability: the ability of the power system to provide the services our customers expect when they want and need them, even under difficult circumstances.

Renewables Portfolio Standard (RPS): a regulatory mandate designed to increase production of energy from renewable energy sources. In California, it sets renewable energy procurement requirements for load-serving entities.

Resource adequacy: a condition in which we have acquired adequate resources to satisfy our forecasted energy needs reliably.

Short-lived climate pollutants: potent climate pollutants that have relatively short atmospheric lifetimes (relative to carbon dioxide). These pollutants include methane, hydrofluorocarbons, and anthropogenic black carbon.

Sustainable community: a community with a healthy environment, a prosperous economy, and equitable access to the multiple essential community components necessary to ensure a high quality of life including livable wage employment and training opportunities, affordable housing options, transportation and connectivity, health care access, nutrition, education opportunities, and digital access.

System adequacy: we're capable of serving our load under extreme weather conditions and identify our system's energy import limits.

System peak: Maximum annual energy demand within SMUD's service territory.

Under-resourced community: these communities lack equitable access to the multiple essential community components necessary to ensure a high quality of life, including but not limited to livable wage employment and training opportunities, affordable housing options, transportation and connectivity, health care access, nutrition, education opportunities, digital access and a healthy environment.

Variable energy resource (VER): a generation resource where the output is not perfectly controllable by a transmission operator and is dependent upon a fuel resource that cannot be stored/stockpiled, and availability is uncertain. Examples include solar and wind.

Acronyms

ARRA – American Reinvestment and Recovery Act
BANC – Balancing Authority of Northern California
BYOD – bring your own device
CAISO – California Independent System Operator
CARB – California Air Resources Board
CEC – California Energy Commission
CO – carbon monoxide
CPUC – California Public Utilities Commission
CVFA – Central Valley Financing Authority
DERMS – Distributed Energy Resource Management System
DERs – distributed energy resources
DOE – Department of Energy
dth – dekatherms
E3 – Energy + Environmental Economics
EI – emission intensity
EPA – U.S. Environmental Protection Agency
EV – electric vehicles
EVSE – electric vehicle supply equipment
FEMA – Federal Emergency Management Agency
FERC – Federal Energy Regulatory Commission
FIT – feed-in-tariffs
GHG – greenhouse gas emissions
GWh – gigawatt hours
HVAC – heating, ventilation, and air conditioning
ILT – Innovation Leadership Team
IRP – Integrated Resource Plan
kV – kilovolt
kW – kilowatt
LCFS – Low Carbon Fuel Standard
LDES – long-duration energy storage
MED – Medical Equipment Discount Rate
MW – megawatt
MWh – megawatt hours
NEM – net energy metering

NERC – North American Electric Reliability Corporation
NOx – Nitrogen Oxide
O&M – operations and maintenance
PM10 – particulate matter smaller than 10 micrometers in diameter
PRM – Planning Reserve Margin
PV – photovoltaic systems
RECAP – E3's Renewable Energy Capacity model
RESOLVE – E3's Renewable Energy Solutions model
RFI – request for information
RMI – Rocky Mountain Institute
RNG – renewable natural gas
RPS – renewables portfolio standard
RS2 – Rancho Seco 2 solar project
SEPA – Smart Electric Power Alliance
SLCPs – short-lived climate pollutants
SMAQMD – Sacramento Metropolitan Air Quality Management District
SMUD – Sacramento Municipal Utility District
SOx – sulfur dioxide
SPA – Sacramento Power Authority
TBD – to be decided
TOD – time-of-day
UARP – Upper American River Project
V2G – vehicle-to-grid
VER – variable energy resource
VOC – volatile organic compounds
VPP – virtual power plant
WAPA – Western Area Power Administrator

Appendix A: Existing SMUD resources

Table 13. Description of SMUD resource capacity as expected available in July 2021[64]

Resource	Resource Type	Fuel	Nameplate Capacity (MW)	Summer Capacity (MW)
Campbell	Combined Cycle	Natural Gas	178	170
Carson	Combined Cycle, Cogen	Biogas & Natural Gas	111	103
Cosumnes	Combined Cycle	Biogas & Natural Gas	621	576
McClellan	Gas Turbine	Natural Gas	72	72
Proctor & Gamble	Combined Cycle, Cogen	Natural Gas	193	166
UARP	Hydroelectric	Water	688	675
Southfork PH	Hydroelectric	Water	2.7	1
Chili Bar	Hydroelectric	Water	8	8
Camp Far West	Hydroelectric	Water	9	3
WAPA Hydro	Hydroelectric	Water	331	328
New Hope	Dairy digester	Biomass	0.45	0.4
Kiefer Landfill	Landfill gas	Biomass	14	12
Santa Cruz Landfill	Landfill gas	Biomass	1.6	1.3
Simpson Biomass	Biogas/Biomass	Biomass	55	42
Van Steyn Dairy	Dairy digester	Biomass	0.2	0.1
Van Warmerdam Dairy	Dairy digester	Biomass	0.6	0.5
Yolo	Landfill gas	Biomass	2.7	2.4
Cal Energy	Geothermal	Geothermal	30	25.5
Patua	Geothermal/PV	Geothermal/Sun	22	11.8
Feed-In Tariff Projects	Solar PV	Sun	98	57
Rancho Seco PV	Solar PV	Sun	11	5.4
Rancho Seco II	Solar PV	Sun	160	72.4
Recurrent PV	Solar PV	Sun	60	34
Wildflower	Solar PV	Sun	13	4.7
Grady	Wind	Wind	200	31.5
High Winds	Wind	Wind	50	14.4
Solano	Wind	Wind	230	52.7

[64] Nameplate rating is the maximum simultaneous rated capacity output of the project. Summer capacity is the rated availability during the summer for thermal and hydro resources and the statistical probable output of wind and solar. Summer capacity values are representative of our resource adequacy plans for July 2021.

Appendix B: UN Sustainable Development Goals[65]

The United Nations has identified 17 sustainable development goals to transform our world on three levels: Global leaders should pursue strong leadership, more resources and smarter solutions. At the local level, they should lay the foundation for needed transitions in policies, budgets, institutions and regulatory frameworks. As for people, everyone needs to take action to generate momentum and push for necessary transformations.

The 17 sustainable development goals are:
GOAL 1: No Poverty: Economic growth must be inclusive to provide sustainable jobs and promote equality.
GOAL 2: Zero Hunger: The food and agriculture sector offer key solutions for development and is central for hunger and poverty eradication.
GOAL 3: Good Health and Well-being: Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.
GOAL 4: Quality Education: Obtaining a quality education is the foundation to improving people's lives and sustainable development.
GOAL 5: Gender Equality: Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world
GOAL 6: Clean Water and Sanitation: Clean, accessible water for all is an essential part of the world we want to live in.
GOAL 7: Affordable and Clean Energy: Energy is central to nearly every major challenge and opportunity.
GOAL 8: Decent Work and Economic Growth: Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs.
GOAL 9: Industry, Innovation and Infrastructure: Investments in infrastructure are crucial to achieving sustainable development.
GOAL 10: Reduced Inequality: To reduce inequalities, policies should be universal in principle, paying attention to the needs of disadvantaged and marginalized populations.
GOAL 11: Sustainable Cities and Communities: There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more.
GOAL 12: Responsible Consumption and Production: Responsible Production and Consumption
GOAL 13: Climate Action: Climate change is a global challenge that affects everyone, everywhere.
GOAL 14: Life Below Water: Careful management of this essential global resource is a key feature of a sustainable future.
GOAL 15: Life on Land: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.
GOAL 16: Peace, Justice, and Strong Institutions: Access to justice for all, and building effective, accountable institutions at all levels.
GOAL 17: Partnerships to achieve the Goal: Revitalize the global partnership for sustainable development.

[65] Adopted from https://sdgs.un.org/goals

Appendix C: Innovation

As part of the process to develop our 2030 Zero Carbon Plan, SMUD asked the public, stakeholders and its staff to submit innovative ideas to help achieve our goal of zero carbon by 2030. The table below includes a list of all the ideas that were submitted and accepted after evaluation by our ILT. This list includes ideas that are incorporated into this Plan plus others that will be explored after adoption of the Plan because additional analysis and studies are needed or insufficient time to properly assess the idea before the Plan is released in March 2021.

Table 14. Ideas submitted to and considered by the ILT

Title	Idea Description
Utility-scale photovoltaic generation maximization	Maximize in-service territory utility-scale photovoltaic generation (GWh) with high density reliable solar energy coupled with battery energy storage system.
Creating small and medium business (SMB) zero carbon advocates	Many SMB customers are not willing to make the initial investment in energy efficiency and/or zero carbon technologies that have perceived long payback periods. By performing journey mapping and looking at the end-to-end value chain, we can identify opportunities that can turn SMB customers into zero carbon advocates.
"Strategically located and right sized" battery storage	Strategically placed battery storage systems on our grid can help us achieve carbon reduction goals gradually ahead of 2030. This technology is already being used by the market as evidenced by the amount of solar + storage and stand-alone storage that are being developed in the CAISO interconnection queue. Many of the technologies that will help us reach absolute zero do not exist yet or are too expensive and unproven at this point. This approach allows us to realize some of these benefits without overcommitting and putting our customers at risk of rate increases.
Hydrogen fuel cells for long-term storage[66] [67]	Create hydrogen gas through electrolysis and store in tanks when energy is cheap or when there is excess from PV. Use the hydrogen with a fuel cell to dispatch that energy when needed. This has a very long-term storage potential since the hydrogen can be stored indefinitely without degradation.

[66] *Optimizing Renewable Energy Storage With Hydrogen Fuel* Cells, BALLARD (Dec. 17, 2020), https://blog.ballard.com/renewable-energy-storage?utm_campaign=Automatic%20Blog%20Email&utm_medium=email&_hsmi=103925816&_hsenc=p2ANqtz-9oqrcEKYF9CyBTuDyIhIdVtQni_MYcOI6i_O_T5qL0LGZZrc2ZHDPvaVODLrOAEoNSAsqqK4_G1qmre654BgcCuKi5XA&utm_content=103925816&utm_source=hs_email.

[67] *To batteries and beyond: With seasonal storage potential, hydrogen offers 'a different ballgame entirely'*, UTILITY DIVE (Oct. 12, 2020), https://www.utilitydive.com/news/to-batteries-and-beyond-with-seasonal-storage-potential-hydrogen-offers/584959/.

Title	Idea Description
Incentives to vendors and community partners[68] [69]	Provide incentives to SMUD vendors and community partners to join in the zero carbon effort similar to what Walmart is doing with its supply chain. This suggestion would expand on the Walmart idea to include our Community Based Organization partners.
Reform grid architecture to support aggressive zero carbon goal[70]	This idea expands on previous ideas already mentioned. SMUD could focus priorities and resources towards creating a new foundation for the distribution grid to better utilize and integrate DERs; solar, batteries, microgrids, EVs, combined heat and power, RNG, hydrogen, fuel cells, etc. The grid management system would ensure the distribution grid is balanced and fully maximized before importing or exporting power to/from the transmission grid. The bottom-up approach would also involve the community and incentivize the customer to support more DERs to reach the new zero carbon goal.
Government relationship and lobby for favorable energy policies	Actively lobbying state and federal government on energy policies that are favorable to electric utilities. Forming coalitions with other utilities to shape policies and legislations regarding DERs.
Profit-sharing with VPP aggregators[71]	It is expected that VPP will become a major supply side resource in the future grid. Given the distributed nature and potential market risk of VPPs, the operations will likely be handled by third-party aggregators. In order to balance the risk and profitability, SMUD should carefully design contracts and evaluate different profit-sharing schemes with these aggregators.
Liquid air energy storage - Highview power[72]	Liquid air energy storage is a long-duration storage technology that stores renewable energy in the form of liquid air (-196degC) and then expand that air through a turbine to re-generate electricity. The technology is very scalable (4 hours to 4 weeks).
Malta electro-thermal energy storage system[73]	Long-duration energy storage that leverages a heat pump with a chilled liquid cold reservoir and a molten salt heat reservoir. Process is reversed through a heat engine. Process sometimes referred to as a Carnot battery.

[68] *See* https://corporate.walmart.com/newsroom/2019/05/08/walmart-on-track-to-reduce-1-billion-metric-tons-of-emissions-from-global-supply-chains-by-2030 . Last accessed 22 March 2021.

[69] *The challenge of climate change*, MCKINSEY & COMPANY (Dec. 11, 2020), https://www.mckinsey.com/business-functions/sustainability/our-insights/the-challenge-of-climate-change#.

[70] Lorenzo Kristov, *The Bottom-Up (R)Evolution of the Electric Power System*, IEEE POWER & ENERGY MAGAZINE (March 20, 2019), https://cleanpowerexchange.org/wp-content/uploads/2019/05/IEEE-PE-1903-Kristov.pdf.

[71] *See* Leslie Nemo, *New York approves utility revenue sharing for battery storage systems*, UTILITY DIVE (Jan. 29, 2021), https://www.utilitydive.com/news/new-york-approves-utility-revenue-sharing-for-battery-storage-systems/594207/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202021-02-02%20Utility%20Dive%20Storage%20%5Bissue:32234%5D&utm_term=Utility%20Dive:%20Storage.

[72] *Technology*, HIGHVIEW POWER, https://highviewpower.com/technology/. Last accessed 22 March 2021.

[73] *Our Solution*, MALTA INC., https://www.maltainc.com/our-solution. Last accessed 22 March 2021.

Title	Idea Description
EV managed charging (V1G)	Manage charging times or throttle the rate of charging. Managed EV charging can reduce the scale of impact and need to upgrade service transformers and eventually (with higher EV adoption) upstream distribution infrastructure such as feeders and substations which will reduce the cost exposure to broad EV adoption. Managed EV charging also can help with the consumption of excess renewable generation supply (i.e. day time solar overgeneration via workplace or at-home charging) that reduces the need to curtail renewable generation, export to the market at a discounted price or make additional investments in energy storage resources.
EV Vehicle-to-grid (V2G) and/or Vehicle-to-home	Vehicle sends electricity back to grid/home. Manage charging times or throttle the rate of charging including potential reverse power flow (discharge of the vehicle battery). V2G from a functional standpoint is a superset of V1G. V2G-enabled EVs can mimic stationary battery storage. As a result, each V2G-enabled EV offers a greater amount load flexibility than a V1G-enabled EV.
DER aggregation / Virtual Power Plant	Including use of supply side renewables. Focus on larger scale - battery and rooftops directly controlled by DERMS. VPP technology is a longer-term solution further down the road. Confirm difference between this and load flexibility.
Load flexibility	Thermostat/Water Heater. Set and forget type systems on customer side.
Carbon capture and sequestration (CCS)	Run carbon from our thermal plants through chemical process to remove carbon dioxide to pure gas/liquid form and transport and store in underground geologic formations (such as spent gas fields). Currently viable technology, but there is no place to store or off-taker for this product in Sacramento. It would be expensive to pipe somewhere else.
Power-to-gas technology (Electrolysis + hydrogen)	Long-term solution that is the hot topic across the industry. Complexities around storage, transport, infrastructure permitting and safety. Very expensive, like 10x to 16x the cost of natural gas today. One hundred percent hydrogen turbines do not exist today, but turbines that can burn up to 30-40% hydrogen exist today (mixed with natural gas).
Long-duration storage	Could be multiple technologies (pumped hydro, flow batteries, etc.)
Drop-in carbon free fuels at existing gas plants	Drop-in carbon free fuels at existing gas plants (biogas, biomethane, or biodiesel). Fuels that can be burned in our existing gas plants with little to no capital expense on the generation set. This is a near- to mid-term solution with complexity in how to transport the carbon free fuels without emitting additional carbon during transportation. Options can be expensive.

Title	Idea Description
2030 Zero Carbon Hack-a-Thon[74]	In partnership with universities (Sacramento State, UC Davis, community colleges) and/or Code for Sacramento and Women Who Code meet up groups, host a single or multi-day opportunity for the best and brightest students in our region to come together and develop technology/software solution as an idea-generating event resulting in project ideas localized to our community. Provide a purpose-driven program that could result in valuable ideas and potential innovation.
Heliogen[75]	Modular Concentrating Solar Power. New innovations in tracking technology substantially reduce commissioning and O&M costs while increasing performance. Eighty-five percent solar-only CF using molten salt storage. Formed out of Idealab with key contributions from SolarReserve and eSolar. Two projects under development, 5 MW each. Current full-scale modular size is a 5 MW plant and can add multiple to tens of multiples together. Either build locally to tap into world-class summertime DNI in Sacramento or build in Mojave and wheel power.
Bioeconomy Development Opportunity Zone (low-risk feedstock conversion)[76][77]	Establish bioeconomy facilities in Opportunity Zones which will bring high-value careers to under-resourced communities. There are no bioeconomy facilities in OZs currently so these communities are not easily able to take advantage of related careers. Focus would be on low-risk feedstock (*e.g.* The Wonderful Company). Research shows great potential.
Long term "Collab-etition" with storage and traditional infrastructure manufacturers to enable a zero carbon grid[78]	The baseline assumption for this idea is that in order to reach our zero carbon goal, we will need large-scale adoption of electrification measures such as EVs & EVSE, DERS, and a customer base that has been enabled to be responsive to SMUD's ADR+ signals. To provide a grid that is capable of easily interconnecting and interacting with these technologies while maintaining high reliability scores, investments in infrastructure improvements may be necessary. Investing in energy storage is an alternative to infrastructure improvements due to capacity restraints. The primary scope of this idea is to transform SMUD's grid to be ready for the 2030 zero carbon goal and to do so with an open relationship with one storage and one "traditional" infrastructure manufacturer at the planning table and jobsites.

[74] This idea is similar to Western Washington University's Institute for Energy Studies annual Carbon Hackathon . See the following for more information. https://energy.wwu.edu/carbon-hackathon. Last accessed 22 March 2021.
[75] *See How it Works*, HELIOGEN, https://heliogen.com/. Last accessed 22 March 2021.
[76] *See* https://bdozone.org/. Last accessed 22 March 2021.
[77] Jordan Soloman, *BD Zones and BDO Zones: Driving Bio-Based Investment in Opportunity Zones*, ENVTL. AND ENERGY STUDY INST.,https://www.eesi.org/files/073020_Ecostrat_Driving_Bio-Based_Investment.pdf. Last accessed 22 March 2021.
[78] Similar to the idea published by Kristen Coyne, 4 January 2016. https://nationalmaglab.org/news-events/feature-stories/collaborate. Last accessed 24 March 2021.

Title	Idea Description
Rail energy storage[79][80]	Develop a portion of private land near UARP facilities with a rail-based gravity energy storage scheme. An electrically-powered railroad would be built between a high elevation point and a low elevation point on land out of the way from public access. Rail cars of heavy weight would run unattended on this line, connected into a train. Rail cars would be equipped with motor-generator units. This rail line would be sited adjacent to and existing UARP transmission line. During times of excess generation, the train would receive energy and run uphill, consuming energy from the grid. When load is needed, the train would run downhill, contributing energy to the grid. An example site is the region between Big Hill and Union Valley Reservoir.
Biomass power at the Sierra Pacific Industries (SPI) facility in Camino[81]	Seems like the technology is improving to make these facilities more efficient and we have this massive supply of materials just outside our service territory, in the mountains surrounding Sacramento. Many of these projects may not pencil out due to cost of transporting the materials to the facility but there are other benefits of having these facilities, namely reducing the build-up up of fuels from non-merchantable wood byproducts. We have a potential location in Camino at the old SPI mill site and this could be a joint venture with them, as they own a lot of land in the area and are regularly harvesting.
Liquid metal long-Term duration storage battery – Ambri[82]	Co-founded by MIT materials chemistry professor Donald Sadoway in 2010 and part-funded to get off the ground by Bill Gates, Ambri has designed a battery that uses a liquid calcium alloy anode, molten salt electrolyte and a cathode made of solid particles of antimony. The company claims this enables a low number of steps in the cell assembly process while the materials are low-cost. Ambri also integrates the batteries into a containerized energy storage system solution of 1 MWh and up to 250 kW.
Collaboration or co-development opportunity with Sacramento-based startup, Infinium[83]	Potential collaboration or co-development opportunity with Sacramento-based startup, Infinium. About Infinium: The company is commercializing a process that uses renewable electricity to release hydrogen from water and mix the hydrogen with waste carbon dioxide to make synthetic gas.

[79] Advanced Rail Energy Storage, LLC. UTILITY SCALE ELECTRIC ENERGY STORAGE SYSTEM, Patent No.: US 8.593,012 B2.
[80] *GravityLine*, ARES, https://aresnorthamerica.com/gravityline/.
[81] *See* https://www.spi-ind.com/. Last accessed 22 March 2021.
[82] *Technology*, AMBRI INC., https://ambri.com/technology/. Last accessed 22 March 2021.
[83] *Technology*, INFINIUM, https://infiniumco.com/technology/ Last accessed 22 March 2021.

Title	Idea Description
Utility solar in high country areas	Consider installing utility-scale solar in our UARP service area. There are lots of open area, burn scar acreage from the Kings fire and other fires that have been cleared and could be potential sites. Solar panels operate more efficiently at higher elevations where it is cooler and the air quality is better. Transmission lines are in the vicinity to import power into SMUD's power grid. Roads are available for site access too.
Thermal energy grid storage	MIT[84] is working on a very high temperature long-duration storage technology that leverages Graphite Thermal Storage Units to store electricity in the form of a liquid tin working fluid. The energy is extracted using a multi-junction PV power block. The liquid tin is transferred to the power block using a patented liquid tin pump. The liquid tin is heated to >2000degF using excess renewables, and converted back to electricity using the multi-junction PV power block, which can be inserted and removed from a cavity containing the molten tin to modulate power production. The tin, when heated to these temperatures, emits a bright white light that is used to capture the stored energy. The technology makes use of common very low cost materials, aside from the small amount of multi-junction PV cells, which are readily available, making it very scalable and low-cost.
Rancho Seco industrial area use	Use the Rancho Seco site to implement and test chosen ideas and technologies. Facility siting will need to be addressed, and a site that was home to a nuclear power plant should be able to house battery banks, H2 storage and many other possible technologies. Its proximity to solar and our Cosumnes Power Plant also make Rancho Seco a favorable location.
Each change matters	Make all high capacity solar energy/battery storage auto dispatchable using EMS to better manage energy in the grid. SMUD needs to have rooftop solar control capability. Install/lease more solar plants all over the SMUD region. Thermal plant/hydro plant controller needs to be tuned further to overcome solar variation. Control EV charging as needed. Need more battery storage to overcome duck curve and smooth control of grid. Not only SMUD needs carbon FREE energy, but that needs to be manageable like any other existing generating plant.

[84] *Atomistic Simulation & Energy Research Group: Thermal Energy Grid Storage (TEGS) Concept*, MASS. INST. OF TECH., https://ase.mit.edu/projects/thermal-energy-grid-storage-tegs/. Last accessed 23 March 2021.

Title	Idea Description
Allam-Fetvedt Cycle[85] for up front carbon capture	Net Power is operating a new type of natural gas plant in LaPorte, Texas that uses the Allam-Fetvedt Cycle. The process involves burning fossil fuel with oxygen instead of air to generate electricity without emitting any carbon dioxide. Not using air also avoids generating NOx, the main atmospheric and health contaminant emitted from gas plants. This is a new, high-pressure, oxy-fuel, supercritical carbon dioxide cycle that generates low-cost electricity from fossil fuels while producing near-zero air emissions. All carbon dioxide that is generated by the cycle is produced as a high-pressure, pipeline-ready by-product for use in industrial processes, or that can be sequestered underground in tight geologic formations where it will not get out to the atmosphere for millions of years. The Allam Cycle also means the power plant is a lot smaller and can be sited in more areas than older plants can.
Concentrating Solar Power with Thermal Energy Storage. [86]	Concentrating energy storage can shift bulk generation like pumped hydro, but with lower energy losses. These technologies are complementary to battery storage however are longer duration than current battery storage installations. Dispatchable CSP enables greater penetration of inverter-based generation.

[85] *The Allam-Fetvedt Cycle*, NET POWER, https://netpower.com/technology/. Last accessed 23 March 2021.
[86] Dr. Fred Morse, President of Morse Associates, Inc,

Appendix D: Global energy decarbonization efforts

In setting a goal of reaching zero carbon by 2030, SMUD is laying out an aggressive clean energy pathway. Here's an overview of carbon reduction goals in other jurisdictions.

- **Sweden** is on an ambitious GHG reduction trajectory with a long-term climate goal that by 2045 Sweden will have net zero GHG emitted into the atmosphere and should thereafter achieve negative emissions. This translates to 2045 emissions being at least 85% lower than emissions in 1990. Sweden has already implemented several major climate measures such as the Klimatklivet initiative (the Climate Leap), the reduction obligation, a bonus-malus-system for new light vehicles, urban environment agreements and the industrial green investment aid program Industriklivet (the Industrial Leap). Moreover, within Sweden there is robust cooperation for the Fossil Free Sweden initiative across the business community, municipalities, regions, research institutions and civil society organizations. So far, 22 sectors (including some large emitting sectors like steel, mining and minerals and the automotive sector) have produced and submitted road maps for fossil-free competitiveness.[87]
- **Australia** has set a goal of reducing economy-wide GHG emissions between 26% and 28% below 2005 levels by 2030.[88] It plans to leverage $18 billion in government funds and an additional $50 billion in private investments to drive down the cost of deploying new and emerging technologies aiming for economic competitiveness with existing business models. Priority technologies are clean hydrogen, energy storage, low carbon materials (steel and aluminum), carbon capture and storage and soil carbon.
- The **European Union** (EU) has set a binding target for net domestic reduction of at least 55% by 2030 relative to 1990 levels.[89] Within the EU, fossil fuels are the largest source of GHG emissions and reforming the energy sector will play a central role in transitioning to a climate-neutral economy. It will also craft policies to improve energy efficiency such as strengthening the role of Eco-design standards and improve EU consumer access to energy efficient products. It'll also explore opportunities to review and revisit renewable energy sustainability criteria and the EU certification system for all renewable and low carbon fuels. Finally, the EU will tackle vehicle emissions by strengthening carbon dioxide standards for cars and vans, and reflecting on the phase-out target date for internal combustion engines.
- The **United Kingdom** has set an economy-wide target to reduce GHG emissions by at least 68% relative to 1990 levels by 2030.[90] The U.K.'s Climate Change Committee has recommended a comprehensive path including encouraging healthier diets with reduced consumption of beef, lamb and dairy products; extensive electrification measures; expanded use of renewable and other low carbon power generation and development of

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[87] https://unfccc.int/sites/default/files/resource/LTS1_Sweden.pdf.
[88] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Australia%20First/Australia%20NDC%20recommunication%20FINAL.PDF.
[89] https://ec.europa.eu/commission/presscorner/api/files/attachment/866232/EU%20Climate%20Target%20Plan%202030%20Key%20contributors%20and%20policy%20Tools.pdf.pdf.
[90] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20Kingdom%20of%20Great%20Britain%20and%20Northern%20Ireland%20First/UK%20Nationally%20Determined%20Contribution.pdf.

a hydrogen economy. Notably, its transportation sector recommendations move beyond passenger vehicles and heavy-goods vehicles to include marine vessels.[91]

- **Mexico** has set its GHG reduction goal at 50% of national GHGs by 2050 below its 2000 emissions level. For its energy transition, Mexico has established policies to direct action in five important areas: the clean energy transition, energy efficiency and sustainable consumption, sustainable cities, reduction of SLCPs and sustainable agriculture and protection of natural carbon sinks. It has also identified strategies for critical crosscutting issues including the need for market-based instruments to price carbon, increased innovation, more research and development of new technologies and the need to build a climate culture with mechanisms for social and private sector participation.[92]
- **Canada** has set a mid-century strategy consistent with net emissions falling by 80% by 2050, relative to 2005 levels. To do this, Canada has noted it will require substantial effort on the part of all Canadians and that there will need to be a fundamental restructuring of multiple sectors of the economy. Cost-effective abatement opportunities will be explored for virtually every GHG source and activity. Specific to the energy sector, Canada will pursue opportunities for enhanced energy efficiency and conservation, to find cleaner ways to produce and store electricity and to switch towards non-emitting electricity or other low-GHG alternatives.[93]

In the U.S., efforts to decarbonize energy supply are largely decentralized. Most of the gains within the U.S. are attributable to state-level action and the economics of solar and wind as well as the shale boom driving new development away from coal. Large U.S. corporations are also playing a role. For example, Microsoft has committed to be carbon negative by 2050. And, in its first sustainability report, it forecasts a 6% reduction in carbon emissions during the 2020 fiscal year. Moreover, Microsoft reinforced its commitment to sustainability by announcing that progress on sustainability goals will be included as a factor in executive pay. More recently, market forces have prompted General Motors to announce it would seek to be carbon neutral by 2040, which the company hopes to achieve, in part, by aiming to make all of its light-duty vehicles (cars, pickup trucks and SUVs) electric by 2035.

Cities and municipalities are also pledging to reduce their climate impacts.

- The **City of Sacramento** has adopted a climate emergency declaration that commits the city to carbon neutrality by 2045. The Mayors' Commission on Climate Change further identifies recommended actions to achieve net zero carbon emission by 2045. The City is in the process of updating its climate action plan to reduce community-wide emissions to 40% below 1990 by 2030 and is embarking on an electrification ordinance for new construction, with all-electric construction required for low-rise in 2023 and for buildings over three-stories in 2026.
- The **County of Sacramento** has adopted a climate emergency declaration that commits the county to carbon neutrality by 2030 and is in the process of developing a community-wide climate action plan to reduce emissions.

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[91] https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf.
[92] https://unfccc.int/files/focus/long-term_strategies/application/pdf/mexico_mcs_final_cop22nov16_red.pdf.
[93] https://unfccc.int/sites/default/files/resource/Canada's%20Mid-Century%20Long-Term%20Low-GHG%20Strategy.pdf.

- The **City of Palo Alto** has a plan to reduce its emissions by 80% by 2030. The road map for achieving carbon neutrality includes strategies such as advancing smart grids, incorporating a zero waste and a circular economy, partnering with the community and maximizing use of carbon sequestration and storage in the natural environment.
- The **City of Richmond** has a climate action plan built upon community input and cross-sector collaboration, which prioritizes actions and outcomes of greatest community benefit − initiatives to improve equitable services and overall quality of life. Past initiatives included a 'green' job training program and employment opportunities for local youth, more miles of bikeways and a 10.5 MW solar facility. Looking to the future, focus areas include energy-efficient buildings and facilities, increased use and generation of renewable energy and improved sustainability of transportation and land use.
- The **City of San Diego** has committed to 100% clean energy by 2035 and has set additional targets for transportation (50% of urban commutes via transit, walking and biking), tree coverage (35% coverage throughout the city) and waste reduction (zero waste by 2040). To achieve this, the City will work to educate consumers on energy and water efficiency; improve local public health and increase local control, reducing dependencies on imported water and energy. The City has also placed job creation at the forefront indicating a commitment to setting incentive-based policies to help create green jobs, such as those manufacturing and installing solar panels.

U.S. utilities are setting carbon reduction goals too, with many placing themselves on a trajectory toward carbon neutrality or 100% carbon free electricity. Below, we've summarized what a few utilities are doing, but this list is not exhaustive. See **Error! Reference source not found.** for additional high-level information on GHG reduction goals some additional utilities and other locations around the world have set.

- **Los Angeles Department of Water and Power (LADWP)** will supply 55% renewable energy by 2025, 80% by 2036 and 100% by 2045.[94] One way it will do this is with its Intermountain Power Project, which is a two-unit 840 MW combined cycle natural gas plant that will replace a 1,800 MW coal facility.
- **Xcel Energy** has set a target of reducing GHG emissions by 80% below 2005 levels company-wide by 2030, which it'll achieve through continued fleet transition, operational changes and by employing renewable, carbon free generation and energy storage technologies.[95]
- Virginia-based **Dominion Energy** had a plan to reach net zero carbon by 2050. However, that timeline has been accelerated by Virginia's Clean Economy Act, which requires Dominion Virginia to supply at least 30% of its electricity from renewables by 2030 and by 2045, they must shut down their carbon-emitting plants.[96] It's 2020 IRP indicates that efforts will focus on renewables, including a goal of 5.1 GW of offshore wind over the next 15 years, and eliminates previous plans to build new natural gas fired power plants.[97]

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[94] https://plan.lamayor.org/targets/targets_plan.html#:~:text=By%202050%2C%20L.A.%20will%20have,our%20progress%20in%20this%20fight.
[95] https://www.xcelenergy.com/staticfiles/xe/PDF/Xcel%20Energy%20Carbon%20Report%20-%20Feb%202019.pdf
[96] https://www.greentechmedia.com/articles/read/the-5-biggest-u.s-utilities-committing-to-zero-carbon-emissions-by-mid-century.
[97] Ibid.

- In January 2020, Arizona-based utility **Arizona Public Service Electric** set a goal to provide 100% clean, carbon free electricity by 2050. It plans to achieve this by working toward a 2030 resource mix that's65% clean energy with 45% of the generation portfolio coming from renewable energy. It's also accelerated the timeline to transition away from coal, ending all coal-fired generation by 2031 − seven years ahead of previous projections.
- **Portland General Electric** aims to achieve company-wide net zero GHG emissions by 2040. It plans on reducing emissions in its own operations by ending operations at coal plants and adding more renewables like wind, solar and battery storage.[98] It also plans to reduce emissions in the energy choices provided to its customers, continuing to create new, innovative programs that offer choices for customers looking for clean, green energy options.
- As the first carbon-neutral utility in the nation, over 80% of the power delivered by **City Light (Seattle)** is generated from carbon-free hydroelectricity.[99] It does not have coal or natural gas resources in its power supply portfolio, but it does make market purchases for balancing purposes. Emissions associated with those purchases are offset by the utility's GHG neutrality policy.
- The **Hetch Hetchy Power (City and County of San Francisco)** is comprised entirely of proven clean technology resources—385 MW of hydroelectric generation capacity and 11 MW of renewables (solar, wind and biogas). It powers all of the City's municipal facilities, residents and businesses in the San Francisco Shipyard, Treasure Island as well as other retail customers—nearly 20% of the City's electricity needs.

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98 https://portlandgeneral.com/about/energy-future/climate-goals.
99 https://www.seattle.gov/city-light/energy-and-environment

DRAFT

RESOLUTION NO. ______________

WHEREAS, SMUD has a long history of environmental leadership in our resource planning and procurement activities and has adopted greenhouse (GHG) reduction goals that exceed those set by the State of California; and

WHEREAS, California enacted the Clean Energy and Pollution Reduction Act of 2015 (SB 350, De Leon) to set new objectives in clean energy and pollution reduction for 2030 and beyond; and

WHEREAS, SB 350's objectives included an increase from 33 percent to 50 percent by 2030 in the procurement of renewable energy from eligible renewable resources, as well as achievement of carbon reduction targets established by the **California Air Resources Board (CARB)** for large local publicly owned electric utilities; and

WHEREAS, California enacted The 100 Percent Clean Energy Act of 2018 (SB 100, De Leon), which accelerates renewable energy procurement to 60 percent by 2030 and directs further study of how electric utilities like SMUD can ultimately supply 100 percent of their annual sales of electricity from zero carbon resources by 2045; and

WHEREAS, SB 100 further directed publicly owned utilities (POUs) to adopt integrated resource plans (IRPs) by January 1, 2019, in addition to a process for updating those IRPs at least once every five years; and

WHEREAS, by Resolution No. 18-10-11 adopted on October 18, 2018, this Board adopted SMUD's initial **Integrated Resources Plan (SMUD IRP)**, which included a process for updating the **SMUD IRP** at least once every five years; and

DRAFT

WHEREAS, SMUD filed the **SMUD IRP** with the **California Energy Commission (CEC)** on April 29, 2019, in compliance with SB 350; and

WHEREAS, on December 11, 2019, the **CEC** adopted the Executive Director's determination finding **SMUD's IRP** filing consistent with the requirements of Public Utilities Code section 9621; and

WHEREAS, by Resolution No. 20-07-05 adopted on July 16, 2020, this Board declared a Climate Emergency and directed the Chief Executive Officer and General Manager (CEO/GM) to report on clear, actionable and measurable strategies, and plans to reach SMUD's climate emergency goals of carbon neutrality by 2030; and

WHEREAS, staff worked to identify a flexible pathway for SMUD to eliminate all of its power supply carbon emissions by 2030 thus developing a roadmap, SMUD's **2030 Zero Carbon Plan**, based on internal modeling, Board and stakeholder input, and extensive community outreach; and

WHEREAS, by Resolution No. 21-04-05 adopted on April 28, 2021, this Board accepted SMUD's **2030 Zero Carbon Plan** with clarifications; and

WHEREAS, since April 2021, SMUD has updated its **Renewable Energy Resources Procurement Plan (RPS Procurement Plan)** to align with SMUD's **2030 Zero Carbon Plan**; and

WHEREAS, because SMUD's **2030 Zero Carbon Plan**, as presented to this Board on June 16, 2022, meets or exceeds all requirements set forth in Public Utilities Code section 9621, staff recommends its formal adoption as SMUD's IRP Update, which, following adoption, staff will file with the **CEC**; **NOW, THEREFORE,**

DRAFT

BE IT RESOLVED BY THE BOARD OF DIRECTORS
OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. This Board adopts SMUD's **2030 Zero Carbon Plan** as SMUD's **Zero Carbon Integrated Resource Plan**, an update to SMUD's **Integrated Resources Plan (SMUD IRP)** adopted by this Board on October 18, 2018, substantially in the form set forth in **Attachment ___**, in compliance with Public Utilities Code section 9621.

SSS No. RSNBS 22-002	**BOARD AGENDA ITEM** **STAFFING SUMMARY SHEET**	Committee Meeting & Date ERCS – 06/15/22 Board Meeting Date June 16, 2022

	TO		TO
1.	Bryan Swann	6.	
2.	Frankie McDermott	7.	
3.	Brandy Bolden	8.	
4.	Lora Anguay	9.	**Legal**
5.	Suresh Kotha	10.	**CEO & General Manager**

Consent Calendar	X	**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**	X	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Garry Mariscal	Resource Strategy	B205	6448	5/27/2022

NARRATIVE:

Requested Action: Adopt an update to SMUD's Renewable Energy Resources Procurement Plan (RPS Procurement Plan) as required by Public Utilities Code section 399.30(a) and by the *Enforcement Procedures for the Renewables Portfolio Standard for Publicly Owned Utilities* (CEC RPS Regulations) section 3205(a), reflecting updated renewable procurement as included in SMUD's 2030 Zero Carbon Plan and latest RPS regulations.

Summary: Senate Bill 2 of the first extraordinary session (SBX1-2 2011), established a Renewables Portfolio Standard (RPS) program for local publicly-owned electric utilities (POU), and required all POUs to adopt an RPS Procurement Plan, and to update this plan periodically as needed. An RPS Procurement Plan illustrates a POU's plan for meeting California's RPS requirements, such as the 2030 60% RPS requirement. POU's are required to update their RPS Procurement Plans periodically as they update their Integrated Resource Plans and/or RPS regulations change.

SMUD adopted its first RPS Procurement Plan in 2013 (Resolution No. 13-11-09) and adopted updates in 2019 (Resolution No. 19-04-04) to reflect the renewable additions included as part of SMUD's 2018 Integrated Resources Plan (IRP) submission to the California Energy Commission (CEC) and the latest RPS regulations.

SMUD's updated RPS Procurement Plan reflects the renewable additions included in SMUD's 2030 Zero Carbon IRP and includes recent changes to RPS regulations, which illustrate SMUD's future compliance with RPS regulations through 2030.

Staff recommends the Board adopt SMUD's updated RPS Procurement Plan pursuant to PUC § 399.30(a) and the CEC RPS Regulations.

Board Policy: *(Number & Title)* Strategic Direction SD-9, Resource Planning

Benefits: Provides the Board with sufficient information to adopt an updated RPS Procurement Plan that meets state policy goals in clean energy and pollution reduction.

Cost/Budgeted: N/A

Alternatives: Action must be taken to comply with the law.

Affected Parties: Resource Strategy, Distributed Energy Strategy, Energy Trading & Contracts, Power Generation, Grid Planning, Grid Operations

Coordination: Executive Office, Board Office, Resource Strategy, Power Generation, Treasury & Risk Management, Legal, Marketing & Corporate Communications

Presenter: Bryan Swann, Director, Resource Strategy

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
Adopt Update to Renewable Energy Resources Procurement Plan	8

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

DRAFT

SMUD Renewable Energy Resources Procurement Plan

June 2022

SMUD®

Table of Contents

Section 1: Introduction

The Sacramento Municipal Utility District (SMUD) is committed to the development and procurement of renewable energy for our customers. In order to grow renewable energy supplies for its customers, SMUD voluntarily created three separate programs: a green pricing program called “Greenergy”, a shared solar program called “SolarShares”, and a Renewables Portfolio Standard (RPS) Program (prior to legislation mandating the program).

In 1997, SMUD began Greenergy, which allows participating residential customers to select a 100% renewable product to serve 100% or 50% of their monthly electricity demand, respectively, in addition to their regular electricity bill. Commercial Greenergy customers pay an additional amount per kWh of electricity usage to serve all or a portion of their monthly electricity demand using renewables, on top of their regular rates. Commercial Greenergy customers can also purchase 1 MWh blocks of a 100% renewable product.

In 2008, SMUD launched a pilot program called SolarShares, which allowed customers to receive a portion of their electricity usage from an off-site solar system. Participants saw a SolarShares charge, and a credit associated with the solar generation. The initial 1 MW pilot was fully subscribed quickly. Since then the program has grown and now includes options for large commercial customers as well. In 2016, SMUD significantly expanded the SolarShares program by extending the SolarShares program to large commercial customers, signing agreements to deliver 150 MW. In 2020, SMUD added a new Neighborhood SolarShares option for new residential construction to meet the requirement of the updated building code standards.

These two voluntary programs result in SMUD customers engaging in renewable procurement beyond the current RPS mandates. State law (SB 350) recognizes this additional procurement by allowing electricity sales to these customers that are supported by specific renewable resources to be excluded from overall retail sales prior to calculating SMUD’s RPS obligation.

In 2001, SMUD established its initial RPS goals, and by 2008 had established goals of procuring 20% of its retail electricity sales from eligible renewable energy resources by 2010 and 33% by 2020 (SMUD’s RPS goals). In 2002 (and in later statutes modifying the initial law), the State of California established an RPS for retail sellers of 20% of retail sales served with electricity from eligible renewable energy resources by December 31, 2010. The RPS statutes at that time did not specifically obligate local publicly owned electric utilities (POUs) such as SMUD with percentage goals and deadlines, nor did the state law require POUs to satisfy state eligibility rules for renewable energy resources to count toward their RPS goals. Nevertheless, POUs were required to consider and implement an RPS that met the “intent of the Legislature”.

Senate Bill 2 in 2011 (SBX1-2) established an RPS goal of 33% by 2020 for POUs as well as retail sellers. SMUD achieved the 20% RPS in 2010, and 33% RPS in 2020 (pending verification from the California Energy Commission [CEC]) with resources meeting the state eligibility rules. Senate Bill 350 (SB 350, 2015) modified provision of the RPS and set a 2030 RPS target of 50%, which was further modified by Senate Bill 100 (SB 100, 2018) to establish a 60% RPS target by 2030 and a planning goal of serving 100% of retail sales with zero carbon and eligible renewable resources by 2045.

In July 2020, our Board of Directors declared a climate emergency and adopted a resolution directing SMUD to take significant and consequential actions to become carbon neutral (net zero carbon) by 2030. The Board also directed SMUD staff to report on clear, actionable and measurable strategies and plans to reach SMUD's climate emergency goals. In April 2021, SMUD's Board approved our *2030 Zero Carbon Plan* (*2030 ZCP*). SMUD's goal to eliminate carbon emissions from our power supply by 2030 is more ambitious than already aggressive state mandates and identified procurement of renewable resources far beyond what is necessary to meet current RPS obligations through 2030. SMUD is on target to easily meet the 60% RPS target by 2030 and serve 100% retail sales with zero carbon and eligible renewable resources – SMUD's *2030 ZCP* achieves the 100% target fifteen years ahead of the State's planning goal date.

SMUD's RPS policy is stated in SMUD Board Strategic Direction (SD) 9. Previous version of our SD9 included the RPS goals of 20% by 2010 – our current SD9 includes RPS goals of 33% by 2020, 44% by 2024, 52% by 2027, 60% by 2030, and our *2030 ZCP* goal of being carbon free by 2030[1]; it also sets policies for energy efficiency and electrification goals, clean distributed generation, and greenhouse gas reduction. Staff strives to reach the policy goals in SD9 in the most effective, efficient, and equitable way practicable. SMUD balances the multiple policies in SD9 with other Board policies including those established for high levels of reliability (SD4), competitive rates (SD2), access to capital markets (SD3), and the local environment (SD7). SMUD also undertakes research, development and demonstration (RD&D) activities (SD10) that contribute to the RPS and other SD9 goals. Balancing the achievement of SMUD's RPS and other policies involves an integrated resource planning (IRP) process.

As required by Public Utilities Code (PUC) § 399.30 (a), and by the *Enforcement Procedures for the Renewable Portfolio Standard for Local Publicly Owned Utilities (CEC RPS Regulations)*, Section 3205(a), SMUD adopted a Renewable Energy Resources Procurement Plan (Procurement Plan) in 2013 and updated that Procurement Plan 2019. Given the legislative changes to RPS requirements, SMUD's *2030 Zero Carbon Plan*, and the passage of time since the last plan adoption, SMUD is adopting a revised Procurement Plan – this document – describing how it will achieve its RPS procurement requirements for each compliance period established by law through 2030.

In accordance with requirements in the *RPS Regulations*, a copy of any adopted updates to this Procurement Plan shall be submitted to the CEC within 30 days of adoption.

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[1] SMUD's SD9 goal was most recently revised in April 2021. This update, adoption of Resolution No. 21-04-04 updated the SD9 direction to align with the goal of 0 MT GHG emissions in our energy supply by 2030, put forth in *SMUD's 2030 Zero Carbon Plan*, the foundational document of our *2030 Zero Carbon Integrated Resource Plan* (IRP).

In December 2011, SMUD's Board approved SMUD's RPS Enforcement and Compliance Plan (Enforcement Plan), pursuant to SBX1-2. In November 2013, SMUD's Board adopted a revised Enforcement Plan to ensure compliance with the *CEC RPS Regulations*, and is adopting revisions concurrently with the adoption of this Procurement Plan. The Enforcement Plan confirms SMUD's commitment to comply with the *CEC RPS Regulations.*

Section 2: Renewable Procurement and RPS Compliance

SMUD has met its RPS compliance obligations for the following compliance periods, per *CEC RPS Regulations*, Section 3204[2]:

- Compliance period 1 (2011 – 2013)
- Compliance period 2 (2014 – 2016)
- Compliance period 3 (2017 – 2020; pending CEC verification)

SMUD is also well under way to meeting the established targets for compliance period 4 (2021-2024). Table 1 illustrates the RPS compliance targets for 2021 through 2030, as provided in PUC § 399.30 (c)(2) and the *CEC RPS Regulations*, Section 3204(a).

Table 1: RPS Compliance Targets

	Compliance Period 4				Compliance Period 5			Compliance Period 6		
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RPS Target (% of Retail Sales)	35.75%	38.50%	41.25%	44.00%	46.00%	50.00%	52.00%	54.67%	57.33%	60.00%

Table 2 shows the expected procurement from contracted and planned eligible renewable contracts as well as owned resources that can be allocated and retired for SMUD's RPS compliance. This estimate is based on SMUD's load forecast used during development of our *2030 ZCP*. Note that this renewable energy procurement shows our estimated availability of resources but does not indicate that the associated Renewable Energy Certificates (RECs) will all be retired for the RPS. Most of these contracts reflect projects that are on-line and generating electricity, contracts that have been executed with an expected commercial online date, or expected contracts from an existing procurement process. The table excludes generation from resources that are allocated to meet SMUD's Greenergy and SolarShares retail sales. For resources that may be used to serve multiple programs, any generation not used to meet RPS requirements is excluded from Table 2. The values in Table 2 incorporate all future resources identified in Appendix A.

SMUD expects to retire RECs from existing and planned resources to fully achieve compliance for compliance periods 5 and 6 (through 2027). SMUD plans to extend

[2] For historical compliance in the first and second compliance periods, see CEC reports on POU RPS compliance.

contracts and/or contract for new resources to achieve compliance in subsequent compliance periods (see Additional Resources Needed in Table 2). Table 2 shows a deficit (Additional Resources Needed) for compliance period 6, but the table does not reflect the additional 13,000 GWh identified in our *2030 ZCP* as needed in order to meet our zero-carbon goal because we have not yet started the process to procure those resources.

Table 2: SMUD's Renewable Resources and Compliance Requirements[3]

	Compliance Period 4 2021 - 2024	Compliance Period 5 2025 - 2027	Compliance Period 6 2028 - 2030
RPS Compliance Period Target (GWh)	**15,063**	**13,927**	**17,023**
Category 1 Minimum	75%	75%	75%
Category 3 Maximum	10%	10%	10%
Procurement by Technology (GWh)			
Biomass/Biogas /Biomethane	1,201 GWh	232 GWh	422 GWh
Geothermal	3,082 GWh	3,569 GWh	3,555 GWh
Solar	3,804 GWh	5,431 GWh	5,123 GWh
Wind	5,991 GWh	4,839 GWh	4,781 GWh
Eligible Hydro < 30MW	300 GWh	265 GWh	265 GWh
Total Generation	**14,378 GWh**	**14,336 GWh**	**14,146 GWh**
Surplus Applied	685 GWh	0 GWh	920 GWh
Total Applied to RPS Target	**15,063 GWh**	**14,336 GWh**	**15,066 GWh**
Additional Resources Needed	0 GWh	0 GWh	1,957 GWh
Surplus Banked	*0 GWh*	*409 GWh*	*0 GWh*
Procurement by Portfolio Content Category (GWh)			
Category 0 RECs	1,822	1,062	958
Category 1 RECs	11,516	13,095	13,008
Category 2 RECs	800	0	0
Category 3 RECs	199	149	149
Pre-June 1, 2010 Category 3 RECs	41	31	31
Total	**14,378**	**14,336**	**14,146**
Long-Term Contracts			
Percentage of Long-Term RECs	94%	>99%	>99%

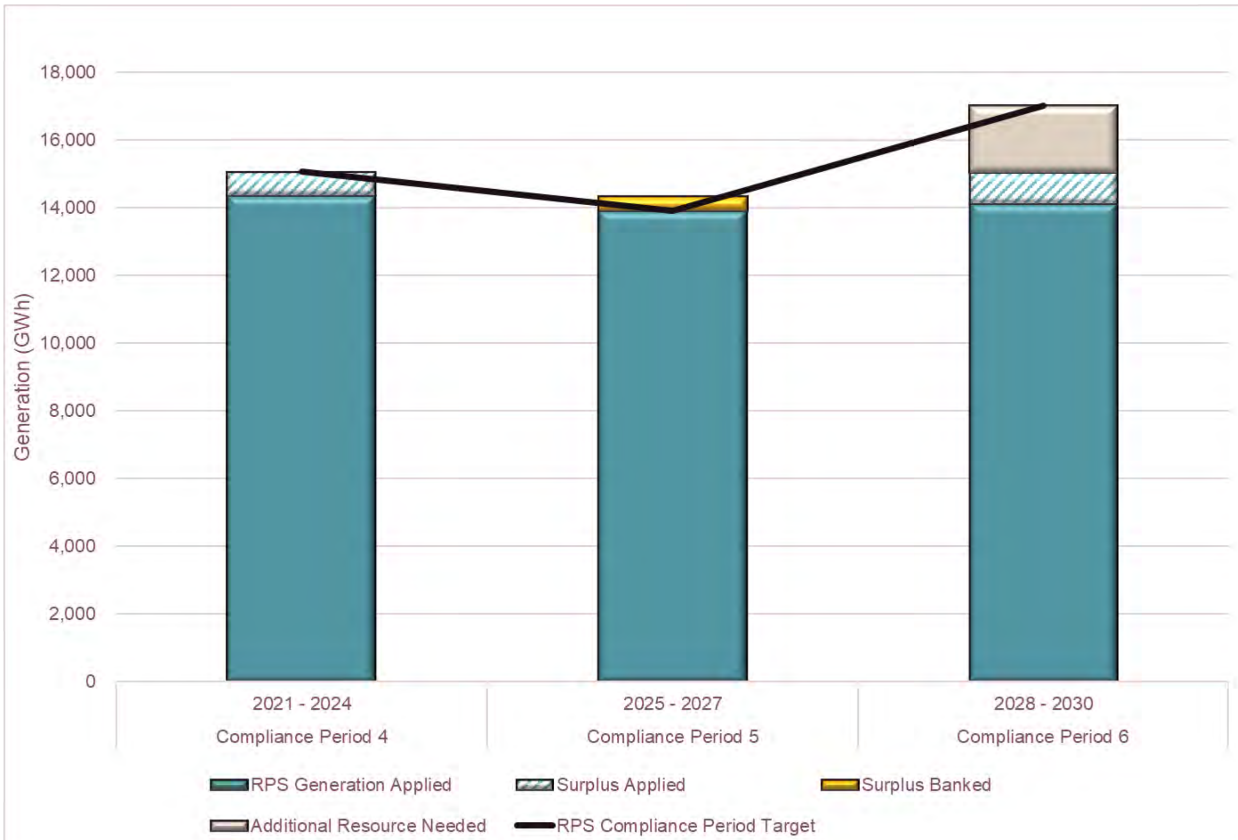
Note: Values in this table are subject to change.

SMUD's currently procured renewable energy resources are predominately Portfolio Content Category (PCC) 0 and PCC 1 RECs. SMUD has procured some PCC 3 RECs from our customers' distributed generation systems under SB 1. SMUD developed a strategy to optimize our renewables portfolio that includes procurement of PCC 2 resources and PCC3 RECs, and alternative uses of biomethane that maximize value in meeting compliance period requirements subject to *CEC RPS Regulations*, Section 3204 (c), and help further carbon emissions reductions. We procured PCC 2 and PCC 3 resources to help meet our compliance period 3 RPS obligations and are looking to procure PCC 1 or PCC 2 resources under short-term contracts to ensure we meet compliance period 4 obligations.

[3] Only resources that are existing, under contract, or under an active procurment process are included in this table. SMUD's *2030 Zero Carbon Plan* calls for an additional 5,000 GWh of renewable resource procurement in compliance period 5 and 13,000 GWh in compliance period 6..

Table 2 shows the PCC 0, PCC 1, PCC 2, and PCC 3 RECs, that SMUD expects from currently committed eligible renewable resources (including RECs expected from an active procurement process). The majority of procurement from contracts/agreements signed after June 1, 2010 are PCC 1, sufficient to exceed the portfolio balance requirements specified in PUC § 399.16 (c) and in the *CEC RPS Regulations*, Section 3203 (c)-(e) with regards to procured electricity products for compliance with RPS requirements. SMUD intends to retire RECs within 36 months of generation to fully meet the portfolio balance requirements as mandated by RPS requirements. Figure 1 illustrates SMUD's compliance through 2030 utilizing compliance period generation and banked resources, along with any surplus and additional resource needs.

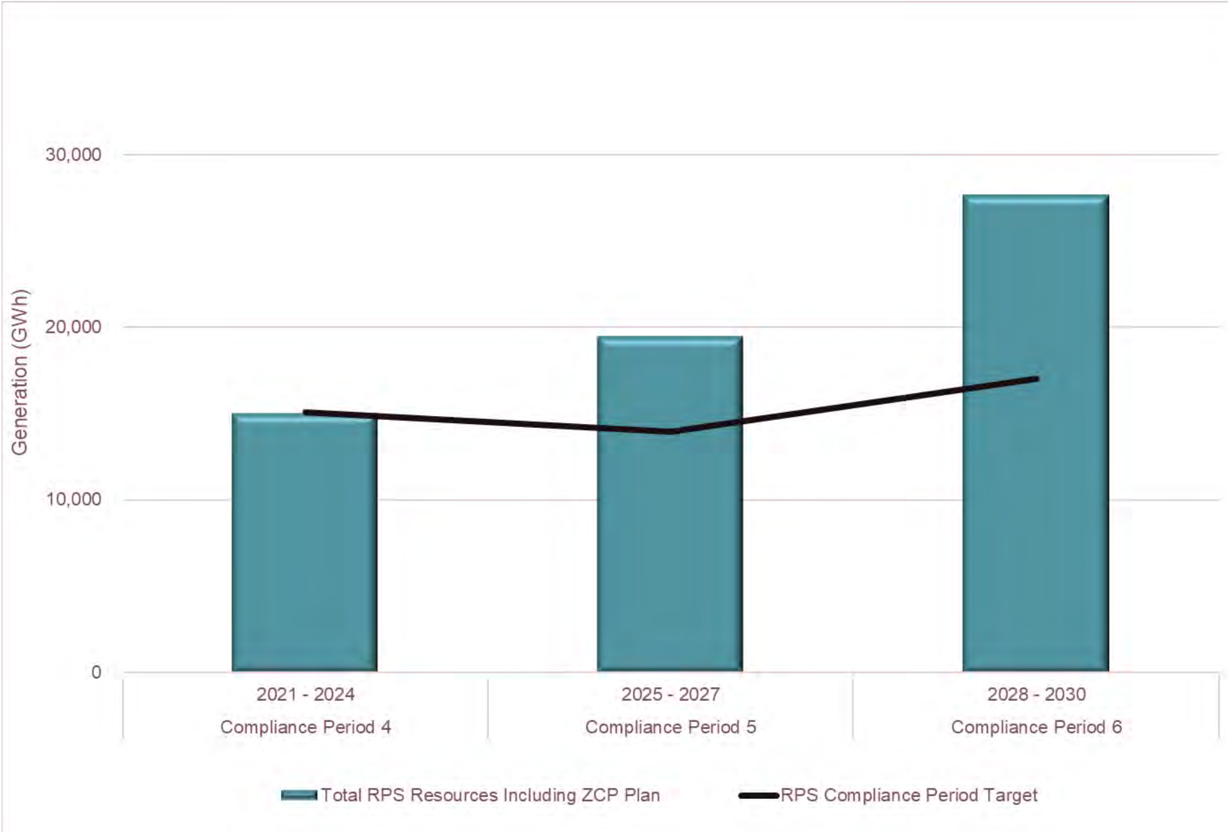
Figure 1: SMUD RPS Resources and Compliance



As noted above, Figure 1 also illustrates SMUD's need for additional resources to meet the compliance period 6 requirements. Consistent with our *2030 ZCP*, we plan to procure additional renewable resources that will far exceed our RPS needs, as illustrated in Figure 2.

SBX1-2 permitted POUs to accumulate excess procurement in one compliance period for use in a subsequent compliance periods. Under these original excess procurement rules, only RECs from long-term contracts and owned resources could count in the excess procurement calculation. This meant that any RECs from short-term contracts were

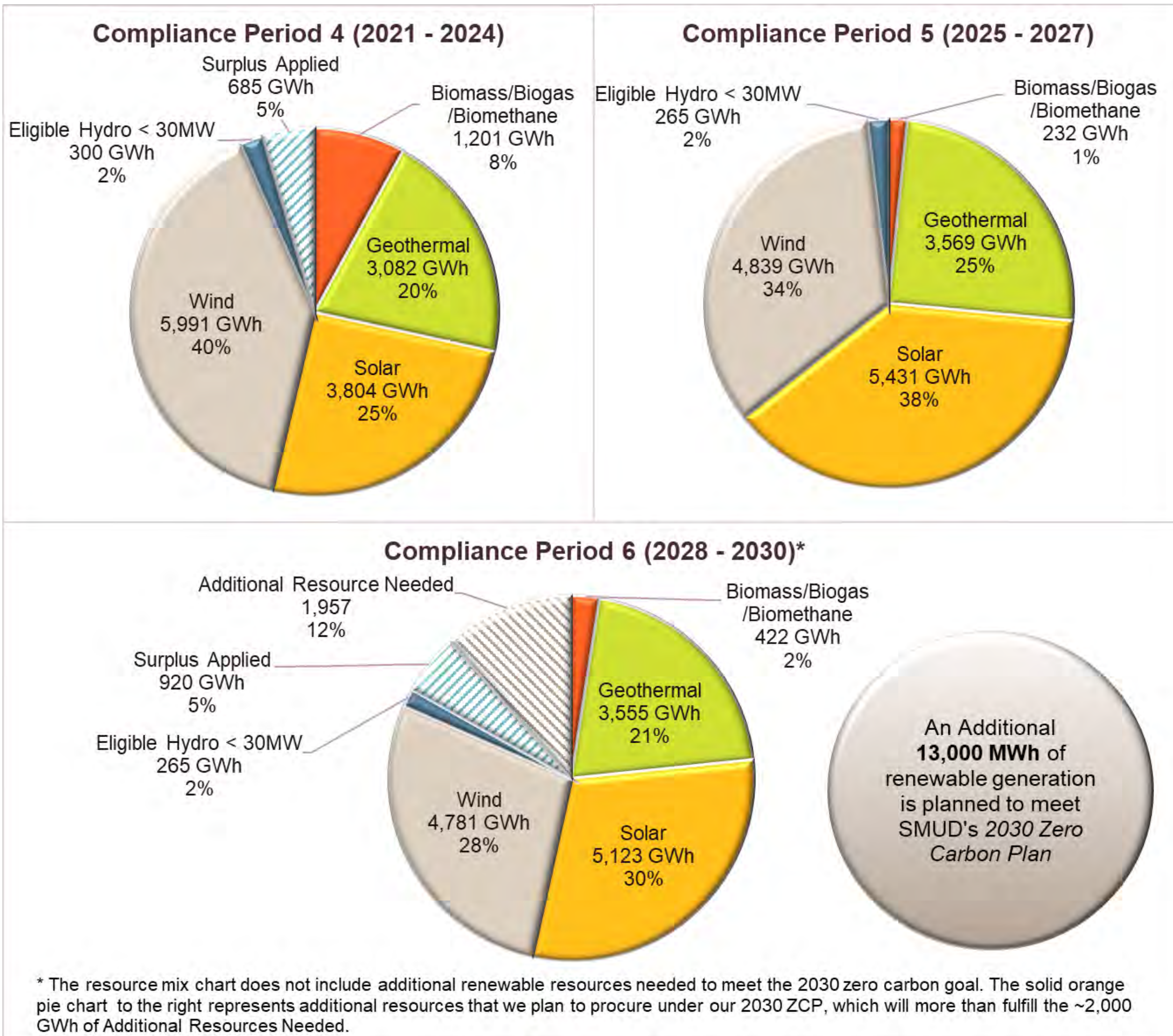
Figure 2: Total RPS Resources Including Planned *2030 ZCP* Procurement



subtracted out before a POU could determine if it had any excess procurement. These original excess procurement rules remained in place until the end of compliance period 3. SMUD has banked excess procurement from compliance periods 1 and 2 for use in subsequent periods, pursuant to these existing excess procurement rules, which are currently implemented in *CEC RPS Regulations*, Section 3206 (a)(1). Once verification for compliance period 3 is completed, SMUD anticipates having banked excess procurement available to use in future compliance periods.

SB 350 significantly amended the excess procurement rules, allowing a POU to calculate its excess procurement without first subtracting out RECs from short-term contracts. Under these new excess procurement rules, only PCC 0 and PCC 1 RECs may be carried forward as excess procurement. This means that if a POU has excess PCC 2 or PCC 3 RECs, those RECs will not be able to be banked and carried forward. While these new excess procurement rules will become mandatory starting in compliance period 4, a POU may use these new excess procurement rules in compliance period 3 if the POU meets the 65% long-term procurement requirement specified in PUC § 399.13 (b), and elects to do so. SMUD's banked excess procurement as of the end of compliance period 2 was 3,551,599 RECs and expects to have approximately 1.2 million PCC 1 RECs of banked excess at the end of compliance period 3 (once verification is completed). Provisions regarding SMUD's authority to bank and use of excess procurement in subsequent compliance periods are included in our Enforcement Plan. SMUD also had historic carryover that was completely retired and used to meet our compliance period 2 obligations. SMUD's total historic carryover balance, as approved by the CEC, was 2,666,104 RECs.[4]

Figure 3: SMUD RPS Compliance Resource Mix



SMUD's 2021 IRP, which is based on our *2030 ZCP*, reflects a need for additional renewable procurement starting in 2025 in order to meet or zero carbon goal by 2030. As identified previously in this Procurement Plan, the tables and charts here do not reflect planned procurement beyond what is currently under an active procurement process, which results in a need for additional resources in compliance period 6.

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[4] Historic carryover balance was verified by the CEC as part of the Compliance Ceriod 1 verification and compliance determination process. The verification report was adopted by the CEC in January 2017, and the compliance determination was issued by the CEC's executive director in June 2017.

SMUD is continuing to pursue additional renewable resource options not included in Table 2 and is working to identify when additional procurement activities must occur in order to add approximately 5,000 GWh of renewables in compliance period 5, and an additional 13,000 GWh in compliance period 6. We will continue to evaluate new options to ensure compliance through 2030 and meet our *2030 ZCP* goal. SMUD's continued efforts to optimize our renewables portfolios and procurement value to our customers will likely impact the timing of additional resource procurements. SMUD will closely monitor resource availability relative to compliance obligations and will strategically assess when to pursue new resources through solicitations, direct contracts with developers and marketers, and building our own. Figure 3 provides an estimate of SMUD's RPS resource mix by compliance period through 2030.

Note that all tables and figures are based on expected generation through 2030. Actual generation and resource mixes may change as SMUD procures additional resources or resources generate differently than expected. SMUD's projected compliance may also be affected by the difference between the current forecast retail sales and actual sales through 2030. The market response to SMUD's investments in electrification, along with the uncertain technological changes in that market may lead to increases or decreases in actual sales from those forecast. In addition, changes in customer demand for our Greenergy and SolarShares programs, and in the resources used to supply those programs, can impact the "net" sales used to calculate SMUD's RPS obligations. Finally, technological advances in non-RPS qualified carbon free technologies may alter the quantity of renewable resources needed to meet our zero carbon goals by 2030.

Section 3: Procurement Process

The SMUD Board of Directors (Board) establishes all RPS goals and SDs and considers them in short and long-term renewable resource investment decisions. As mentioned above, the SDs include policies for environmental performance, power reliability, carbon emissions reductions, financial objectives, and renewables RD&D and procurement. SMUD's IRP process helps ensure SMUD achieves its long-term goals and SDs, at a reasonable cost. The IRP process helps develop balanced recommendations that support renewable procurement and development actions and other SMUD SDs.

SMUD owns and operates eligible renewable energy resources and uses the resulting electricity products for RPS compliance or to meet the needs of our voluntary green programs. SMUD owns several small hydro, wind, and solar PV facilities which are listed in Appendix A.

SMUD also procures eligible renewable electricity resources by contract through formal solicitation processes and unsolicited offers as needed to meet the requirements of various statutory obligations and SMUD's own goals. These proposals and offers are evaluated based on benefits, costs and overall value to SMUD's customer/owners.

Section 4: Historic Carryover

Since the Board approved an RPS goal in 2001, SMUD has actively procured renewable energy. In order to ensure SMUD met its annual RPS goals and, specifically, the 2010 target, SMUD procured renewable energy exceeding the annual targets established in the *CEC RPS Regulations*. Per the *CEC RPS Regulations*, “Historic carryover” means a POU’s procurement that satisfies the following criteria:

- The procurement is for electricity and the associated renewable energy credit generated in 2004-2010 by any eligible renewable energy resource that met the Commission’s RPS eligibility requirements in effect when the original procurement contract or ownership agreement was executed by the POU.
- The original contract or ownership agreement was executed by the POU prior to June 1, 2010.
- The procurement is in excess of the sum of the 2004-2010 annual procurement targets defined in section 3206 (a)(5)(D) and was not applied to the RPS of another state or to a voluntary claim.

Through the CEC’s verification process, SMUD received 2,666,104 RECs of historic carryover from renewable energy consistent with these criteria. SMUD applied all its historic carryover towards the requirements for compliance period 2.

Section 5: Portfolio Content Category 0 Resources

SMUD has some of its current renewable supply procured pursuant to contracts or ownership agreement executed before June 1, 2010 from resources that met the CEC’s eligibility requirements when the resources were procured. Pursuant to PUC § 399.16 (d) as implemented in *CEC RPS Regulations,* Section 3202 (a)(2), the electricity product from these legacy resources are counted in full toward the RPS requirements. The CEC reporting forms refer to these resources as PPC “0” resources.

SMUD has modified or extended some of these contracts and as a result has changed the status of the resources from the date of modification from PCC 0 to PCC 1. See Appendix A for a listing of SMUD’s resources.

Section 6: Additional Committed Category Resources

SMUD continued to develop and procure renewable supply after June 1, 2010. SMUD’s Feed-In Tariff (FIT) solicitation in 2009 resulted in nearly 100 MW of solar PV systems that have since been constructed under the FIT. SMUD expanded its Solano Wind Facility in the Rio Vista area in 2012, by completing construction of Solano Phase III, which added 128 MW of capacity. In 2013, SMUD supported the construction of several local dairy digestor projects in SMUD’s service territory. Some of SMUD’s dairy digester resources have experienced operational issues and have been offline occasionally.

SMUD also has 3 legacy common carrier biomethane contracts that are certified to provide renewable biomethane to the Cosumnes Power Plant (CPP), along with a biogas cleanup facility near the Sacramento Regional County Sanitation District's (SRCSD) wastewater treatment plant that began injecting the cleaned biogas into SMUD's dedicated pipeline for combustion at CPP in 2011. This SRCSD biogas was previously combusted at SMUD's Carson power plant and may still be combusted there when combustion at CPP is infeasible (due to planned or unplanned outages). SMUD will continuing exploring opportunities to maximizee the value of these resources, including use of the biomethane for purposes other than the RPS that help advance the overall goals of our *2030 ZCP*.

SMUD has also extended contracts for two landfill gas facilities and a wind facility, and has added two geothermal and one solar PV projects.

Additionally, SMUD has added, or extended, the following contracts since the Procurement Plan was last updated:

- Wildflower Solar I – 13 MW solar PV project in SMUD's service territory began deliveries at the end of 2020.
- Rancho Seco PV II – 160 MW solar PV project in SMUD's service territory began deliveries in 2021.
- Grady Wind – 200 MW wind facility started delivery in 2019.
- South Fork Powerhouse – 1.9 MW small hydro facility started delivery in 2019.
- Chili Bar – 8.3 MW small hydro facility was purchased in 2020.

SMUD currently has some PCC 3 resources through the implementation of the SB-1 solar roof-top incentive program. The amount of PCC 3 generation represented is a fraction of the PCC 3 maximum in the CEC regulations. SMUD procured PCC 2 resources under short-term contracts to meet compliance period 3 RPS obligations as part of optimizing our overall renewables portfolio and plans to continue optimizing our portfolio mix, including procuring additional PCC 2 resources, through at least compliance period 4.

Section 7: Future Procurement

Since meeting its RPS goal through 2020 (compliance period 3), SMUD continues to conduct activities to procure renewable energy to meet future obligations. Activities include the following:

- SMUD staff will continue to seek additional renewable resources to address the RPS resource needs through 2030 and beyond. SMUD's *2030 ZCP* calls for significant additions of new renewable resources between 2025 and 2030 and is working to identify when the procurement process to meet these needs must occur. We plan to closely monitor when additional resources are needed and ensure that requests for proposals for new projects are available well in advance of expected shortfalls, or that other means of identifying, negotiating, and contracting for new resources take place. Our *2030 ZCP* calls for many of the planned resource additions to be located within SMUD's service territory to provide greater local benefits, but we will also consider other in-state resources along with out-of-state resources.

- SMUD continually reviews existing renewable contracts set to expire to examine the possibility of extending and/or modifying these contracts.
- SMUD has signed agreements to purchase renewable energy from the following resources:
    - A new 100 MW solar PV facility located in Southern California that is scheduled to be online in 2022. RECs from this facility may be used for SMUD's voluntary renewable programs, with any surplus available to meet RPS requirements.
    - A 100 MW geothermal project scheduled to begin deliveries in January 2023.
    - A local (SMUD service territory) 200 solar PV plus 100 MW battery storage project expected to be operational in 2024.
    - A new local 50 MW solar PV project expected to be online in 2024.
- SMUD is planning to repower the earliest phase of our existing Solano Wind facility, and incorporating it into a Solano Wind phase 4 (~85 MW) project. .
- SMUD is currently engaged in a solicitation process to procure approximately 340 MW of solar PV resources and 170 MW of battery storage located in SMUD's service territory with expected online dates in 2024. This is the first of what is expected to be multiple solicitations to help meet the resource needs identified in the *2030 ZCP*.
- SMUD staff has supported development of new local dairy digester projects and continues to look for opportunities to economically expand this resource in SMUD's service territory.
- As SMUD's SolarShares and Greenergy Programs are expected to expand, staff continues to look for solar and renewable projects to supply these programs.

Some of the resources used to serve SMUD's voluntary renewable programs are listed here since any excess generation not used to serve load from those programs will be used to meet RPS obligations. However, this plan and any requirements or provisions herein apply to procurement to serve SMUD's RPS obligations.

These planned activities and other future procurement may also contribute to meeting SMUD's RPS compliance requirements, along with existing resources and committed projects. In addition, they will add to SMUD's renewable fuel diversity and contribute toward SMUD's longer term carbon reduction goals.

Appendix A – SMUD RPS Resources

Existing Resources

Resource	Technology	PCC	Short/Long	Capacity		Termination
CPP	Biomethane	PCC 0 & 1	Long			Post 2030
Solano Phase 1 & 2	Wind	PCC 0	Long	102		Post 2030
Solano Phase 3	Wind	PCC 1	Long	128		Post 2030
Grady	Wind	PCC 1	Long	200		Post 2030
Kiefer 1	Biogas	PCC 1	Long	8.3		2025
Kiefer 2	Biogas	PCC 1	Long	5.7		2026
Highwinds	Wind	PCC 1	Long	50		2025
Yolo Landfill	Biogas	PCC 0	Long	3.4		2026
Santa Cruz (GRS, Landfill)	Biogas	PCC 0	Long	1.9		2024
Loyalton Cogen (SB 859)	Biomass	PCC 1	Short	4.2		2023
Cal Energy	Geothermal	PCC 1	Long	30		Post 2030
Patua 1	Geothermal	PCC 1	Long	21		Post 2030
Robbs Peak	Small Hydro	PCC 0	Long	29		Post 2030
Jones Fork	Small Hydro	PCC 0	Long	11.5		Post 2030
South Fork Powerhouse	Small Hydro	PCC 1	Long	1.9		Post 2030
Chili Bar	Small Hydro	PCC 1	Long	8.3		Post 2030
RanchoSeco PV *	Solar PV	PCC 1	Long	10.9		Post 2030
Great Valley Solar *	Solar PV	PCC 1	Long	60		Post 2030
Wildflower Solar I *	Solar PV	PCC 1	Long	13		Post 2030
Rancho Seco PV II *	Solar PV	PCC 1	Long	160		Post 2030
FIT **	Solar PV	PCC 1	Long	100		Post 2030
WAPA CVP	Small Hydro	PCC 0	Long	13.5		Post 2030
New Hope Diary	Biogas	PCC 1	Long	0.4		Post 2030
Van Warmerdam Dairy	Biogas	PCC 1	Long	0.6		Post 2030
Van Steyn Dairy	Biogas	PCC 1	Long	0.2		2025
Cal Expo	Solar PV	PCC 0	Long	0.4		2020
Commercial PV (SB-1, PCC 3)	Solar PV	PCC 3	Long			Post 2030

Future Resources - Contracted/Under Development

Resource	Technology	PCC	Short/Long	Capacity	Online	Termination
NTUA ***	Solar PV	PCC 1	Long	100	2022	Post 2030
Calpine Geysers	Geothermal	PCC1	Long	100	2023	Post 2030
Solano Wind Phase 4	Wind	PCC 1	Long	85.5	2024	Post 2030
Coyote Creek (+ 100 MW Battery Storage)	Solar PV	PCC 1	Long	200	2024	Post 2030
Kings Country	Solar PV	PCC 1	Long	50	2024	Post 2030

Future Resources - Planned/Under Consideration

Resource	Technology	PCC	Short/Long	Capacity	Online	Termination
Sacramento Solar (+ 170 MW Battery Storage)	Solar PV	PCC 1	Long	340	2024	Post 2030

* These resources will be used primarily to serve load from SMUD's SolarShares programs and not available for RPS compliance needs. However, any excess generation not needed to serve SolarShares loads may be applied to SMUD's RPS compliance needs.

** Generation from the FIT resources will be used to serve SMUD's voluntary programs on occasion as needed (i.e. unexpected fluctuations in loads, delay in solar/renewable resource development, etc.)

*** The NTUA agreement specifically identifies the use of generation from this resource may be used to meet RPS requirements or to serve load from our voluntary renewable programs (SolarShares, Greenergy).

All RECs from these facilities are tracked in WREGIS and retired into the appropriate retirement accounts (compliance or voluntary program) to ensure no double counting between programs occurs.

DRAFT

RESOLUTION NO. _____________

WHEREAS, Public Utilities Code section 399.30(a) requires each publicly owned utility (POU) to adopt and implement a renewable energy resources procurement plan that ensures procurement from eligible renewable energy resources pursuant to requirements set forth in in Public Utilities Code section 399.30; and

WHEREAS, Section 3205(a) of the **California Energy Commission (CEC)** *Enforcement Procedures for the Renewables Portfolio Standard for Local Publicly Owned Electric Utilities* **(CEC RPS Regulations)**, includes additional requirements applicable to POU renewable energy resources procurement plans; and

WHEREAS, by Resolution No. 13-11-09, adopted November 21, 2013, this Board approved and adopted SMUD's initial **Renewable Energy Resources Procurement Plan (RPS Procurement Plan)**; and

WHEREAS, by Resolution No. 19-04-04, adopted on April 25, 2019, this Board approved and adopted the updated **RPS Procurement Plan** to reflect the renewable additions included as part of SMUD's 2018 **Integrated Resources Plan (IRP)** and **CEC RPS Regulations**; and

WHEREAS, by Resolution No. 21-04-05 adopted on April 28, 2021, this Board accepted SMUD's **2030 Zero Carbon Plan**, a flexible path to eliminating carbon emissions from its power supply by 2030; and

WHEREAS, in 2022, SMUD will seek approval from this Board to formally adopt SMUD's **2030 Zero Carbon Plan** as its updated **IRP**, consistent with Public Utilities Code section 9621; and

DRAFT

WHEREAS, the **CEC RPS Regulations** were modified, effective July 12, 2021; and

WHEREAS, in consideration of the 2021 updates to the **CEC RPS Regulations** and SMUD's imminent update to its **IRP**, staff has developed an updated **RPS Procurement Plan**, substantially in the form of **Attachment ___,** that meets the statutory requirements of Public Utilities Code section 399.30 and the **CEC RPS Regulations**, and which illustrates SMUD's future compliance with RPS regulations through 2030; and

WHEREAS, Public Utilities Code section 399.30(f) and the *CEC RPS Regulations* require the SMUD Board of Directors to provide the public with notice, pursuant to Chapter 9, of Part 1 of Division 2 of Title 5 of the Government Code, whenever it deliberates in public on its **RPS Procurement Plan**; and

WHEREAS, SMUD provided such notice on June 10, 2022; **NOW THEREFORE,**

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

The Board hereby approves and adopts the updated **Renewable Energy Resources Procurement Plan (RPS Procurement Plan)**, substantially in the form of **Attachment ___.**

9

SSS No. RSNBS 22-001	**BOARD AGENDA ITEM** STAFFING SUMMARY SHEET	Committee Meeting & Date: ERCS – 06/15/22; Board Meeting Date: June 16, 2022

TO		TO	
1.	Bryan Swann	6.	
2.	Suresh Kotha	7.	
3.	Frankie McDermott	8.	
4.	Brandy Bolden	9.	**Legal**
5.	Lora Anguay	10.	**CEO & General Manager**

Consent Calendar	X	**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**	X	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Garry Mariscal	Resource Strategy	B205	6448	5/27/2022

NARRATIVE:

Requested Action: Adopt an update to SMUD's Renewables Portfolio Standard (RPS) Enforcement and Compliance Plan.

Summary: State law requires publicly owned utilities to submit and periodically update a Board adopted Renewable Portfolio Standard (RPS) Enforcement and Compliance Plans, which details actions it will take to ensure achievement of RPS requirements. The Board adopted SMUD's Renewables Portfolio Standard (RPS) Enforcement and Compliance Plan on December 15, 2011 (Resolution No. 11-12-15) in compliance with California Public Utilities Code section 399.30. On November 21, 2013, the Board adopted an update to the RPS Enforcement and Compliance Plan (Resolution No. 13-11-09) in compliance with regulations adopted by the California Energy Commission (CEC) entitled, *Enforcement Procedures for the Renewables Portfolio Standard for Local Publicly Owned Electric Utilities* (*CEC RPS Regulations*).

In December 2020, the *CEC RPS Regulations* were revised and set forth new requirements effective July 12, 2021, which require an update to SMUD's RPS Enforcement and Compliance Plan. SMUD's updated RPS Enforcement and Compliance Plan reflects the latest RPS laws and is reflected in SMUD's Zero Carbon Plan.

Staff recommends adoption of the updated RPS Enforcement and Compliance Plan.

Board Policy: *(Number & Title)* Governance Process GP-3 (j), Board Job Description – Take such other actions as may be required by law. Strategic Direction SD-9, Resource Planning.

Benefits: Provides the Board with sufficient information to adopt an updated RPS Enforcement and Compliance Plan that meets state policy goals in clean energy and pollution reduction.

Cost/Budgeted: N/A

Alternatives: Action must be taken to comply with the law.

Affected Parties: Resource Strategy, Distributed Energy Strategy, Energy Trading & Contracts, Power Generation, Grid Planning, Grid Operations

Coordination: Executive Office, Board Office, Resource Strategy, Power Generation, Treasury & Risk Management, Legal, Marketing & Corporate Communications

Presenter: Bryan Swann, Director, Resource Strategy

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
Adopt Update to SMUD's Renewables Portfolio Standard Enforcement and Compliance Plan	9

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

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SMUD RPS Enforcement and Compliance Plan

June 2022

SMUD®

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Section 1: Introduction

The Sacramento Municipal Utility District (SMUD) is committed to development and procurement of renewable energy for our ratepayers. Senate Bill 2 (SBX1-2; 2011) established a Renewables Portfolio Standard (RPS) goal of 33% by 2020 for local publicly-owned electric utilities (POUs) as well as retail sellers. Senate Bill 350 (SB 350; 2015) modified certain provisions of the RPS and set a 2030 RPS target of 50%, which was further modified by Senate Bill 100 (SB 100; 2018) to establish a 60% RPS target by 2030 and a planning goal of serving 100% of retail sales with zero carbon and eligible renewable resources by 2045.This document describes SMUD's RPS Enforcement and Compliance Plan (Enforcement Plan), which, upon approval by the Board, will be submitted to the California Energy Commission (CEC) as required by Public Utilities Code (PUC) § 399.30(e) and by the *Enforcement Procedures for the Renewables Portfolio Standard for Local Publicly Owned Utilities (CEC RPS Regulations)*, Section 3205(b). SMUD adopted its initial Enforcement Plan in 2011 and updated this plan in 2013.

In July 2020, our Board of Directors declared a climate emergency and adopted a resolution directing SMUD to take significant and consequential actions to become carbon neutral (net zero carbon) by 2030. In April 2021, SMUD's Board approved our 2030 Zero Carbon Plan (2030 ZCP). SMUD's goal to eliminate carbon emissions from our power supply by 2030 is more ambitious than already aggressive state mandates and identifies procurement of renewable resources far beyond what is necessary to meet current RPS obligations through 2030. SMUD's goals beyond the State mandated RPS targets are not governed or subject to the provisions set forth in this Enforcement Plan.

Modifications or amendments to the Enforcement Plan require that no less than 10 calendar days' notice be given to the public of a meeting held for the purpose of adopting an updated Enforcement Plan. Upon adoption of an updated Enforcement Plan, SMUD shall submit a copy to the CEC within 30 days.

Section 2: Enforcement

At the end of each compliance period, SMUD staff will review RPS qualified generation and renewable energy credits (RECs) to determine whether SMUD has met its RPS procurement requirements in accordance with Section 3204 of the *CEC RPS Regulations*, for the compliance period. If staff determines that SMUD has met its RPS procurement requirements, an RPS compliance report addressing the reporting requirements of Section 3207 of the *CEC RPS Regulations* will be prepared and submitted to the CEC.

If SMUD staff determines that the conditions for delaying compliance detailed in Section 6, the cost limitation provisions of Section 7, or the adjustment of portfolio content category (PCC) provisions of Section 8 need to be applied for the compliance period, the Board will meet in open session to review the RPS compliance report. The Board shall consider staff's recommendation to apply the provisions of Section 6, 7, and/or 8; and approve the compliance report if they determine that in doing so SMUD will comply with the RPS obligations for the compliance period pursuant to the *CEC RPS Regulations.*

Subject to the conditions for delaying compliance detailed in Section 6, and with consideration of any optional compliance modifications from Sections 5, 7, 8, 9, 10, and/or 11, the Board will take enforcement action if it finds either of the following:

- Failure to meet the procurement obligations for the previous compliance period set forth in Section 4; or
- Failure to meet the portfolio balance requirement for procurement of PCC 1 resources for the previous compliance period, for resources procured or owned by SMUD after June 1, 2010, as set forth in Section 5.

Section 3: Enforcement Actions

If the RPS compliance report shows either or both of the failures listed in Section 2, the Board shall direct the Chief Executive Officer (CEO)/General Manager (GM) to develop and present a plan within 6 months to bring SMUD into compliance. The plan will be presented at a Board meeting for discussion and action. The Board will consider one or more of the following enforcement actions, or other actions as determined by the Board:

- Instruct staff to issue a Request for Offers to solicit more renewable energy generation to meet the goals and/or the applicable portfolio balancing requirements; or
- Determine and impose a payment that goes into an AB 32-related fund, with the restriction that such deposits in the account may only be used for renewable research, development and/or procurement purposes;
- Instruct staff to identify the issues resulting in non-compliance and submit a report to the Board that includes recommendations for mitigation.

Section 4: Compliance
[PUC §399.30 (c), PUC 399.16 (c) and CEC RPS Regulations,* Section 3204*]

SMUD's procurement target will be consistent with PUC § 399.30 (c) and *CEC RPS Regulations,* Section 3204. SMUD shall meet the portfolio balance requirements for the procurement categories in each compliance period, as specified in PUC § 399.16(c) and *CEC RPS Regulations,* Section 3204 (c); and the long-term procurement requirements in PUC § 399.30 (d)(1) with reference to PUC § 399.13 (b), and CEC RPS Regulations, Section 3204(d).

Section 5: Rules For Excess Procurement and Carryover
[PUC § 399.30 (d)(1) and CEC RPS Regulations,* Section 3206(a)(1)*]

SMUD shall allow banking of excess procurement from one compliance period for use in subsequent periods, pursuant to *PUC § 399.30 (d)(1) and PUC § 399.13 (a)(5)(B)*, and *CEC RPS Regulations,* Section 3206(a)(1).

SMUD defines "excess procurement" as any eligible renewable generation in a compliance period that exceeds the compliance period requirement for that period as calculated using the formulas in *CEC RPS Regulations,* Section 3206(a)(1)(H), subject to the limitations and provisions of *CEC RPS Regulations,* Section 3206(a)(1)(B) – (F), as summarized below:

For Compliance Periods 1, 2, and 3 the following rules shall apply:

- SMUD may apply excess procurement in one compliance period to a subsequent compliance period, subject to the following limitations:
    - Electricity products that exceed the maximum limit for PCC 3, as specified in PUC § 399.16 (c), must be subtracted from the calculation of excess procurement.
    - Electricity products procured under contracts of less than 10 years in duration shall be subtracted from the calculation of excess procurement, unless the electricity product meets the legacy contract requirements of PUC § 399.16 (d).
- SMUD may begin accruing excess procurement as of January 1, 2011.
- Excess procurement meeting these requirements may be applied to any future compliance period and shall not expire.

For Compliance Period 4 and all subsequent compliance periods, the following rules shall apply:

- SMUD may apply excess procurement in one compliance period to a subsequent compliance period, subject to the following limitations:
    - Electricity products that are classified as PCC 2 or PCC 3 may not be counted as excess procurement.
    - Electricity products that exceed the maximum limit for PCC 3, as specified in PUC § 399.16(c), must be subtracted from the calculation of excess procurement.
- Excess procurement shall be classified as either short-term or long-term.
- Excess procurement meeting these requirements may be applied to any future compliance period and shall not expire.

Section 6: Conditions to Delay Compliance
***[CEC RPS Regulations,* Section 3206(a)(2)]**

The Board may delay compliance for an RPS procurement requirement pursuant to the *CEC RPS Regulations,* Section 3206(a)(2) for a particular compliance period if any of the following conditions occur that prevent compliance and it is demonstrated that SMUD took all reasonable actions to meet the RPS procurement requirements of the *CEC RPS Regulations*, Section 3204, the conditions are or were beyond the control of SMUD, and SMUD would have been compliant but for the occurrence of the conditions:

- Inadequate transmission capacity to allow for sufficient electricity to be delivered;
- Permitting, interconnection, or other circumstances that delay procured eligible renewable energy resource projects;
- Unanticipated curtailment of eligible renewable energy resources necessary to address the needs of a balancing authority that limit renewable energy deliveries to a California balancing authority;
- Unanticipated increase in retail sales due to transportation electrification.

If the Board approves a delay in compliance for a particular compliance period, the CEO/GM shall provide the Board with a compliance plan within 3 months that identifies actions to ensure future procurement requirements.

Section 7: Cost Limitations/Constraints
[PUC § 399.30 (d)(2)(B) and CEC RPS Regulations*, Section 3206(a)(3*)]

SMUD shall establish specific cost limitations on procurement to ensure that RPS costs do not result in disproportionate rate impacts, pursuant to the *CEC RPS Regulations,* Section 3206(a)(3). SMUD launched a 2030 clean energy vision in 2020 and adopted the 2030 ZCP in 2021. SMUD's 2030 ZCP and long-term strategy include provision to minimize rate increases targeted at or below the rate of inflation while operating within targeted financial metrics. In accordance with this strategy, SMUD's goal is that compliance with the 60% RPS standard does not drive rate increases greater than the rate of inflation. SMUD may consider pursuing renewable energy that would cause rates to change by more than the rate of inflation if such procurement provides sufficient benefits to SMUD's ratepayers, or for other reasons, such as if other budget elements offset renewable increases so that the overall rate change is less than the rate of inflation.

In the event that SMUD's RPS costs are projected to be above the cost limitation, SMUD shall consider either: 1) adjusting the portfolio balance requirements in Section 4, pursuant to Section 8, until the cost limitation is achieved; 2) delaying the compliance period requirements in Section 4, pursuant to Section 6 above, until the cost limitation is achieved – this may include refraining from entering into new contracts or constructing facilities for eligible renewable energy resources beyond the quantity that can be procured within the cost limitation; or 3) waiving the cost-limitation established in this section.

Section 8: Adjustment of Portfolio Balance Requirements
***[PUC § 399.16(c) and CEC RPS Regulations*, Section 3206(a)(4)]**

SMUD adopts the following rule allowing for the reduction of the portfolio balance requirement for PCC 1, pursuant to PUC § 399.16(e), and the *CEC RPS Regulations,* Section 3204(a)(4):

SMUD's Board may adjust the percentage limitations specified in PUC § 399.16(c) for procurement of PCC 1 in order to comply with the obligation for a compliance period, provided the Board:

- Finds the need to reduce the PCC 1 procurement results from conditions beyond SMUD's reasonable control;
- Adopts such changes at a publicly noticed meeting; and
- Adopts an updated RPS Procurement Plan, submits it to the CEC, and includes the following information:
    - An explanation of why the reduction resulted from conditions beyond SMUD's control
    - The compliance period for which the reduction is adopted
    - The level by which the requirement was reduced

In no case shall the Board adjust the percentage requirement for procurement from PCC 1 below 65% for compliance after Compliance Period 2.

Section 9: Application Of Historic Carryover
***[CEC RPS Regulations*, Section 3206(a)(5)]**

SMUD shall calculate historic carryover associated with SMUD's eligible renewable procurement prior to 2011, and apply that excess historical carryover in the compliance periods defined herein, pursuant to the *CEC RPS Regulations,* Section 3206(a)(5). "Historic carryover" is defined as a POU's procurement that satisfies the following criteria:

- The procurement is for electricity and the associated renewable energy credit generated in 2004-2010 by any eligible renewable energy resource that met the CEC's RPS eligibility requirements in effect when the original procurement contract or ownership agreement was executed by the POU.
- The original contract or ownership agreement was executed by the POU prior to June 1, 2010.
- The procurement is in excess of the sum of the 2004-2010 annual procurement targets defined in section 3206 (a)(5)(D) and was not applied to the RPS of another state or to a voluntary claim.

Any excess historical procurement that is carried forward for application in the compliance periods herein, will meet the applicable CEC's RPS eligibility requirements in place at the time of procurement. SMUD shall include generation from contracts of any length in the calculation of excess historical procurement.

Section 10: Long-Term Procurement

[PUC § 399.30 (d)(1) with reference to PUC § 399.13 (b)*, and *CEC RPS Regulations*, Section 3204(d)*]

SMUD's procurement strategy shall ensure that at least 65% of generation retired and applied to meet SMUD's RPS obligation in any given compliance period starting after January 1, 2021 (starting with compliance period 4), shall be from contracts deemed to be "long-term" in compliance with provisions of the *CEC RPS Regulations*, Section 3204(d), and in accordance with the formula in the *CEC RPS Regulations*, Section 3204(d)(1).

A long-term contract is defined as a contract to procure a nonzero quantity of electricity products from an RPS-certified facility for a duration of at least 10 continuous years, consistent with *CEC RPS Regulations*, Section 3204 (d)(2)(B) and (C).

Section 11: Retail Sales Exclusion for Voluntary Green Pricing or Shared Renewable Generation Programs

[*PUC § 399.30 (c)(4)* and *CEC RPS Regulations*, Section 3204(b)(9)]

Beginning January 1, 2014, SMUD may exclude from its retail sales the MWhs generated by an eligible renewable energy resource that is credited to customers participating in the SMUD's voluntary green pricing or shared renewable generation programs.

The exclusion may be applied under the following conditions:

- The generation is from an RPS-certified facility.
- The generation must be from a PCC 1 resource, as defined in the *CEC RPS Regulations*, Section 3203(a), or a resource that meets the criteria of *CEC RPS Regulations*, Section 3202(a)(2) and also satisfies the criteria for a PCC 1.
- The RECs associated with the generation are retired in WREGIS, are not counted toward SMUD's RPS procurement requirements, and are not further sold, transferred, or otherwise monetized for any purpose.
- To the extent possible, SMUD shall procure electricity products from facilities located within a California balancing authority area.

Prior to the CEC's incorporation of the provisions above into the *CEC RPS Regulations*, pursuant to the provisions of *PUC § 399.30 (c)(4)* and guidance from the CEC, SMUD elected to exclude certain green pricing and shared renewable program loads served by eligible RECs (meeting the requirements of this section) from total retail sales for purposes of determining RPS compliance obligation for the second (2014 – 2016) and third (2017 – 2020) compliance periods. Provisions for this exclusion were previously incorporated in our RPS Procurement Plan.

Section 12: Separability of Voluntary Renewable Programs

This is the enforcement and compliance plan for SMUD's RPS obligation. SMUD also procures renewable energy for its voluntary green pricing and shared renewable programs, including Greenergy and SolarShares. Nothing in this Enforcement Plan is intended to apply to SMUD's procurement for those voluntary green pricing and shared renewable programs, except to the extent that the generation that is procured for those programs is excluded from retail sales pursuant to Section 11 above. In that case, such procurement shall be consistent with the provisions of Section 11.

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RESOLUTION NO. ____________

WHEREAS, Public Utilities Code section 399.30 requires each publicly-owned utility (POU) to adopt and periodically update a Renewables Portfolio Standard (RPS) Enforcement and Compliance Plan, which details actions the POU will take if the POU determines that it will not meet its RPS procurement requirements; and

WHEREAS, by Resolution No. 11-12-15, adopted on December 15, 2011, this Board adopted SMUD's initial **Renewables Portfolio Standard Enforcement and Compliance Plan (RPS Enforcement Plan)**; and

WHEREAS, in August 2013, the **California Energy Commission (CEC)** adopted final regulations entitled the *Enforcement Procedures for the Renewables Portfolio Standard for Local Publicly Owned Electric Utilities* **(CEC RPS Regulations)**, which became effective on October 1, 2013; and

WHEREAS, by Resolution No. 13-11-09, adopted on November 21, 2013, this Board adopted an update to the **RPS Enforcement Plan** in compliance with the **CEC RPS Regulations**; and

WHEREAS, the **CEC RPS Regulations** were modified, effective July 12, 2021; and

WHEREAS, staff has developed an update to the **RPS Enforcement Plan**, substantially in the form of **Attachment ____,** that meets the statutory requirements of Public Utilities Code section 399.30 and is consistent with the modified **CEC RPS Regulations**; and

WHEREAS, Public Utilities Code section 399.30(e) and Section 3205(b)(2)(B) of the **CEC RPS Regulations** requires 10 days' notice be given to the

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public before any meeting is held to make changes to the **RPS Enforcement Plan**, in addition to public noticing requirements pursuant to Chapter 9, of Part 1 of Division 2 of Title 5 of the Government Code; and

WHEREAS, SMUD provided public notice on June 3, 2022, and June 10, 2022; **NOW, THEREFORE,**

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

This Board hereby approves and adopts the update to SMUD's **Renewables Portfolio Standard Enforcement and Compliance Plan (RPS Enforcement Plan)**, substantially in the form of **Attachment ____.**

SSS No. ES 22-004	**BOARD AGENDA ITEM** **STAFFING SUMMARY SHEET**	Committee Meeting & Date ERCS June 15, 2022 Board Meeting Date June 16, 2022

TO		TO	
1.	Emily Bacchini	6.	Frankie McDermott
2.	Patrick Durham	7.	
3.	Suresh Kotha	8.	
4.	Brandy Bolden	9.	**Legal**
5.	Lora Anguay	10.	**CEO & General Manager**

Consent Calendar		**Yes**	x	**No** *If no, schedule a dry run presentation.*	**Budgeted**	x	**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Kim Crawford	Environmental Services	B209	5063	5/24/2022

NARRATIVE:

Requested Action: Certify the California Environmental Quality Act (CEQA) Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan (HCP) Final Environmental Impact Report (FEIR), including adoption of the Findings; adopt the Mitigation Monitoring and Reporting Program; and approve the project.

Summary: SMUD has prepared an Operations, Maintenance, and New Construction Habitat Conservation Plan (HCP) to support issuance of requested Incidental Take Permits (ITPs) from the California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS). The HCP is a 30-year plan designed to avoid, minimize, and mitigate impacts to HCP Covered Species that may be affected by SMUD's various operation, maintenance, and new construction activities. The HCP covers activities within SMUD's service territory and in portions of Placer, Yolo, Amador and San Joaquin Counties where SMUD's facilities are present. The HCP Covered Species includes 7 state and federally endangered and threatened species — slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, California tiger salamander, and giant garter snake.

SMUD prepared an environmental impact report (EIR) to evaluate the potential impacts of issuance of the ITPs by USFWS and CDFW, implementation of those ITPs and approval and implementation of the proposed HCP (proposed Project). The public scoping process for the EIR began September 13, 2018, with submittal of the Notice of Preparation (NOP) to the State Clearinghouse. The NOP, which is a CEQA requirement, notified stakeholders of SMUD's intent to prepare an EIR. Two public meetings were held on September 27, 2018, and the scoping process concluded on October 15, 2018. There were no significant issues identified in the six scoping comments received.

The Draft EIR included mitigation measures to reduce potential impacts to cultural resources and tribal cultural resources to a less-than-significant level and concluded the project would not result in any significant and unavoidable impacts. The Draft EIR was available for public review from January 31, 2022, through March 17, 2022. A virtual public meeting was held during the 45-day comment period on February 22, 2022; one attendee was present during the public meeting. Public notice of the availability of the Draft EIR was published in the *Sacramento Bee*, posted on SMUD.org and sent to approximately 100 interest parties (agencies, special interest groups, nonprofit organizations, and other stakeholders). Four comments were received during the comment period. The comments letters requested more information about the HCP or indicated there were no comments on the Draft EIR. None of the comments required changes to the text of the Draft EIR. The Final EIR was made available to commenters on June 3, 2022, for a 10-day review period prior the June 15th ERCS Committee meeting and June 16th Board of Directors meeting.

Board Policy: *(Number & Title)* HCP implementation supports Strategic Direction SD-7, Environmental Leadership, by minimizing environmental impacts and conserving resources while achieving operational efficiencies across the organization.

Benefits: Benefits of the Project include:

- Receive incidental take permits from the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife
- Streamline and coordinate regulatory processes for review and environmental permitting
- Regulatory certainty and efficiency
- Time and cost savings
- Conserve (avoid, minimize, and mitigate impacts on) listed species that may be affected by SMUD activities
- Provide greater certainty to SMUD regarding mitigation requirements

Cost/Budgeted: $10.4M during the 30-year permit term or $350K per year

Alternatives: Under the No Project Alternative, SMUD would not pursue an HCP. SMUD would seek to avoid impacts to all Covered Species but would need to acquire incidental take authorizations on a project-by-project basis. SMUD would continue its environmental planning and screening processes to avoid and minimize impacts, but site-specific avoidance and minimization measures (including numerous pre-activity surveys) would be required for certain projects. Take of Covered Species could be similar or the same with or without the HCP. Individual projects pursued without the HCP would likely result in higher costs and project delays because each one would be reviewed and analyzed individually. Neither SMUD nor the wildlife agencies have the staff or ability to efficiently conduct environmental review for numerous individual projects and which could result in numerous delays and schedule disruptions. Because of potential delays involved with permitting such a large volume of work, the No Project Alternative would be an impediment to the efficient and timely maintenance of SMUD facilities, potentially delaying reliability and safety improvements. This alternative was also deemed to be cost inefficient.

Affected Parties: U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, SMUD

Coordination: Energy Delivery & Operations, Zero Carbon Energy Solutions, Communications, Marketing & Community Relations, Sustainable Communities, Environmental Services, Legal, United Auburn Indian Community, Shingle Springs Band of Miwok Indians, Wilton Rancheria, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, Friends of the Swainson's Hawk, Laguna Creek Watershed Council, California Native Plant Society, Sacramento Valley Conservancy, Cites of Sacramento, Rancho Cordova, Galt and Citrus Heights, Sacramento Tree Foundation, Yolo County Habitat Conservation Plan.

Presenter: Emily Bacchini, Manager, Environmental Services

Additional Links:

- The Final EIR can be viewed at www.smud.org/ceqa
https://www.smud.org/-/media/Documents/Corporate/About-Us/Reports-and-Documents/CEQA-Reports/SMUD-HCP_FEIR_05-23-2022.ashx

SUBJECT	SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan	ITEM NO. *(FOR LEGAL USE ONLY)* 10

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan EIR

Final Environmental Impact Report

May 2022

State Clearinghouse No. 2018092030

Powering forward. Together.

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Sacramento Municipal Utility District

Operations, Maintenance, and New Construction Habitat Conservation Plan EIR

Final Environmental Impact Report

State Clearinghouse No. 2018092030

May 2022

Lead Agency:

Sacramento Municipal Utility District
6201 S Street, MS H201
Sacramento, CA 95817-1899

or

P.O. Box 15830 MS H201
Sacramento, CA 95852-1830
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List of Abbreviated Terms

Draft EIR	draft environmental impact report
Final EIR	final environmental impact report
MMRP	mitigation monitoring and reporting program
NOP	Notice of Preparation
Proposed HCP	SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan
SMUD	Sacramento Municipal Utility District
the Board	SMUD Board of Directors
VELB	Valley Elderberry Longhorn Beetle

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1 Introduction

On January 31, 2022, the Sacramento Municipal Utility District (SMUD) released for public review the draft environmental impact report (Draft EIR) for the proposed SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan (proposed HCP). The EIR evaluates the impacts associated with implementation of the proposed HCP subject to state and federal endangered species take authorizations, and the impacts of the application for, issuance, and implementation of those authorizations.

1.1 Public Review and Response to Comments

Public participation is an essential part of the CEQA process. In accordance with 14 CCR Section 15082, a lead agency must provide notice that it will prepare an EIR and provide adequate opportunity for interested parties to provide comments on the scope of the EIR. Such comments are considered by the lead agency.

The public scoping process, which also establishes the environmental baseline, began September 13, 2018, with submittal of the Notice of Preparation (NOP) to the State Clearinghouse. The NOP notified the public and agencies of the SMUD HCP, the intent to prepare an EIR, and two public meetings that were held on September 27, 2018. The NOP also informed the public that written comments on the NOP should be received by October 15, 2018.

There were no significant issues identified in the scoping comments received. The NOP and scoping comments are included in Appendix A. The HCP is in Appendix B.

A Notice of Completion form and the Draft EIR were submitted to the State Clearinghouse on January 31, 2022. A notice of the availability of the Draft EIR and of the public meeting was mailed to agencies, organizations, and individuals that expressed interest during the scoping meetings described above.

The Draft EIR was available for public review starting January 31, 2022 and ending March 17, 2022. A virtual public meeting was held during the 45-day comment period on February 22, 2022. SMUD staff and SMUD’s environmental consultant were available to present the project, receive comments, and answer questions. There was one attendee from the public at the public meeting but they did not submit any comments. During the 45-day public review process, interested parties (agencies, other stakeholders, and the general public) submitted a total of four e-mail comments (Table 2-1). The e-mails and SMUD’s responses are provided in Chapter 2, *Comments and Responses to Comments.*

Responses to each of the comments received are provided in this document as part of the final environmental impact report (Final EIR). None of the comments require changes to the text of the Draft EIR. Therefore, there are no changes that constitute “significant new information,” which would require recirculation of the Draft EIR. Significant new information is defined in Section 15088.5(a) of the State CEQA Guidelines as follows:

(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.

(4) The Draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

None of these circumstances have arisen from comments on the Draft EIR; therefore, recirculation is not required.

The Draft EIR, Final EIR, and associated appendices are available for review online at: https://www.smud.org/CEQA.

As required by State CEQA Guidelines Section 15088(b), SMUD has provided a printed or electronic copy (through the SMUD's website; see prior discussion) to each public agency that submitted written comments on the Draft EIR with written responses to that public agency's comments at least 10 days prior to consideration of the Final EIR for certification.

1.2 Organization of the Responses to Comments

Chapter 2 of the Final EIR consists of the written comments received on the Draft EIR, and presents responses to environmental issues raised in the comments (as required by State CEQA Guidelines Section 15132). The focus of the responses to comments is on the disposition of significant environmental issues that are raised in the comments, as required by Section 15088(c) of the State CEQA Guidelines. Each comment letter has been reproduced and numbered. Responses to the comments follow each letter.

1.3 Comments that Require Responses

Section 15088(c) of the State CEQA Guidelines specifies that the focus of the responses to comments shall be on the disposition of significant environmental issues. Responses are not required on comments regarding the merits of the project or on issues not related to the project's environmental impacts. Comments on the merits of the proposed project or other comments that do not raise environmental issues will be reviewed by SMUD's Board of Directors (the Board) before an action is taken on the project. The responses address environmental issues and indicate where issues raised are not environmental or address the merits of the projects. In the latter instance, no further response is provided.

1.4 Project Decision Process

This document and the Draft EIR together constitute the Final EIR, which will be considered by the Board before a decision on whether to approve the project. If the Board decides to approve the Project, it must first certify that the Final EIR was completed in compliance with CEQA's requirements, was reviewed and considered by the Board, and reflects the Board's independent judgment and analysis, as required by State CEQA Guidelines Section 15090. The Board would then be required to adopt findings of fact on the disposition of each significant environmental impact, as required by State CEQA Guidelines Section 15091. A Mitigation Monitoring and Reporting Program, which is required by CEQA Guidelines Section 15091(d), has been included as part of Chapter 3 of this Final EIR.

1.5 Revisions to the Draft EIR

CEQA Guidelines Section 15132 provides that a Final EIR must include, among other things, the Draft EIR or a revision of the draft. For this Final EIR, changes to the Draft EIR are shown with underline for additions and strikethrough for deletions.

The following text was added to Chapter 2, *Project Description* on page 2-8 of the Draft EIR and to the HCP (Appendix B of the Draft EIR) in Section 5.4.5.2, *Purchase Credits at Other Conservation Banks*:

Additional conservation/mitigation banks may be established in the future outside of the Plan Area that provide mitigation credits for VELB. If SMUD wishes to purchase credits at a newly-established conservation/mitigation bank, SMUD will review the conservation/mitigation bank documents to ensure that the bank satisfies the requirements of the SMUD HCP conservation strategy and permit. If SMUD believes the conservation/mitigation bank is appropriate, they will propose to purchase mitigation credits from that new conservation/mitigation bank to the Service to satisfy mitigation requirements of the HCP. The Service will review SMUD's proposal and approve if the conservation/mitigation bank satisfies the mitigation requirements of the HCP.

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2 Comments and Responses to Comments

This chapter contains the comment letters received during the public review period for the Draft EIR, which concluded on March 17, 2022. In conformance with Section 15088(a) of the State CEQA Guidelines, written responses were prepared addressing comments received from reviewers of the Draft EIR.

2.1 Commenters on the Draft EIR

Table 2-1 below indicates the numerical designation for the comment letters received, the author of the comment letter, and the date of the comment letter. Comment letters have been numbered in the order they were received by SMUD.

Table 2-1. List of Commenters on the Draft EIR

Comment Letter #	Commenter	Date Comment Received
1	United Auburn Indian Community, Anna Starkey	1/31/2022
2	San Joaquin Council of Governments, Steven Mayo	2/3/2022
3	County of Sacramento, Julie Newton	2/9/2022
4	Sacramento Metropolitan Air Quality Management District, Karen Huss	3/1/2022

2.2 Comments and Responses on the Draft EIR

The written comments received on the Draft EIR and the responses to those comments are provided in this section of the Final EIR. The comment letters received are reproduced in their entirety and followed by the response(s) to the letter.

All comments and provided herein are included within the record for consideration by the SMUD Board of Directors (the Board) as part of the SMUD HCP Project.

Letter 1. Anna Starkey, United Auburn Indian Community, dated January 31, 2022

From: Anna Starkey
To: Kim Crawford
Subject: [EXTERNAL] RE: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR
Date: Monday, January 31, 2022 10:28:21 AM
Attachments: image001.png

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Congrats for getting this EIR out!
I do not have any comments other than really appreciate all the time and effort that was made to ensure tribal cultural resources were properly addressed and tribes were satisfied with the end results, including the language used in the TCR chapter. Great job!

Kindly,
Anna

From: Kim Crawford <Kim.Crawford@smud.org>
Sent: Monday, January 31, 2022 10:13 AM
To: Kim Crawford <Kim.Crawford@smud.org>
Subject: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR

Good Morning,

Attached is the Notice of Availability for the Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan EIR.

Written comments should be submitted to Kim Crawford, SMUD, 6201 S Street, MS B209, Sacramento, CA, 95817-1889 or at Kim.Crawford@smud.org before 5 p.m., March 17, 2022. A virtual public meeting will be held on February 22nd, see the attached Notice for Availability for more information. If you have questions, please contact me via email or at 916-732-5063.

Thank you,
Kim Crawford

Environmental Specialist
Environmental Services Department

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Sacramento Municipal Utility District
w.916-732-5063
kim.crawford@smud.org

Response to Comment Letter 1 – Anna Starkey, United Auburn Indian Community

The United Auburn Indian Communitiy has no comment on the Draft EIR; although, offered their appreciation for the results of the Tribal Cultural Resources chapter. No changes to the Draft EIR are necessary.

Letter 2. Steven Mayo, San Joaquin Council of Governments, dated February 3, 2022

From: Steve Mayo
To: Kim Crawford
Subject: [EXTERNAL] RE: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR
Date: Thursday, February 3, 2022 8:18:35 AM

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Kim,

Thank you for the Notice of Availability for the SMUD O&M and New Construction HCP. We will be providing any comments to you by the deadline.

Our agency, as administrators of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP), would like to request more information/details on the draft.

1. Mapping of the overlap area within SJ County (300 +/- acres) depicting the following:
   a. Area of overlap in a polygon
   b. Landscape vegetation type
   c. Past, current or future projects
2. Conservation Planning for impacts within SJ County

Respectfully,

Steven Mayo
Program Manager
Habitat Conservation Plan
San Joaquin Council of Governments
555 East Weber Avenue
Stockton, CA 95202
209-235-0600 phone
209-235-0438 fax
www.sjcog.org

Please note: During the pandemic, our staff will be limited in the office for responding to messages/calls and meetings. Thank you for understanding.

From: Kim Crawford <Kim.Crawford@smud.org>
Sent: Monday, January 31, 2022 10:13 AM
To: Kim Crawford <Kim.Crawford@smud.org>
Subject: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat

Conservation Plan EIR

External Email:

Good Morning,

Attached is the Notice of Availability for the Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan EIR.

Written comments should be submitted to Kim Crawford, SMUD, 6201 S Street, MS B209, Sacramento, CA, 95817-1889 or at Kim.Crawford@smud.org before 5 p.m., March 17, 2022. A virtual public meeting will be held on February 22nd, see the attached Notice for Availability for more information. If you have questions, please contact me via email or at 916-732-5063.

Thank you,

Kim Crawford
Environmental Specialist
Environmental Services Department

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w.916-732-5063
kim.crawford@smud.org

Response to Comment Letter 2 – Steven Mayo, San Joaquin Council of Governments

This comment is not directed at the environmental analysis included in the Draft EIR. Rather, it consists of a request for more information. Kim Crawford (SMUD) spoke with Steven Mayo on February 8, 2022, to provide more information and details on the proposed HCP. Below is a summary of the information discussed:

- the proposed HCP overlaps with San Joaquin County where SMUD has distribution electrical facilities. SMUD's electrical facilities are limited to approximately 3 miles of overhead distribution lines and 41 poles.

- land cover types within the Permit Area are described in Section 3.3 of the proposed HCP.

- SMUD's Covered Activities consist of O&M and construction activities within Permit Area as described in Section 2 (Covered Activities) of the proposed HCP.

- The Conservation Strategy consists of avoidance, minimization and mitigation as described in Section 3 (Conservation Strategy) of the proposed HCP. The Plan Area, where HCP mitigation would occur, did not include San Joaquin County.

No changes to the Draft EIR are necessary.

Letter 3. Julie Newton, County of Sacramento, dated January 5, 2021

From: Newton, Julie
To: Kim Crawford
Subject: [EXTERNAL] FW: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR
Date: Wednesday, February 9, 2022 1:57:59 PM
Attachments: SMUD HCP EIR NOA.pdf

Good afternoon Kim,

I am one of the Sacramento County staff members that implements the South Sacramento Habitat Conservation Plan. We are hoping to get a better understanding of how the SMUD plan works implementation-wise, and have a few questions. We figured it would be easier to just talk through it if you have an hour in which you are available.

Below are some times that we are available, would one of these work for you?
Tuesday 2/22 – 10-11 am
Thursday 2/24 – 9 am – 1pm
Friday 2/25 – after 10 am

Thanks
-Julie

Julie Newton, Senior Planner
Planning and Environmental Review
827 7th Street, Room 225, Sacramento, CA 95814 | (916) 876-8502
www.per.saccounty.net

Planning & Environmental Review (PER) is open by appointment only. Please see our website at www.planning.saccounty.net for the most current information on how to obtain services and to schedule an appointment.

From: Kim Crawford <Kim.Crawford@smud.org>
Sent: Monday, January 31, 2022 10:13 AM
To: Kim Crawford <Kim.Crawford@smud.org>
Subject: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR

Good Morning,

Attached is the Notice of Availability for the Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan EIR.

Written comments should be submitted to Kim Crawford, SMUD, 6201 S Street, MS B209, Sacramento, CA, 95817-1889 or at Kim.Crawford@smud.org before 5 p.m., March 17, 2022. A virtual public meeting will be held on February 22nd, see the attached Notice for Availability for more information. If you have questions, please contact me via email or at 916-732-5063.

Thank you,

Kim Crawford
Environmental Specialist
Environmental Services Department

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w.916-732-5063
kim.crawford@smud.org

Response to Comment Letter 3 – Julie Newton, County of Sacramento

In this comment, the commenter requests more information regarding the implementation of the HCP and the comment is not directed at the environmental analysis.

On February 22, 2022, SMUD Environmental Services staff and Sacramento County staff that implements the South Sacramento HCP, discussed implementation of the South Sacramento HCP and SMUD's proposed HCP. Items discussed included SMUD's HCP Covered Activities and Conservation Strategy and potential coordination implementation and mitigation efforts between the two HCPs. There were no comments on the Draft EIR and therefore, no changes are necessary.

Letter 4. Karen Huss, Sacramento Metropolitan Air Quality Management District, dated March 1, 2022

From: Karen Huss
To: Kim Crawford
Cc: Paul Philley
Subject: [EXTERNAL] RE: Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR
Date: Tuesday, March 1, 2022 11:42:19 AM
Attachments: image001.png
image002.png

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Hi Kim,
The Sac Metro Air District does not have comments on SMUD's HCP EIR.
Thank you for sending it over for review.

Karen Huss
Associate Air Quality Planner/Analyst
Transportation & Climate Change Division - CEQA & Land Use
Desk: (279) 207-1131
Website: www.AirQuality.org
Send project review inquiries to projectreview@airquality.org

@AQMD

From: Kim Crawford <Kim.Crawford@smud.org>
Sent: Monday, January 31, 2022 10:13 AM
To: Kim Crawford <Kim.Crawford@smud.org>
Subject: DUE 3/17 Notice of Availability for SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan EIR

*** THIS EMAIL ORIGINATED OUTSIDE AIRQUALITY.ORG ***

Good Morning,

Attached is the Notice of Availability for the Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan EIR.

Written comments should be submitted to Kim Crawford, SMUD, 6201 S Street, MS B209, Sacramento, CA, 95817-1889 or at Kim.Crawford@smud.org before 5 p.m., March 17, 2022. A virtual public meeting will be held on February 22nd, see the attached Notice for Availability for more information. If you have questions, please contact me via email or at 916-732-5063.

Thank you,

Kim Crawford
Environmental Specialist
Environmental Services Department

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Sacramento Municipal Utility District
w.916-732-5063
kim.crawford@smud.org

Response to Comment Letter 4 – Karen Huss, Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District has no comment on the Draft EIR. No changes to the Draft EIR are necessary.

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3 Mitigation Monitoring and Reporting Program

This mitigation monitoring and reporting program (MMRP) summarizes the mitigation measures, implementation schedule, and responsible parties for monitoring the mitigation measures required for the proposed Project, as set forth in the EIR prepared for the Project.

Section 21081.6 of the California Public Resources Code and Section 15091(d) and Section 15097 of the State CEQA Guidelines require public agencies "to adopt a reporting or monitoring program for changes to the project which it has adopted or made conditions of project approval to mitigate or avoid significant effects on the environment." A MMRP is required for the project because the EIR for the project identified potentially significant adverse impacts related to construction and operation of the proposed Project, and mitigation measures have been identified to reduce most of those impacts to a less-than-significant-level.

This MMRP will be adopted by SMUD if it approves the Project and will be kept on file at SMUD's Customer Service Center at 6301 S Street, Sacramento, CA 95817; and at SMUD's East Campus Operations Center at 4401 Bradshaw Road, Sacramento, CA 95827. SMUD will use this MMRP to ensure that identified mitigation measures, adopted as a condition of project approval, are implemented appropriately.

3.1 Mitigation Implementation and Monitoring

SMUD will be responsible for monitoring the implementation of mitigation measures designed to minimize impacts associated with the project. While SMUD has ultimate responsibility for ensuring implementation, others may be assigned the responsibility of actually implementing the mitigation. SMUD will retain the primary responsibility for ensuring that the project meets the requirements of this MMRP and other permit conditions imposed by participating regulatory agencies.

SMUD will designate specific personnel who will be responsible for monitoring implementation of the mitigation that will occur during project construction. The designated personnel will be responsible for submitting documentation and reports to SMUD on a schedule consistent with the mitigation measure and in a manner necessary for demonstrating compliance with mitigation requirements. SMUD will ensure that the designated personnel have authority to require implementation of mitigation requirements and will be capable of terminating project construction activities found to be inconsistent with mitigation objectives or project approval conditions.

SMUD and its appointed contractor will also be responsible for ensuring that its construction personnel understand their responsibilities for implementing the mitigation measures and adhering to the performance requirements of the mitigation plan. In addition to the prescribed mitigation measures, the MMRP table below lists each identified environmental resource being affected (in the same order and using the same numbering system as in the EIR), the associated CEQA checklist question (used as the thresholds of significance in the EIR), the corresponding monitoring and reporting requirement, the party responsible for ensuring implementation of the mitigation measure and monitoring effort, and the project component to which the mitigation measure applies.

If an issue addressed in the EIR does not result in mitigation, it is not included in the table.

3.2 Mitigation Enforcement

SMUD will be responsible for enforcing mitigation measures. If alternative measures are identified that would be equally effective in mitigating the identified impacts, implementation of these alternative measures will not occur until agreed upon by SMUD.

3.3 Reporting

SMUD shall prepare a monitoring report upon completion of the project describing the compliance of the activity with the required mitigation measures. Information regarding inspections and other requirements shall be compiled and explained in the report. The report shall be designed to simply and clearly identify whether mitigation measures have been adequately implemented. At a minimum, each report shall identify the mitigation measures or conditions to be monitored for implementation, whether compliance with the mitigation measures or conditions has occurred, the procedures used to assess compliance, and whether further action is required. The report shall be presented to SMUD’s Board of Directors.

3.4 Mitigation Monitoring and Reporting Program Table

The categories identified in the attached MMRP table are described below.

Environmental Resource Topic – This column identifies which CEQA issue area the mitigation measure is attributed to in the EIR.

Impact – This column provides the impact number and statement included in the EIR.

Mitigation Measure – This column provides the verbatim text of the adopted mitigation measure.

Implementation Duration – This column identifies when the mitigation measure shall be implemented (e.g., prior to construction, during construction, prior to occupancy, etc.).

Monitoring Duration – This column identifies the period within which monitoring shall be conducted.

Responsibility – This column identifies the party(ies) responsible for implementation and/or enforcing compliance with the requirements of the mitigation measure.

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
3.5 Cultural Resources	**Impact 3.5-2: Have a substantial adverse change in the significance of a unique archaeological resource.**	**Mitigation Measure CUL-1: Avoidance and Archaeological Monitoring** The northern portion of the SMUD Bank holds the most potential for uncovering early Native American cultural resources. If possible, soil disturbance in this area should be avoided. If avoidance is not possible, a qualified archaeologist must be present during any ground disturbance or excavation. This area includes that portion of the SMUD Bank north of latitude 38° 20’ 37.00” N or UTM 424560N (Zone 10). This east-west line would occur approximately just north of the reservoir that exists roughly 1,000 feet northwest of the lake and approximately 2,000 feet southeast of the ranch buildings adjacent to the northwest portion of the SMUD Bank.	During implementation of Direct Actions including Enhance Sacramento Oructt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	During implementation of Direct Actions including Enhance Sacramento Oructt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	SMUD; contractor	SMUD

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
3.5 Cultural Resources	**Impact 3.5-2: Have a substantial adverse change in the significance of a unique archaeological resource.**	**Mitigation Measure CUL-2: Environmental Awareness Training** Prior to working onsite, individuals who are involved in soil moving and handling must attend environmental awareness training provided by a qualified professional archaeologist. This training would provide information on the types and extent of cultural resources that may be located onsite. Individuals conducting any excavation or other substantial subsurface disturbance activities onsite shall also attend the environmental awareness training.	Prior to and during implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	During implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	SMUD; qualified archaeologist	SMUD
3.5 Cultural Resources	**Impact 3.5-2: Have a substantial adverse change in the significance of a unique archaeological resource.**	**Mitigation Measure CUL-3: Stop Work if Archaeological Resources are Encountered** Should any evidence of early Native American or historic cultural resources be discovered during excavation or other substantial	During implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	During implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	SMUD; qualified archaeologist; contractor	SMUD

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
		subsurface disturbance activities, all work should immediately cease, and a qualified archaeologist must be consulted to assess the significance of the cultural materials.				
3.5 Cultural Resources	**Impact 3.5-3: Disturbance of any human remains including those interred outside of formal cemeteries.**	**Mitigation Measure CUL-4: Stop Work if Human Remains Are Discovered during Ground Disturbing Activities** If human remains are discovered during excavation or other substantial subsurface disturbance activities, all work must immediately cease and the local coroner must be contacted. Should the remains prove to be of cultural significance, the NAHC in Sacramento, California, must be contacted with additional notification going to the most likely descendants.	During implementation of Direct Actions including Enhance Sacramento Oructt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	During implementation of Direct Actions including Enhance Sacramento Oructt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	SMUD; Coroner; contractor	SMUD

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
3.18 Tribal Cultural Resources	**Impact 3.18-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource that is Listed or Eligible for Listing in the California Register of Historical Resources or Other Local Register.**	**Mitigation Measure TCR-1: Discovery of Unanticipated Tribal Cultural Resources** If any suspected TCRs are discovered during ground disturbing construction activities, all work shall cease within 100 feet of the find, or an agreed upon distance based on the project area and nature of the find. A Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with a geographic area shall be immediately notified and shall determine if the find is a TCR (PRC §21074). The Tribal Representative will make recommendations for further evaluation and treatment as necessary. When avoidance is infeasible, preservation in place is the preferred option for mitigation of TCRs under CEQA and Tribal protocols, and	During implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank	During implementation of Direct Actions including Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bankand afterwards to ensure appropriate treatment is carried out	SMUD; contractor; culturally-affiliated Tribe	SMUD; contractor; culturally-affiliated Tribe

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
		every effort shall be made to preserve the resources in place, including through project redesign, if feasible. Culturally appropriate treatment may be, but is not limited to, processing materials for reburial, minimizing handling of cultural objects, leaving objects in place within the landscape, or returning objects to a location within the project area where they will not be subject to future impacts. Permanent curation of TCRs will not take place unless approved in writing by the consulting Tribe that is traditionally and culturally affiliated with the project area. The contractor shall implement any measures deemed by the CEQA lead agency to be necessary and feasible to preserve in place, avoid, or minimize impacts to the				

Environmental Resource Topic	Impact	Mitigation Measure	Implementation Duration	Monitoring Duration	Responsibility	
					Implementation	Monitoring
		resource, including, but not limited to, facilitating the appropriate tribal treatment of the find, as necessary. Treatment that preserves or restores the cultural character and integrity of a TCR may include Tribal Monitoring, culturally appropriate recovery of cultural objects, and reburial of cultural objects or cultural soil. Work at the discovery location cannot resume until all necessary investigation and evaluation of the discovery under the requirements of the CEQA, including AB52, have been satisfied.				

4 List of Preparers

4.1 SMUD

Kim Crawford – Environmental Specialist

Emily Bacchini – Manager, Environmental Services

4.2 ICF

Sally Lyn Zeff, AICP – Project Manager, Project Description, Environmental Approach

Tina Sorvari – Project Coordinator, Hazards and Hazardous Materials

Margaret Lambright – Project Coordinator, Introduction, Environmental Setting, Impacts, and Mitigation Measures

Angela Alcala – Senior Biologist (Wildlife), Biological Resources

Jordan Mayor – Senior Biologist (Botany), Biological Resources

Stephen Pappas – Cultural Resources and Tribal Cultural Resources

David Lemon – Cultural Resources

Devan Atteberry – Energy, Wildfire

Patrick Maley – Geology, Soils, and Minerals

Diana Roberts – Paleontological Resources

Caroline Vurlumis – Hydrology and Water Quality

Brendan Belby – Hydrology and Water Quality Peer Review

Daniel Schiff – GIS Specialist

Christine McCrory – Technical Editor

Jesse Cherry – Document Production

4.3 Ascent Environmental, Inc.

Heather Blair – Project Manager, Project Description, Environmental Approach

Gary Jakobs – Principal in Charge, Environmental Approach

Stephanie Rasmussen – Aesthetics, Project Description

Erin Kraft – Agricultural and Forest Resources, Land Use and Planning, Utilities

Kristi Black – Air Quality, Greenhouse Gas Emissions, Population and Housing, Public Services

Dimitri Antoniou – Noise

Ally Kerley – Recreation

Zachary Miller – Transportation

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**CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS
IN CONNECTION WITH**

SACRAMENTO MUNICIPAL UTILITY DISTRICT OPERATIONS, MAINTENANCE, AND NEW CONSTRUCTION HABITAT CONSERVATION PLAN

I. Introduction

The Sacramento Municipal Utility District (SMUD) is the lead agency under the California Environmental Quality Act (CEQA) for the SMUD Operations, Maintenance, and New Construction Habitat Conservation Plan (HCP) Environmental Impact Report (EIR). The EIR is a public information document that assesses and discloses the potential environmental effects not only of SMUD's discretionary application for, issuance and implementation of take authorizations from the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife and implementation of the HCP, but also its broader consideration and approval of the whole of the action under CEQA, which includes the direct and reasonably foreseeable indirect effects caused by the Covered Activities that will result with issuance of the take authorizations, and implementation of the Conservation Strategy covered by the authorizations and HCP. In combination, these activities constitute the proposed "Project" for purposes of CEQA.

CEQA prohibits an agency from approving or carrying out a project for which significant effects have been identified, unless the agency can make one or more of a set of three findings set forth in Public Resources Code (PRC) section 21081, subdivision (a):

> (1) Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
>
> (2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.
>
> (3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the environmental impact report. (See also California Code of Regulations [CCR] Title 14, section 15091.)

When significant effects are subject to a finding under paragraph (3) of subdivision (a), it means that before approving the project the lead agency must find that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment. (PRC section 21081, subd.(b).)

CEQA also requires public agencies to prepare a program for monitoring or reporting on the revisions which it requires in the project and the measures it has imposed to mitigate or avoid significant environmental effects. (CCR Title 14, section 15097, subd. (a).)

II. CEQA Compliance

SMUD, as the lead agency pursuant to CEQA, has prepared a Draft and Final EIR for the Project. The SMUD Board of Directors (Board) hereby issues these Findings and concurrently certifies the EIR.

The EIR has been assigned State Clearinghouse Number 2018092030. The Final EIR consists of the Draft EIR and the Final EIR Responses to Comments document, which includes minor changes to the EIR and formal responses to comments received on the Draft EIR. The Final EIR assesses the potential environmental effects of implementation of the Project, identifies the means to eliminate or reduce potentially significant adverse environmental impacts, and evaluates a reasonable range of alternatives to the Project.

Pursuant to PRC section 21081 and CCR Title 14, section 15090, the Board hereby certifies that it completed the following activities prior to taking action related to activities evaluated under the SMUD HCP EIR: the Board has received the Final EIR; the Board has reviewed and considered the information contained in the Final EIR and received through public comments; and the Board has considered all additional written and oral statements received prior to or at its public hearing on the Final EIR. The Board additionally certifies that the Final EIR was completed in compliance with CEQA (PRC section 21000 et seq.), the CEQA Guidelines (CCR Title 14, section 15000 et seq.), and SMUD's policies and procedures for the implementation of CEQA and that the Final EIR reflects the SMUD Board of Directors' independent judgment and analysis. The conclusions presented in these Findings are based on the Final EIR and other evidence in the administrative record.

The Findings set forth below pertain to the certification of the SMUD Operations, Maintenance and New Construction HCP EIR.

Findings

Having received, reviewed, and considered the Final EIR and all other information in the administrative record, the Board hereby adopts the following Findings for the SMUD HCP EIR in compliance with CEQA, the CEQA Guidelines, and SMUD's procedures for implementing CEQA. The Board adopts these Findings in conjunction with its approval of the SMUD HCP EIR, as set forth below.

a. Project Description and Background

SMUD is applying for take authorizations from the U.S. Fish and Wildlife Service (USFWS), pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act (ESA) of 1973, as amended, and from the California Department of Fish and Wildlife (CDFW), pursuant to Section 2081(b) of the California Fish and Game Code and the California Endangered Species Act (CESA). The take authorizations would authorize take of seven state and federally listed species (i.e., Covered Species), incidental to otherwise lawful activities (i.e., Covered Activities).

SMUD developed a HCP in consultation with USFWS and CDFW and is intended to support and inform the issuance of the requested environmental permitting from USFWS and CDFW. The HCP is a 30-year plan designed to protect and contribute to the recovery of Covered Species and natural communities in the HCP Plan Area. The HCP provides streamlined environmental permitting while providing a framework to protect, enhance, and restore natural resources.

The Plan Area is the area within which SMUD would implement conservation measures to mitigate potential impacts on Covered Species resulting from Covered Activities. The Plan Area includes the Permit Area, which encompasses SMUD's service territory plus SMUD's transmission line in Placer county and gas pipeline in Yolo County. The total size of the Permit Area is approximately 577,554 acres. The Permit Area encompasses SMUD's facilities within its service territory, which is primarily Sacramento County and a small portion of Placer County in California. The Permit Area also includes SMUD's gas pipeline in Yolo County, SMUD's transmission line in Placer County, small portions of Amador and San Joaquin Counties where SMUD has electrical facilities. The total size of the Permit Area is approximately 577,554 acres (Figure ES-1). The Permit Area is the area in which SMUD is requesting authorization from USFWS and CDFW for incidental take of Covered Species under the ESA and CESA resulting from Covered Activities, which include all activities and projects that may result in the take of species covered by the HCP.

The HCP proposes coverage for seven federally listed species, which include two plants, three invertebrates, one amphibian, and one reptile. The HCP includes conservation measures to protect all seven Covered Species, which are slender Orcutt grass (Orcuttia tenuis), Sacramento Orcutt grass (Orcuttia viscida), vernal pool fairy shrimp (Branchinecta lynchi), valley elderberry longhorn beetle (Desmocerus californicus dimorphus), vernal pool tadpole shrimp (Lepidurus packardi), California tiger salamander (Ambystoma californiense), and giant garter snake (Thamnophis gigas).

The Covered Activities are activities that SMUD would implement within the Permit Area that have the potential to result in incidental take of a Covered Species. The Covered

Activities are operations and maintenance and new construction activities within the following categories: electrical facilities, natural gas transmission facilities, telecommunications, vegetation management, conservation and enhancement, and miscellaneous. For the purposes of the analysis in the EIR, implementation of the Covered Activities is described as the Indirect Actions. The Indirect Actions are not entitled by the actions covered by this EIR but are largely activities we have been undertaking as part our ongoing operations. Therefore, SMUD's lead agency approval of the Project implements the HCP and take authorizations but does not confer or imply discretionary approval by SMUD of implementation of any specific Indirect Action.

The Conservation Strategy for the HCP would ensure the potential impacts from Covered Activities are avoided, minimized, and mitigated to the maximum extent practicable. Potential impacts from Covered Activities would be reduced or eliminated through pre-project planning and implementation of avoidance and minimization measures. A comprehensive mitigation program would offset unavoidable impacts and contribute to long-term conservation of Covered Species by fully mitigating for actual impacts. Mitigation would be accomplished by using existing credits at the SMUD Nature Preserve Mitigation Bank (SMUD Bank), purchasing credits from other conservation/mitigation banks within the Plan Area, or collaborating with the implementing entity of another HCP. The Conservation Strategy will also include offsetting effects on Sacramento and slender Orcutt grass modeled habitat by invasive plant management and introduction of Sacramento and slender Orcutt grasses at the SMUD Bank. For the purposes of the analysis in the EIR, the Conservation Strategy is described as the Direct Actions. The Direct Actions would be directly enabled by approval of the Project, the HCP and the take authorizations issued by USFWS and CDFW. The only Direct Action with potential physical impacts would be the Enhance Sacramento Orcutt Grass Population and Slender Orcutt Grass Introduction at SMUD Bank activity.

b. Absence of Significant New Information

CEQA Guidelines section 15088.5 requires a lead agency to recirculate an EIR for further review and comment when significant new information is added to the EIR after public notice is given of the availability of the draft EIR but before certification. New information includes: (i) changes to the project; (ii) changes in the environmental setting; or (iii) additional data or other information. CEQA Guidelines section 15088.5 further provides that "[n]ew information added to an EIR is not 'significant' unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement."

Comments received on the Draft EIR included two requests for more information regarding the HCP, one no comment, and one in support of the EIR. Each comment has been responded to in the Final EIR and none of the comments required changes to the Draft EIR or triggered the need to recirculate the Draft EIR.

Having reviewed the information contained in the Draft and Final EIR, and in the administrative record, including all comments received, as well as the requirements under CEQA Guidelines section 15088.5 and interpretive judicial authority regarding recirculation of draft EIRs, The Board hereby finds that no significant new information was added to the Draft EIR after the public review period. The Board specifically finds that: no new significant environmental impact would result from the project or from the implementation of a mitigation measure; no substantial increase in the severity of an environmental impact would result, or if such an increase would result, SMUD has adopted mitigation measures to reduce the impact to a level of insignificance; SMUD has not declined to adopt any feasible project alternative or mitigation measures considerably different from others previously analyzed that would clearly lessen the environmental impacts of the project; and the Draft EIR is not so fundamentally and basically inadequate in nature that it precluded meaningful public review.

Having reviewed the information in the Draft EIR, Final EIR, and administrative record, the Board finds that no new significant information was added to the EIR following public review, and recirculation of the EIR is therefore unnecessary and not required by CEQA.

c. Environmental Impacts Summary

As required by CEQA and the CEQA Guidelines, the following section summarizes the direct, indirect, and cumulative environmental impacts of the Project identified in the Final EIR and includes the Board's Findings regarding those impacts and any mitigation measures set forth in the Final EIR, adopted by the Board, and incorporated as requirements of the Project. These Findings summarize the determinations of the Final EIR with respect to the Project's impacts before and after mitigation and do not attempt to describe the full analysis of each environmental impact considered in the Final EIR. Instead, the Findings provide a summary of each impact, describe the applicable mitigation measures identified in the Final EIR and adopted by the Board, and state the Board's Findings regarding the significance of each impact with the adopted mitigation measures. The Final EIR contains a full explanation of each impact, mitigation measure, and the analysis that led SMUD to its conclusions on that impact. These Findings hereby incorporate by reference the discussion and analysis in the Final EIR, which support the Final EIR's determinations regarding the Project's environmental impacts and mitigation measures. In making these Findings, the Board ratifies, adopts, and incorporates by reference the Final EIR's analysis, determinations, and conclusions relating to environmental impacts and mitigation measures. The substantial evidence supporting these findings and conclusions is are set forth in the Final EIR and the record of proceedings.

The Board hereby adopts, and incorporates as conditions of approval, the mitigation measures set forth in the findings below to reduce or avoid the potentially significant impacts of the Project. In adopting the mitigation measures described below, the Board intends to adopt each of the mitigation measures recommended in the MMRP. Accordingly, in the event that a mitigation measure identified in the Final EIR has been inadvertently omitted from these Findings, that mitigation measure is hereby adopted and incorporated by reference in the Findings. Additionally, in the event that the description of mitigation measures set forth below fails accurately to capture the substance of a given mitigation measure due to a clerical error (as distinct from specific and express modification by the Board through these Findings), the language of the mitigation measure as set forth in the MMRP of the Final EIR shall govern.

d. Issues for which the Project would have a Less-than-Significant Impact with Mitigation Measures Incorporated

Pursuant to PRC section 21081(a)(1) and CEQA Guidelines section 15091(a)(1), the following potentially significant impacts identified in the Final EIR will be reduced to less-than-significant impacts through the implementation of the mitigation measures hereby incorporated into the Project.

Cultural Resources

Impact 3.5-2: Have a substantial adverse change in the significance of a unique archaeological resource. The Project will enable SMUD to implement the Direct Actions that could potentially could destroy known and unknown unique archaeological resources and could have an adverse change in the significance of a unique archaeological resource. Therefore, there would be a potentially significant impact on a unique archaeological resource.

Mitigation Measure CUL-1: Avoidance and Archaeological Monitoring.

The northern portion of the SMUD Bank holds the most potential for uncovering early Native American cultural resources. If possible, soil disturbance in this area should be avoided. If avoidance is not possible, a qualified archaeologist must be present during any ground disturbance or excavation. This area includes that portion of the SMUD Bank north of latitude 38° 20’ 37.00” N or UTM 424560N (Zone 10). This east-west line would occur approximately just north of the reservoir that exists roughly 1,000 feet northwest of the lake and approximately 2,000 feet southeast of the ranch buildings adjacent to the northwest portion of the SMUD Bank.

Mitigation Measure CUL-2: Environmental Awareness Training.

Prior to working onsite, individuals who are involved in soil moving and handling must attend environmental awareness training provided by a qualified professional archaeologist. This training would provide information on the types and extent of cultural resources that may be located onsite. Individuals conducting any excavation or other substantial subsurface disturbance activities onsite shall also attend the environmental awareness training.

Mitigation Measure CUL-3: Stop Work if Archaeological Resources are Encountered.

Should any evidence of early Native American or historic cultural resources be discovered during excavation or other substantial subsurface disturbance activities, all work should immediately cease, and a qualified archaeologist must be consulted to assess the significance of the cultural materials.

Finding: The Board finds that implementation of the Project could damage archaeological resources. But through adoption and incorporation of Mitigation Measures CUL-1, CUL-2, and CUL-3 into the Project that would reduce potential impacts from Direct Actions to a less-than-significant level, the Board finds that the Project with mitigation will not cause significant impacts on an archaeological resource.

Impact 3.5-3: Disturbance of any human remains including those interred outside of formal cemeteries. Although no human remains were found during previous cultural resources investigations, the Direct Actions could involve ground-disturbing activities that could have the potential to disturb human remains, including those interred outside of formal cemeteries. This would be a potentially significant impact.

Mitigation Measure CUL-4: Stop Work if Human Remains Are Discovered during Ground-Disturbing Activities.

If human remains are discovered during excavation or other substantial subsurface disturbance activities, all work must immediately cease and the local coroner must be contacted. Should the remains prove to be of cultural significance, the NAHC in Sacramento, California, must be contacted with additional notification going to the most likely descendants.

Finding: The Board finds that implementation of the Direct Actions could disturb previously unknown human remains. But because through adoption and incorporation of Mitigation Measure 3.5-3 into the Project that would reduce potential impacts on previously unknown human remains, including those found outside formal cemeteries, to a less-than-significant level, the Board finds the Project with mitigation will not cause significant impacts on buried human remains.

Tribal Cultural Resources

Impact 3.18-1: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource that is Listed or Eligible for Listing in the California Register of Historical Resources or Other Local Register. Tribal cultural resources have been identified through AB52 consultations for the Project. Although, it was determined that the Direct Actions would not result in impacts on identified Tribal cultural resources, ground disturbing activities could lead to the destruction or damage of previously unknown Tribal cultural resources. This would be a significant impact.

Mitigation Measure TCR-1: Discovery of Unanticipated Tribal Cultural Resources.

If any suspected TCRs are discovered during ground disturbing construction activities, all work shall cease within 100 feet of the find, or an agreed upon distance based on the project area and nature of the find. A Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with a geographic area shall be immediately notified and shall determine if the find is a TCR (PRC §21074). The Tribal Representative will make recommendations for further evaluation and treatment as necessary.

When avoidance is infeasible, preservation in place is the preferred option for mitigation of TCRs under CEQA and Tribal protocols, and every effort shall be made to preserve the resources in place, including through project redesign, if feasible. Culturally appropriate treatment may be, but is not limited to, processing materials for reburial, minimizing handling of cultural objects, leaving objects in place within the landscape, or returning objects to a location within the project area where they will not be subject to future impacts. Permanent curation of TCRs will not take place unless approved in writing by the consulting Tribe that is traditionally and culturally affiliated with the project area.

The contractor shall implement any measures deemed by the CEQA lead agency to be necessary and feasible to preserve in place, avoid, or minimize impacts to the resource, including, but not limited to, facilitating the appropriate tribal treatment of the find, as necessary. Treatment that preserves or restores the cultural character and integrity of a TCR may include Tribal Monitoring, culturally appropriate recovery of cultural objects, and reburial of cultural objects or cultural soil.

Work at the discovery location cannot resume until all necessary investigation and evaluation of the discovery under the requirements of the CEQA, including AB52, have been satisfied.

Finding: The Board finds that implementation of the Project could potentially result in destruction or damage of previously unknown Tribal cultural resources during implementation of Direct Actions. But because adoption and incorporation of Mitigation Measure TCR-1 into the Project will reduce the impact to a less-than-significant level. the Board finds that the Project, with mitigation, will not cause significant impacts on Tribal cultural resources.

e. Alternatives

In compliance with CEQA and the CEQA Guidelines, Chapter 5, "Alternatives" of the Draft EIR evaluated a reasonable range of alternatives to the Project, including the No Project Alternative, followed by identification of an environmentally superior alternative. The EIR examined each alternative's feasibility and ability to meet the following Project Objectives:

- Conserve (avoid, minimize, and mitigate impacts on) Covered Species that may be affected by specific Covered Activities within the Permit Area.

- Receive take authorization from USFWS for federally listed species covered by the proposed HCP, pursuant to Section 10(a)(1)(B) of the ESA for Covered Activities proposed by SMUD.

- Receive take authorization from CDFW for state-listed species (California tiger salamander [CTS], and giant garter snake [GGS]) covered by the proposed HCP, Section 2081(b) of the California Fish and Game Code (California Endangered Species Act [CESA]) for Covered Activities proposed by SMUD.

- Receive take authorization from CDFW for state-listed species (Sacramento Orcutt grass and slender Orcutt grass) covered by the proposed HCP, Section 2081(a) of the California Fish and Game Code (California Endangered Species Act [CESA]) for Covered Activities proposed by SMUD.

- Streamline and coordinate regulatory processes for review and permitting of SMUD's Covered Activities.

- Provide greater certainty to SMUD regarding mitigation requirements.

Several alternatives including the option of using a different Conservation Strategy were initially evaluated but were not carried forward as alternatives analyzed in the EIR based on their lack of feasibility in light of identified screening criteria.

In particular, the proposed Project seeks to provide a coordinated HCP, which, when implemented, would conserve (avoid, minimize, and mitigate impacts on) Covered Species that may be affected by Covered Activities within the Permit Area. Alternatives that did not meet these objectives were eliminated from detailed consideration.

The No Project Alternative was carried forward and analyzed with regard to whether it would reduce or avoid significant impacts of the Project. Under the No Project Alternative, SMUD would not pursue an HCP to provide comprehensive ESA coverage for all of its Covered Activities in its service territory. SMUD would seek to avoid take of all Covered Species, but would need to acquire incidental take authorizations under Section 7 of the ESA or the California Endangered Species Act as applicable for each individual activity or project that may cause take. SMUD would continue its environmental planning and screening processes to avoid and minimize impacts, but site-specific AMMs (including numerous pre-activity surveys) would still be required for certain projects. Take of Covered Species could be similar or the same as under the Project. But individual projects and associated mitigation would likely result in higher costs and delays in O&M as compared to the Project because each one would be reviewed and analyzed individually. Neither SMUD nor the wildlife agencies have the staff or ability to efficiently conduct environmental review for numerous individual projects and could result in numerous delays and schedule disruptions.

Because of potential delays involved with permitting such a large volume of work, the No Project Alternative would be an impediment to the efficient and timely maintenance of SMUD facilities, potentially delaying reliability and safety improvements. This alternative was also deemed to be cost inefficient and would not provide streamlined or coordinated regulatory review and take authorizations from the USFWS or CDFW.

In connection with certification of the Final EIR for the Project, the Board certifies that it has independently reviewed and considered the information on alternatives provided in the Final EIR and the record of proceedings. The Board finds that no new alternatives have been identified and that the feasibility of the analyzed alternatives has not changed since the Draft EIR was circulated for public review. The Board certifies that it has independently reviewed and considered the information on alternatives provided in the Final EIR and the administrative record, and finds, for the reasons set forth above, that the No Project Alternative cannot feasibly attain, either at all or to the same extent as the proposed Project, one or more of the project objectives and is rejected by the Board from further consideration.

CCR section 15126.6 suggests that an EIR should identify the “environmentally superior” alternative. “If the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.” No impacts identified would be significant and unavoidable. Feasible mitigation is available for all potentially significant impacts associated with project implementation.

Compared with the No Project alternative, the Project would best meet the project objectives, as stated in Chapter 7, “Alternatives” in the Draft EIR. The impacts associated with the Project and the No Project Alternative are qualitatively similar. Although impacts associated with ground-disturbing activities (Cultural Resources, Hydrology, Minerals) under the No Project Alternative may be slightly reduced compared to the Project, these impacts would remain less than significant. The Project would provide for a greater level of conservation in the Plan Area. The Conservation Strategy would provide greater species conservation and improvements to existing mitigation banks. The Project would result in benefits due to its approach of preserved habitat in larger blocks. The overall benefit to species would therefore be greater under the Project without a measurable difference in impacts on the environment.

f. Additional Findings

- These Findings incorporate by reference in their entirety the text of the Draft and Final EIR prepared for the Project. Without limitation, this incorporation is intended to elaborate on the scope and nature of the Project, related mitigation measures, and the basis for determining the significance of such impacts.

- All of the environmental effects of the Project have been adequately addressed in the Draft and Final EIR and have been mitigated or avoided, where feasible.

- CEQA Guidelines section 15074 requires the Lead Agency approving a Project to adopt an MMRP for the Project that it adopts or makes a condition of Project approval in order to ensure compliance during Project implementation. The Board adopts the MMRP for Project and the specific mitigation measures will be monitored in conjunction with SMUD’s MMRP and Reporting process.

g. Record of Proceedings

For purposes of CEQA and these Findings, the record of proceedings for the Project (Record of Proceedings) consists of the following documents and other evidence, at a minimum:

- The Notice of Preparation (NOP) distributed on September 13, 2018 and comments received during its 30-day public review;
- The EIR for the Project, including, without limitation, the Draft EIR, Final EIR, and all of its appendices;
- All studies, EIRs, maps, rules, regulations, guidelines, permits and other documents and materials incorporated by reference in any portion of the EIR;
- All presentation materials from every noticed public meeting and public hearing for the Project;
- The MMRP for the proposed Project;
- Matters of common knowledge, including but not limited to federal, state and local laws and regulations, including, without limitation, SMUD's adopted CEQA Procedures and other adopted plans, policies and programs;
- Any documents expressly cited in these Findings; and
- All materials not otherwise identified which are expressly required to be in the Record of Proceedings by PRC section 21167.6(e).

g. Custodian and Location of Records

The documents and other materials which constitute the Record of Proceedings are located at SMUD Headquarters. Copies of those documents are and at all relevant times have been and will be available upon request at the Customer Service Center (6300 S Street, Sacramento, CA 95817). The custodian of the Record of Proceedings may be contacted as follows:

Kim Crawford
Sacramento Municipal Utility District
6201 S Street, MS B203
Sacramento, CA 95817-1899
(916) 732-5063
kim.crawford@smud.org

This information is provided in compliance with PRC section 21081.6(a)(2) and CEQA Guidelines section 15091(e).

III. Project Benefits

The fundamental purpose of the SMUD HCP Project is to provide a coordinated habitat conservation plan, which, when implemented, would conserve (avoid, minimize, and mitigate impacts on) Covered Species that may be affected by Covered Activities within the Permit Area. In addition, the Project would provide a framework to protect, enhance, and restore the natural resources affected by the Covered Activities. Within this framework, the proposed Project would achieve conservation goals and comply with state and federal environmental regulations while streamlining existing processes for review and permitting of SMUD's activities.

Finding: The SMUD Board finds the approval of the proposed SMUD HCP Project will result in continuing and enhanced benefits to SMUD customers in form of effective streamlining and meeting conservation goals.

IV. Summary

Based on the foregoing findings and the information contained in the record, it is hereby determined that:

- The Project will not result in a significant and unavoidable impacts.
- As the environmentally superior alternative, the Project would provide for a greater level of conservation in the Plan Area while meeting the objectives of the Project. This determination reflects the Board's independent judgment and analysis.

DRAFT

RESOLUTION NO. ____________

WHEREAS, this Board has adopted policies stating this Board is committed to meeting customers' electrical energy needs (SD-4); demonstrating energy reliability and environmental leadership (SD-7); and ensuring high levels of customer satisfaction (SD-5); and

WHEREAS, SMUD's primary purpose is to supply electrical energy to customers in the Sacramento area; and

WHEREAS, the **Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan (HCP)** was prepared to support issuance of requested take authorizations from the **California Department of Fish and Wildlife (CDFW)** and **U. S. Fish and Wildlife Service (USFWS)**; and

WHEREAS, the **HCP** is a 30-year plan designed to avoid, minimize, and mitigate impacts to **HCP Covered Species** that may be affected by SMUD's various operations, maintenance, and new construction activities; and

WHEREAS, the **HCP** covers activities within SMUD's service territory and in portions of Placer, Yolo, Amador, and San Joaquin Counties where SMUD's facilities are present; and

WHEREAS, the **HCP Covered Species** includes seven state and federally endangered and threatened species: slender Orcutt grass, Sacramento Orcutt grass, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, California tiger salamander, and giant garter snake; and

WHEREAS, SMUD prepared an **Environmental Impact Report (EIR)** to evaluate the potential impacts of issuance of the take authorizations by **USFWS** and **CDFW**, implementation of those take authorizations, and approval and implementation of the **HCP**; and

WHEREAS, the **Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan Environmental Impact Report (HCP EIR)** provides the **California Environmental Quality Act (CEQA)** analysis for the project, and the **Mitigation Monitoring and Reporting Program** incorporated environmental avoidance, mitigation and improvement measures; and

WHEREAS, the public scoping process for the **HCP EIR** began September 13, 2018, with submittal of the **Notice of Preparation (NOP)** to the State Clearinghouse notifying stakeholders of SMUD's intent to prepare the **HCP EIR**, two public meetings being held on September 27, 2018, and concluding on October 15, 2018, with no significant issues identified in the six scoping comments received; and

WHEREAS, the **HCP EIR** and **Mitigation Monitoring and Reporting Program** were posted on the SMUD website, distributed to approximately 100 interested parties including agencies, special interest groups, nonprofit organizations, and other stakeholders; notice was published in the *Sacramento Bee*, inviting public comment; the comment period was open from January 31, 2022, through March 17, 2022; a virtual public meeting was held on February 22, 2022, which was attended by one member of the public; and four comments were received consisting of requests for more information about the project or indicating there were no comments, thus requiring no corresponding changes to the text of the **HCP EIR**; and

DRAFT

WHEREAS, the **HCP EIR** included mitigation measures for cultural resources and tribal cultural resources to reduce impacts to a less-than-significant level and concluded the **Project** would not result in any significant and unavoidable impacts; and

WHEREAS, all comments received during the public review period have been responded to as appropriate and incorporated into the **Final HCP EIR** and **Mitigation Monitoring and Reporting Program**, which was made available for comments on June 3, 2022, and will require certification by the SMUD Board of Directors; and

WHEREAS, the **HCP EIR** and **Mitigation Monitoring and Reporting Program** are located in the records of SMUD under the custody of the Environmental Management Department; **NOW THEREFORE,**

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SACRAMENTO MUNICIPAL UTILITY DISTRICT:

Section 1. This Board has reviewed and considered information in the **Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan Environmental Impact Report (HCP EIR)** and **Mitigation Monitoring and Reporting Program** and (1) adopts the **Findings** as set forth in **Attachment ___**, (2); certifies that the **HCP EIR** complies with the **California Environmental Quality Act (CEQA)**; (3) adopts the **Mitigation Monitoring and Reporting Program,** as set forth in **Attachment ___**; and (4) approves the project.

Section 2. This Board, exercising its independent judgment, finds, on the basis of the **HCP EIR** and **Mitigation Monitoring and Reporting Program**, and comments received during the public review period that there is no substantial evidence that the **Sacramento Municipal Utility District Operations, Maintenance, and New Construction Habitat Conservation Plan** will have a significant effect on the environment.

Section 3. The Environmental Services Department is directed to file with the County Clerks of Sacramento County, Placer County, Yolo County, San Joaquin County, and Amador County a Notice of Determination, which shall set forth the information required by **CEQA**.

SSS No.	BOARD AGENDA ITEM	Committee Meeting & Date
CFO 21-018	STAFFING SUMMARY SHEET	Finance & Audit, 2022
		Board Meeting Date
		June 16, 2022

TO		TO	
1.	Jennifer Davidson	6.	
2.	Lora Anguay	7.	
3.	Scott Martin	8.	
4.		9.	**Legal**
5.		10.	**CEO & General Manager**

Consent Calendar		**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**		**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Lisa Limcaco	Accounting	B352	6957	12/28/21

NARRATIVE:

Requested Action: Provide SMUD's financial results for the year-to-date period in 2022.

Summary: Staff will present SMUD's financial results for the year-to-date period in 2022 to the Board of Directors.

Board Policy: *(Number & Title)* GP-3, Board Job Description

Benefits: Provides Board members with information regarding SMUD's financial condition.

Cost/Budgeted: N/A

Alternatives: N/A

Affected Parties: Accounting

Coordination: Accounting

Presenter: Kathy Ketchum, Assistant Controller

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
SMUD's 2022 Year-to-Date Financial Results	11

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
OFFICE MEMORANDUM

TO: Distribution

DATE: May 31, 2022
ACC 22-016

FROM: Kathy Ketchum / Lisa Limcaco

SUBJECT: **APRIL 2022 FINANCIAL RESULTS AND OPERATIONS DATA**

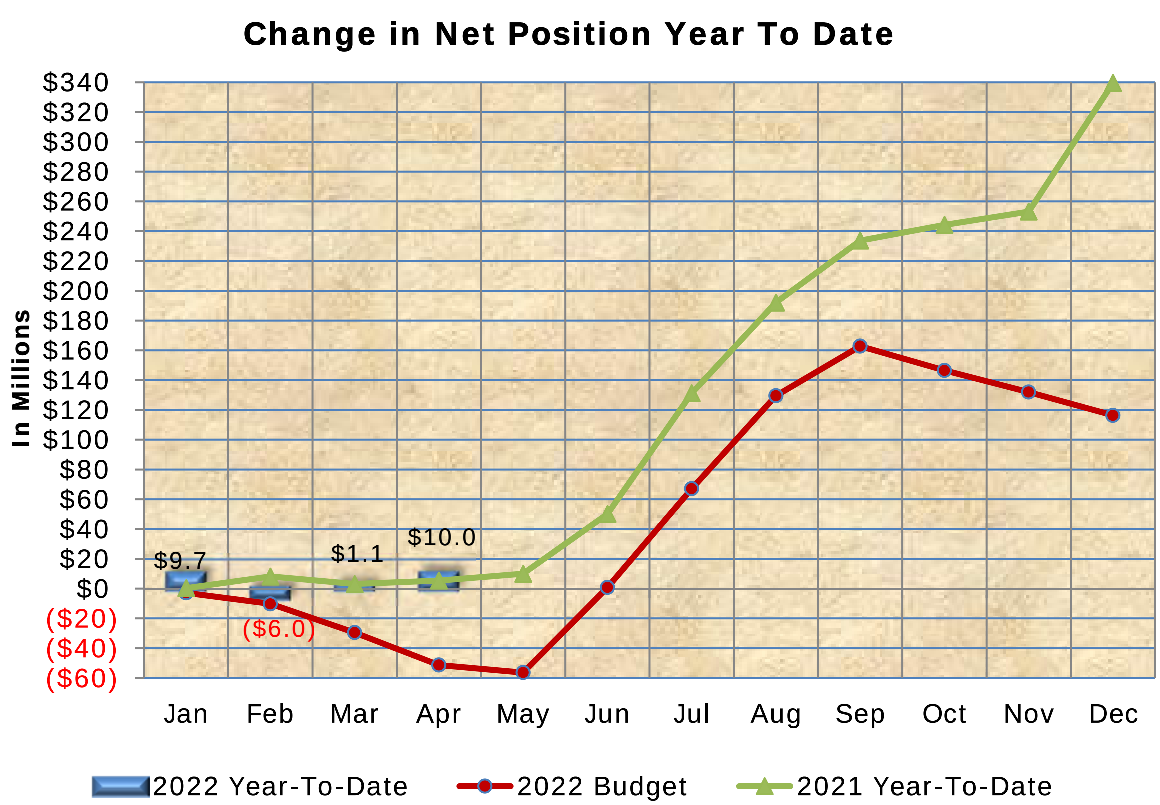
We are attaching the financial and operating reports for the four months of 2022. They include sales and generation statistics and other selected data.

The change in net position is an increase of $10.0 million compared to a budgeted decrease of $51.3 million, resulting in a favorable variance of $61.3 million.

We prepared these statements on the accrual basis of accounting, and they conform to generally accepted accounting principles. The bases for the budget amounts are:

1) Budgeted electric revenues are based on the Forecast of Revenues by the Pricing Department, adjusted for unbilled revenues; and

2) Budgeted operating expenses reflect the 2022 Budget approved by the Board of Directors on December 9, 2021.



SACRAMENTO MUNICIPAL UTILITY DISTRICT
EXECUTIVE SUMMARY
For the Four Months Ended April 30, 2022

Net Position

- The change in net position is an increase of $10.0 million compared to a budgeted decrease of $51.3 million, resulting in a favorable variance of $61.3 million.

Revenues

- Revenues from sales to customers were $407.1 million, which was $9.2 million higher than planned.
    - o The increase is primary due to higher commercial customer revenues of $19.2 million in 2022 and lower provision for uncollectible accounts of $3.2 million, offset by a $13.3 million year-to-date adjustment of commercial customer revenues related to the 2021 estimated unbilled revenues.
- Revenues under the California Global Warming Solutions Act (Assembly Bill [AB] - 32) were $5.8 million. This is due to carbon allowances sold through the state sanctioned quarterly auctions.
- Low Carbon Fuel Standard (LCFS) revenues were $1.1 million, which was $4.3 million lower than planned due to a decrease in price per credit and the timing of credit sales.
- Non-cash revenues transferred to the rate stabilization fund were $6.9 million, of which $5.8 million was for AB-32 and $1.1 million was for LCFS. Funds are deferred until SMUD has qualified program expenses (projects that reduce carbon emissions or electric vehicle programs) to recognize revenue.
- Non-cash revenues transferred from the rate stabilization fund were $28.0 million, of which $25.1 million was for revenue recognized for Hydro, $2.7 million was for revenues recognized from LCFS electric vehicle programs expenses, and $0.2 million was from AB-32 program expenses.

Commodities, Purchased Power and Production

Overall, load was higher than planned. Both hydro and thermal generation were lower than planned due to precipitation levels and outages, respectively. This resulted in lower fuel usage, decreased net price per MMBTU (due to fuel sales), and additional purchased power expense.

- SMUD's generation was lower by 268 GWh (13.9 percent); JPA and other generation was lower by 223 GWh (14.0 percent); Hydro generation was lower by 45 GWh (13.1 percent).
- Purchased power expense of $128.8 million, less surplus power sales of $29.1 million, was $99.7 million, which was $31.2 million higher than planned. Purchased power expense increased because of higher prices of $15.8 million and higher quantities purchased of $15.4 million.
- Production operations cost of $123.6 million, less surplus gas sales of $56.1 million, was $67.5 million, which was $17.5 million lower than planned.
    - o Fuel costs of $82.3 million, less surplus gas sales of $56.1 million, was $26.2 million, which was $19.4 million lower than planned. This is primarily due to lower fuel prices of $14.1 million and lower fuel usage of $5.3 million. The lower price variance is due to surplus gas sales, natural gas hedging activities, and higher sales price per Renewable Identification Number (RIN), which resulted in sales of $1.4 million higher than planned.
- The "power margin", or sales to customers less cost of purchased power, production operations costs and gas hedges included in investment revenue was $243.9 million, which was $0.5 million higher than planned. Power margin as a percentage of sales to customers was 59.9 percent, which was 1.5 percent lower than planned.

Other Operating Expenses

- All other operating expenses were $249.1 million, which was $36.8 million lower than planned.
    - o Customer accounts expenses were $2.7 million lower than planned primarily due to lower labor in Revenue Assurance with moving the collection process to reset in mid-February.
    - o Customer service and information expenses were $5.6 million lower than planned primarily due to lower transportation electrification expenses due to a DOE grant not awarded for the Equity EV program, supply chain issues and delays, lower load flexibility planning and support outside services, and lower Greenergy Recs and Carbon Offsets.
    - o Administrative and General expenses were $0.9 million lower than planned primarily due to lower enterprise and customer strategy costs and lower employee pension and benefit medical retiree costs.

- Public good expenses were $3.7 million lower than planned primarily due to a delay in Storage and Generation Programs, delays in annual pilot fees and incentives, and overall fewer projects completed than planned. Activity is expected to increase over the summer.
- Production maintenance costs were $1.1 million lower than planned primarily due to lower Cosumnes plant maintenance/overhaul costs offset by higher Carson plant maintenance/overhaul costs. Both plant maintenance projects are expected to fall in line with plan by the end of the year.
- Transmission and distribution maintenance expenses were $5.5 million higher than planned. This is primarily due to higher routine tree trimming expenses as crews took advantage of dry weather, higher service reconnect and repair expenses caused by completing 42% more work than planned for year-to-date, and higher station equipment preventative maintenance and onboarding/training of 13 new apprentices.
- Negative non-cash amortization of pension and other post-employment benefits (OPEB) was $30.4 million lower than planned, which resulted in a positive impact to net position. This is due to Governmental Accounting Standards Board (GASB) 68 Pension and GASB 75 OPEB negative amortizations.

Non-operating Revenues and Expenses

Other revenue, net, was $5.3 million higher than planned primarily due to higher investment revenue of $4.0 million due to natural gas hedging activities and $1.6 million higher contributions in aid of construction due to differences between accounting treatment of offsets and amounts recorded for budget purposes.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION
For the Month Ended April 30, 2022
(thousands of dollars)

	Actual	Budget	Over (Under)	Percent of Increase (Decrease)
OPERATING REVENUES				
Sales to customers	$ 101,302	$ 99,177	$ 2,125	2.1 %
Sales of surplus power	11,198	8,119	3,079	37.9
Sales of surplus gas	10,864	-	10,864	*
LCFS revenue	147	1,917	(1,770)	(92.3)
Other electric revenue	3,483	3,015	468	15.5
Revenue to rate stabilization fund	(147)	-	(147)	*
Revenue from rate stabilization fund	25,788	-	25,788	*
Total operating revenues	152,635	112,228	40,407	36.0
OPERATING EXPENSES				
Operations				
Purchased power	38,500	32,543	5,957	18.3
Production	29,557	16,844	12,713	75.5
Transmission and distribution	7,002	6,249	753	12.0
Customer accounts	4,205	4,504	(299)	(6.6)
Customer service and information	6,101	7,033	(932)	(13.3)
Administrative and general	14,527	13,393	1,134	8.5
Public good	4,769	4,461	308	6.9
Total operations	104,661	85,027	19,634	23.1
Maintenance				
Production	8,932	10,309	(1,377)	(13.4)
Transmission and distribution	8,886	9,642	(756)	(7.8)
Total maintenance	17,818	19,951	(2,133)	(10.7)
Depreciation and amortization				
Depreciation	18,487	18,325	162	0.9
Amortization of pension and OPEB	(6,515)	1,087	(7,602)	(699.4)
Amortization of regulatory asset	3,120	2,881	239	8.3
Total depreciation and amortization	15,092	22,293	(7,201)	(32.3)
Total operating expenses	137,571	127,271	10,300	8.1
OPERATING INCOME (LOSS)	15,064	(15,043)	30,107	200.1
NON-OPERATING REVENUES AND EXPENSES				
Other revenues/(expenses)				
Interest income	589	343	246	71.7
Investment revenue (expense)	(159)	(173)	14	8.1
Other income (expense) - net	847	740	107	14.5
Unrealized holding gains (losses)	(312)	-	(312)	*
Revenue - CIAC	1,558	1,161	397	34.2
Total other revenues	2,523	2,071	452	21.8
Interest charges				
Interest on long-term debt	8,605	8,642	(37)	(0.4)
Interest on commercial paper	38	169	(131)	(77.5)
Total interest charges	8,643	8,811	(168)	(1.9)
CHANGE IN NET POSITION	$ 8,944	$ (21,783)	$ 30,727	141.1 %

* Equals 1000% or greater.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION
For the Four Months Ended April 30, 2022
(thousands of dollars)

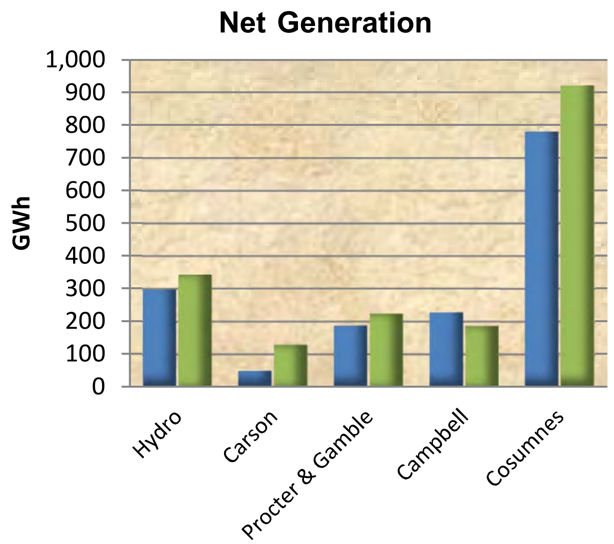
	Actual	Budget	Over (Under)	Percent of Increase (Decrease)
OPERATING REVENUES				
Sales to customers	$ 407,076	$ 397,869	$ 9,207	2.3 %
Sales of surplus power	29,061	54,383	(25,322)	(46.6)
Sales of surplus gas	56,069	-	56,069	*
AB32 revenue	5,830	-	5,830	*
LCFS revenue	1,107	5,401	(4,294)	(79.5)
Other electric revenue	12,621	11,945	676	5.7
Revenue to rate stabilization fund	(6,937)	-	(6,937)	*
Revenue from rate stabilization fund	27,963	-	27,963	*
Total operating revenues	532,790	469,598	63,192	13.5
OPERATING EXPENSES				
Operations				
Purchased power	128,764	122,887	5,877	4.8
Production	123,586	84,999	38,587	45.4
Transmission and distribution	27,433	26,997	436	1.6
Customer accounts	16,501	19,225	(2,724)	(14.2)
Customer service and information	21,213	26,764	(5,551)	(20.7)
Administrative and general	53,774	54,655	(881)	(1.6)
Public good	13,814	17,494	(3,680)	(21.0)
Total operations	385,085	353,021	32,064	9.1
Maintenance				
Production	17,038	18,120	(1,082)	(6.0)
Transmission and distribution	39,181	33,724	5,457	16.2
Total maintenance	56,219	51,844	4,375	8.4
Depreciation and amortization				
Depreciation	73,859	73,030	829	1.1
Amortization of pension and OPEB	(26,061)	4,347	(30,408)	(699.5)
Amortization of regulatory asset	12,359	11,523	836	7.3
Total depreciation and amortization	60,157	88,900	(28,743)	(32.3)
Total operating expenses	501,461	493,765	7,696	1.6
OPERATING INCOME (LOSS)	31,329	(24,167)	55,496	229.6
NON-OPERATING REVENUES AND EXPENSES				
Other revenues/(expenses)				
Interest income	1,374	1,330	44	3.3
Investment revenue (expense)	3,353	(690)	4,043	585.9
Other income (expense) - net	3,314	2,835	479	16.9
Unrealized holding gains (losses)	(825)	-	(825)	*
Revenue - CIAC	6,184	4,643	1,541	33.2
Total other revenues	13,400	8,118	5,282	65.1
Interest charges				
Interest on long-term debt	34,338	34,565	(227)	(0.7)
Interest on commercial paper	370	677	(307)	(45.3)
Total interest charges	34,708	35,242	(534)	(1.5)
CHANGE IN NET POSITION	$ 10,021	$ (51,291)	$ 61,312	119.5 %

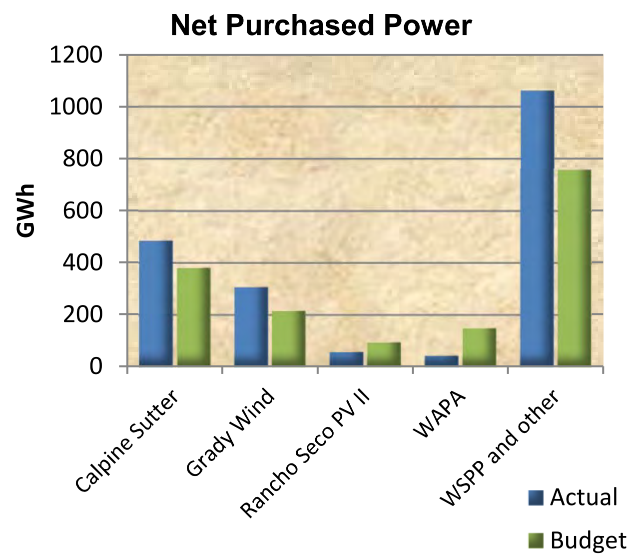
* Equals 1000% or greater.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
SOURCES AND USES OF ENERGY - COMPARED TO BUDGET
For the Period Ended April 30, 2022

Sources of Energy (GWh)	Month Actual	Month Budget	Increase (Decrease) Percentage	Year to Date Actual	Year to Date Budget	Increase (Decrease) Percentage
Net Generated						
Hydro	154	77	100.0	298	343	(13.1)
Carson Power Plant	24	35	(31.4)	49	128	(61.7)
Procter & Gamble Power Plant	57	36	58.3	187	223	(16.1)
Campbell Power Plant	86	24	258.3	227	186	22.0
Cosumnes Power Plant	-	60	(100.0)	781	921	(15.2)
Other	48	58	(17.2)	124	133	(6.8)
Total net generation	369	290	27.2	1,666	1,934	(13.9)
Purchased Power less transmission losses:						
CalEnergy	20	18	11.1	74	73	1.4
Calpine Sutter	149	23	547.8	485	381	27.3
Drew Solar	-	29	(100.0)	-	76	(100.0)
Feed in Tariff	21	22	(4.5)	64	60	6.7
Grady Wind	85	73	16.4	307	215	42.8
Rancho Seco PV II	22	33	(33.3)	58	94	(38.3)
WAPA	18	68	(73.5)	43	149	(71.1)
WSPP and other	221	337	(34.4)	1,061	758	40.0
Other long term power	42	57	(26.3)	166	195	(14.9)
Total net purchases	578	660	(12.4)	2,258	2,001	12.8
Total sources of energy	947	950	(0.3)	3,924	3,935	(0.3)
Uses of energy:						
SMUD electric sales and usage	701	716	(2.1)	3,043	2,960	2.8
Surplus power sales	210	209	0.5	762	779	(2.2)
System losses	36	25	44.0	119	196	(39.3)
Total uses of energy	947	950	(0.3) %	3,924	3,935	(0.3) %

* Change equals 1000% or more.





Net generation is lower than planned for the four-month period.

- Hydro generation is lower than planned (13.1 percent).
- JPA generation is lower than planned (14.7 percent).

Purchased power, less surplus power sales, is higher than plan (22.4 percent).

SACRAMENTO MUNICIPAL UTILITY DISTRICT
STATEMENTS OF NET POSITION
April 30, 2022 and 2021
(thousands of dollars)

	SMUD	Cosumnes	NCEA	NCGA #1	Intercompany Eliminations	Total 2022	Total 2021
ELECTRIC UTILITY PLANT							
Plant in service, original cost	$ 5,816,526	$ 946,971	$ -	$ -	$ -	$ 6,763,497	$ 6,413,602
Less accumulated depreciation	2,722,183	656,501	-	-	-	3,378,684	3,198,389
Plant in service - net	3,094,343	290,470	-	-	-	3,384,813	3,215,213
Construction work in progress	425,601	7,746	-	-	-	433,347	519,730
Investment in Joint Power Agencies	309,708	-	-	-	(282,645)	27,063	22,627
Total electric utility plant - net	3,829,652	298,216		-	(282,645)	3,845,223	3,757,570
RESTRICTED ASSETS							
Revenue bond reserves	2,931	-	-	-	-	2,931	3,813
Restricted for payment of debt service	102,998	-	-	-	-	102,998	102,676
JPA funds	-	11,228	15,708	18,156	-	45,092	43,115
Nuclear decommissioning trust fund	8,874	-	-	-	-	8,874	8,873
Rate stabilization fund	167,967	-	-	-	-	167,967	155,291
Net pension asset	35,738	-	-	-	-	35,738	-
Net OPEB asset	57,532	-	-	-	-	57,532	770
Other funds	23,963	-	3,000	1,633	-	28,596	22,392
Due (to) from unrestricted funds (decommissioning)	(6,684)	-	-	-	-	(6,684)	(6,684)
Due (to) from restricted funds (decommissioning)	6,684	-	-	-	-	6,684	6,684
Less current portion	(113,790)	(11,228)	(18,708)	(19,789)	-	(163,515)	(165,254)
Total restricted assets	286,213	-	-	-	-	286,213	171,676
CURRENT ASSETS							
Cash, cash equivalents and investments							
Unrestricted	546,944	57,441	-	-	-	604,385	616,432
Restricted	113,790	11,228	18,708	19,789	-	163,515	165,254
Accounts receivable - net	215,133	42,497	-	2,253	(62,157)	197,726	177,102
Energy efficiency loans due within one year	201	-	-	-	-	201	2,691
Interest receivable	840	24	-	15	-	879	1,574
Regulatory costs to be recovered within one year	37,080	104	-	105	-	37,289	38,299
Derivative financial instruments maturing within in one year	110,483	-	-	-	-	110,483	11,416
Inventories	79,213	19,561	-	-	-	98,774	88,801
Prepaid gas to be delivered within one year	-	-	3,981	23,240	-	27,221	24,185
Prepayments and other	18,077	8,364	28	16	-	26,485	27,333
Total current assets	1,121,761	139,219	22,717	45,418	(62,157)	1,266,958	1,153,087
NONCURRENT ASSETS							
Regulatory costs for future recovery							
Decommissioning	74,600	-	-	-	-	74,600	80,369
Pension	334,869	-	-	-	-	334,869	351,896
OPEB	276,752	-	-	-	-	276,752	289,525
Bond Issues	-	748	-	437	-	1,185	1,394
Derivative financial instruments	(212)	-	-	-	-	(212)	5,920
Derivative financial instruments	105,583	-	-	-	-	105,583	12,311
Prepaid gas	-	-	527,625	129,446	-	657,071	684,292
Prepaid power and capacity	311	-	-	-	-	311	519
Energy efficiency loans - net	838	-	-	-	-	838	15,989
Other	68,812	4	-	65	-	68,881	50,902
Total noncurrent assets	861,553	752	527,625	129,948	-	1,519,878	1,493,117
TOTAL ASSETS	$ 6,099,179	$ 438,187	$ 550,342	$ 175,366	$ (344,802)	$ 6,918,272	$ 6,575,450
DEFERRED OUTFLOWS OF RESOURCES							
Accumulated decrease in fair value of hedging derivatives	10,840	-	-	-	-	10,840	34,599
Deferred pension outflows	67,245	-	-	-	-	67,245	165,698
Deferred OPEB outflows	23,708	-	-	-	-	23,708	25,171
Deferred ARO outflows	-	1,627	-	-	-	1,627	1,618
Unamortized bond losses - other	9,815	1,387	-	-	-	11,202	14,059
TOTAL DEFERRED OUTFLOWS OF RESOURCES	111,608	3,014	-	-	-	114,622	241,145
TOTAL ASSETS AND DEFERRED OUTFLOWS OF RESOURCE	$ 6,210,787	$ 441,201	$ 550,342	$ 175,366	$ (344,802)	$ 7,032,894	$ 6,816,595

SACRAMENTO MUNICIPAL UTILITY DISTRICT
STATEMENTS OF NET POSITION
April 30, 2022 and 2021
(thousands of dollars)

	SMUD	Cosumnes	NCEA	NCGA #1	Intercompany Eliminations	Total 2022	Total 2021
LONG-TERM DEBT - NET	$ 2,275,914	$ 98,705	$ 550,166	$ 142,935	$ -	$ 3,067,720	$ 3,245,680
CURRENT LIABILITIES							
Accounts payable	104,204	10,450	-	401	-	115,055	86,679
Purchased power payable	78,209	19,882	-	-	(62,158)	35,933	29,993
Credit support collateral obligation	8,125	-	-	1,633	-	9,758	3,558
Long-term debt due within one year	100,150	11,450	-	20,550	-	132,150	127,390
Accrued decommissioning	6,889	-	-	-	-	6,889	6,751
Interest payable	31,497	1,686	7,251	186	-	40,620	42,089
Accrued salaries and compensated absences	43,620	-	-	-	-	43,620	38,986
Derivative financial instruments maturing within one year	9,671	-	-	-	-	9,671	18,189
Customer deposits	1,316	-	-	-	-	1,316	3,907
Other	42,091	-	-	-	-	42,091	23,877
Total current liabilities	425,772	43,468	7,251	22,770	(62,158)	437,103	381,419
NONCURRENT LIABILITIES							
Accrued decommissioning - net	76,791	9,021	-	-	-	85,812	91,192
Derivative financial instruments	5,197	-	-	-	-	5,197	24,025
Net pension liability	-	-	-	-	-	-	416,820
Other	84,723	-	160	-	-	84,883	93,160
Total noncurrent liabilities	166,711	9,021	160	-	-	175,892	625,197
TOTAL LIABILITIES	2,868,397	151,194	557,577	165,705	(62,158)	3,680,715	4,252,296
DEFERRED INFLOWS OF RESOURCES							
Accumulated increase in fair value of hedging derivatives	212,215	-	-	-	-	212,215	23,570
Deferred pension inflows	210,392	-	-	-	-	210,392	9,475
Deferred OPEB inflows	84,347	-	-	-	-	84,347	52,613
Regulatory credits	525,960	-	-	-	-	525,960	505,983
Unamortized bond gains - other	8,759	-	-	-	-	8,759	6,187
Unearned revenue	3,347	40	-	-	-	3,387	3,508
TOTAL DEFERRED INFLOWS OF RESOURCES	1,045,020	40	-	-	-	1,045,060	601,336
NET POSITION							
Balance at beginning of year	2,292,641	283,722	(6,565)	9,838	(282,539)	2,297,097	1,957,512
Net increase (decrease) for the year	4,729	6,245	(738)	(215)	-	10,021	5,451
Member contributions (distributions) - net	-	-	68	38	(106)	-	-
TOTAL NET POSITION	2,297,370	289,967	(7,235)	9,661	(282,644)	2,307,119	1,962,963
TOTAL LIABILITIES, DEFERRED INFLOWS OF RESOURCES AND NET POSITION	$ 6,210,787	$ 441,201	$ 550,342	$ 175,366	$ (344,802)	$ 7,032,894	$ 6,816,595

SACRAMENTO MUNICIPAL UTILITY DISTRICT
STATEMENTS OF CASH FLOWS
For the Period Ended April 30, 2022
(thousands of dollars)

	Month	Year to Date
CASH FLOWS FROM OPERATING ACTIVITIES		
Receipts from customers	$ 114,340	$ 472,452
Receipts from surplus power and gas sales	28,377	76,879
Other receipts	8,096	36,606
Payments to employees - payroll and other	(34,714)	(125,763)
Payments for wholesale power and gas purchases	(52,742)	(214,071)
Payments to vendors/others	(32,772)	(124,595)
Net cash provided by operating activities	30,585	121,508
CASH FLOWS FROM NONCAPITAL FINANCING ACTIVITIES		
Interest on debt	(1,759)	(14,395)
Net cash used in noncapital financing activities	(1,759)	(14,395)
CASH FLOWS FROM CAPITAL AND RELATED FINANCING ACTIVITIES		
Construction expenditures	(24,166)	(85,958)
Contributions in aid of construction	3,568	10,143
Interest on debt	-	(45,060)
Net cash used in capital and related financing activities	(20,598)	(120,875)
CASH FLOWS FROM INVESTING ACTIVITIES		
Sales and maturities of securities	8,236	115,019
Purchases of securities	(176,029)	(223,661)
Interest and dividends received	522	1,411
Investment revenue/expenses - net	(162)	3,345
Net cash used in investing activities	(167,433)	(103,886)
Net decrease in cash and cash equivalents	(159,205)	(117,648)
Cash and cash equivalents at the beginning of the month and year	830,205	788,648
Cash and cash equivalents at April 30, 2022	$ 671,000	$ 671,000
Cash and cash equivalents included in:		
Unrestricted cash and cash equivalents	$ 523,885	$ 523,885
Restricted and designated cash and cash equivalents	41,884	41,884
Restricted and designated assets (a component of the total of $286,213 at April 30, 2022)	105,231	105,231
Cash and cash equivalents at April 30, 2022	$ 671,000	$ 671,000

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SSS No.	BOARD AGENDA ITEM	Committee Meeting & Date
CFO 21-017	STAFFING SUMMARY SHEET	Finance & Audit, 2022
		Board Meeting Date
		June 16, 2022

TO		TO	
1.	Jennifer Davidson	6.	
2.	Lora Anguay	7.	
3.	Scott Martin	8.	
4.		9.	**Legal**
5.		10.	**CEO & General Manager**

Consent Calendar		**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**		**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Russell Mills	Treasury	B355	6509	12/28/21

NARRATIVE:

Requested Action: Provide the summary of SMUD's current Power Supply Costs.

Summary: Staff will present the summary of SMUD's current Power Supply Costs to the Board of Directors.

Board Policy: *(Number & Title)* GP-3, Board Job Description

Benefits: Provides Board members with current power supply costs information for SMUD.

Cost/Budgeted: N/A

Alternatives: N/A

Affected Parties: SMUD

Coordination: Accounting and Treasury

Presenter: Kathy Ketchum, Assistant Controller

Additional Links:

SUBJECT	ITEM NO. ***(FOR LEGAL USE ONLY)***
Summary of SMUD's current Power Supply Costs	12

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

13

SSS No. AQS 2022-5

BOARD AGENDA ITEM
STAFFING SUMMARY SHEET

Committee Meeting & Date
N/A
Board Meeting Date
June 16, 2022

TO		TO	
1.	Suresh Kotha	6.	
2.	Lora Anguay	7.	
3.		8.	
4.		9.	**Legal**
5.		10.	**CEO & General Manager**

Consent Calendar		**Yes**		**No** *If no, schedule a dry run presentation.*	**Budgeted**		**Yes**		**No** *(If no, explain in Cost/Budgeted section.)*

FROM (IPR)	DEPARTMENT	MAIL STOP	EXT.	DATE SENT
Claire Rogers	Audit and Quality Services	ME-2	7122	6/8/22

NARRATIVE:

Requested Action: Informational agenda item to provide Board Members with the opportunity to ask questions and/or discuss recent reports issued by Audit and Quality Services.

Summary: Reports Issued by Audit and Quality Services:

Title	**Report Number**
• Green-e® Energy Annual Verification…………………………………………………	28007461
• Data Sharing……………………………………………………………………..……...	28007441

Board Policy: *(Number & Title)* Board-Staff Linkage, Board-Internal Auditor Relationship (BL-3)

Benefits: N/A

Cost/Budgeted: N/A

Alternatives: N/A

Affected Parties: Board, Internal Auditor

Coordination: Audit & Quality Services

Presenter: Claire Rogers, Director of Audit Services

Additional Links:

SUBJECT	ITEM NO. *(FOR LEGAL USE ONLY)*
Reports Issued by Audit and Quality Services	13

ITEMS SUBMITTED AFTER DEADLINE WILL BE POSTPONED UNTIL NEXT MEETING.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

OFFICE MEMORANDUM

TO: Board of Directors

DATE: May 31, 2022
Audit Report #28007461

FROM: Claire Rogers

SUBJECT: Green-e® Energy Annual Verification — Agreed-Upon Procedures

Audit and Quality Services (AQS) has performed the procedures enumerated below, which were agreed to by SMUD and the Center for Resource Solutions, to verify SMUD's compliance with annual reporting requirements of the Center for Resource Solutions' Green-e® Energy program for the year ended December 31, 2021. SMUD's management is responsible for compliance with the annual reporting requirements of the Center for Resource Solutions' Green-e® Energy program.

The sufficiency of these procedures is solely the responsibility of the specified users of the report. Consequently, we make no representation regarding the sufficiency of the procedures described below either for the purpose for which this report has been requested or for any other purpose.

The procedures include, but are not limited to:

- Validation and recalculation of Greenergy (excluding Partner Plus) and Solar Shares retail sales;
- Validation and recalculation of Greenergy (excluding Partner Plus) and Solar Shares resource supply, or renewable energy credits (RECs), retired in the Western Electric Coordinating Council (WECC) WREGIS tracking system database;
- Validation and recalculation of Greenergy (excluding Partner Plus) and Solar Shares Product Content Labels.

Based on the Green-e® Energy Audit Protocol and the results of the Agreed-Upon Procedures, AQS asserts that SMUD has no exceptions with regard to its compliance of the Green-e Energy verification reporting requirements put forth in the Annual Verification Protocol.

The agreed-upon procedures engagement was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. AQS was not engaged to and did not conduct an examination or review, the objective of which would be the expression of an opinion or conclusion, respectively, on SMUD's compliance to the annual reporting requirements of the Center for Resource Solutions' Green-e® Energy program. Accordingly, we do not express such an opinion or conclusion. Had we performed additional procedures, other matters might have come to our attention that would have been reported to SMUD and the Center for Resource Solutions.

AQS Report #28007441
June 6, 2022

Data Sharing
Executive Summary

Audit and Quality Services' (AQS) has completed a review of Data Sharing. The purpose of the audit was to evaluate the processes and controls that protect data and information owned or entrusted to SMUD and shared with third parties. The audit was included in the 2022 AQS audit plan.

Data sharing is the process or act of copying or transferring SMUD data for storage and/or use in a third party's system(s). Data sharing requests including Sensitive and Confidential Information (SCI) that will be sent to a third party require a Non-Disclosure Agreement (NDA). SCI is data or information that is classified as such according to MP 07.01.01.100, Sensitive and Confidential Information. This can be Critical Infrastructure Protection data, information related to SMUD's energy management system or grid, customer or employee personally identifiable information, strategic, intellectual property, or trade secret information.

AQS completed an evaluation of the current processes and procedures for data sharing with a focus on the processes for sharing SCI with third parties. We identified that all data sharing requests sampled had an executed NDA, all required approvals were obtained, and that cybersecurity assessments were complete for SCI data sharing requests that went through the procurement process. In addition, AQS validated that the sample selected for testing was for primary business purposes and that the NDA data elements were consistent with the ServiceNow data domain information. AQS also evaluated the education and awareness efforts related to the data sharing program and found them to be sufficient. However, opportunities exist to enhance the data sharing process involving sharing SCI with third parties; these enhancements include ensuring security assessments of the third party's system/data repository are completed for data sharing requests that do not go through the procurement process, capturing the actual data sharing end date for each data sharing request and developing a process to periodically monitor that SMUD staff have received the data destruction letter from the third party, developing a process to periodically assess the continued need of third party SCI data sharing requests that have no data sharing end date defined, and to document/clarify within ServiceNow and the procedures that the Director's approval of third party SCI data sharing requests includes an affirmation that the data sharing request is for primary business purposes. In addition, we noted an opportunity exists to ensure that data sharing procedures and reference guides are in alignment and reflect current processes.

While opportunities for improvement to the program were identified during this audit, the growth that the data sharing process has made since its start in late 2019 is very positive and impactful, and AQS commends everyone involved for their effort. AQS would like to thank IT Strategic Initiatives and Operations Technology-Data Governance, Cybersecurity, and Procurement, Warehouse and Fleet for their cooperation and support in conducting this audit.

ERM Dashboard	OP: Systems and IT – Privacy

Audit & Quality Services

Data Sharing

Audit Report 28007441

Data Sharing
Audit & Quality Services Report

Background:
SMUD's data sharing process began operating in late 2019 with an initial goal of identifying accountability for and closing gaps within SMUD's sharing of customer and employee Sensitive and Confidential Information (SCI). All data sharing requests involving the sharing of SCI with a third party require a Non-Disclosure Agreement (NDA). The core data sharing request and approval process as well as NDA request processing is supported by automated workflows deployed on the ServiceNow service management platform.

Data sharing is the process or act of copying or transferring SMUD data for storage and/or use in a third party's system(s). SCI is data or information that is classified as such according to MP 07.01.01.100, Sensitive and Confidential Information. This can be Critical Infrastructure Protection data, information related to SMUD's energy management system or grid, customer or employee personally identifiable information, strategic, intellectual property, or trade secret information.

Within IT Strategic Initiatives and Operations Technology, the Data Governance Program oversees the data sharing process, coordinates the data sharing request workflow, and educates staff regarding their data sharing roles and responsibilities. Cybersecurity administers the data sharing policy and the technical safeguards over data communication, including performing security assessments of the third party's system/data repository. Procurement Operations within Procurement, Warehouse & Fleet has an advisory and processing role as it pertains to data sharing; Procurement Operations approves the overall contract when the NDA is part of the contract.

Scope:
Our audit scope included the processes and procedures used by SMUD to manage the sharing of SCI with third parties. AQS examined data sharing agreements that were approved during the period of January 1, 2020 through October 31, 2021.

Objectives:
The objectives of the audit were to:

1. Evaluate whether SMUD's processes and controls over data sharing are being completed in accordance with applicable administrative and management procedures. Specifically:
   a. Whether a fully executed NDA was in place prior to sharing SCI with third parties.
   b. Whether the data sharing request was classified as either for primary or secondary business purposes.
   c. Whether a cybersecurity assessment was completed for requests involving the sharing of SCI with a third party.
   d. Whether proper approvals were obtained for the data sharing request.

2. Evaluate if shared information is appropriately returned or destroyed at the termination of data sharing agreements per the executed NDA.
3. Evaluate the education and awareness efforts related to the Data Sharing Program.

Summary:

AQS interviewed staff from Data Governance, Cybersecurity, and Procurement Operations to obtain an understanding of SMUD's data sharing process when sharing SCI with third parties. We then reviewed several documents such as policies, procedures, and a reference guide related to SMUD's data sharing process and noted an opportunity exists to ensure that the data sharing process reference guide and procedures are in alignment and reflect current processes. AQS sampled 12 data sharing requests that involved sharing SCI with a third party and noted that all 12 data sharing requests sampled had an executed NDA and all required approvals were obtained. In addition, AQS validated that the sample selected for testing was for primary business purposes and that the NDA data elements were consistent with the ServiceNow data domain information. However, the data sharing process and procedures should be enhanced to document/clarify that within ServiceNow, the Director's approval of third-party SCI data sharing requests includes an affirmation that the data sharing request is for primary business purposes.

To evaluate whether security assessments were completed in accordance with MP 07.03.01.122-Data Sharing, we selected a sample of 5 data sharing requests that involved sharing SCI with a 3rd party and noted that cybersecurity assessments were complete for SCI data sharing requests that went through the procurement process. However, one of the five items sampled did not have a security assessment completed due to a process gap for data sharing requests that do not go through the procurement process. An opportunity exists to enhance the data sharing process to ensure security assessments of the third party's system/data repository are completed for data sharing requests that do not go through the procurement process.

AQS also sampled five data sharing requests with data sharing end dates that were within our scope period to evaluate whether SMUD received confirmation that SCI shared with a third party was appropriately returned or destroyed at the termination of the contract/data sharing agreement. As a result of our testing, we noted that opportunities to enhance the data sharing process exist including capturing the actual data sharing end date for each data sharing request and developing a process to periodically monitor that SMUD staff have received the data destruction letter from the third party. Further, during our testing it came to our attention that there were several data sharing requests that did not have a data sharing end date populated within ServiceNow that were also listed as having a data sharing frequency of "Ongoing (12+ months)". AQS noted an enhancement opportunity to develop a process to periodically assess the continued need of third-party SCI data sharing requests that have no data sharing end date defined. Lastly, AQS evaluated the education and awareness efforts related to the data sharing program and found them to be sufficient with no exceptions noted.

Conclusion:

AQS completed an evaluation of the current processes and procedures for data sharing with a focus on the processes for sharing SCI with third parties. We identified that all data sharing requests sampled had an executed NDA, all required approvals were obtained, and that cybersecurity assessments were complete for SCI data sharing requests that went through the procurement process. In addition, AQS validated that the sample selected for testing was for primary business purposes and that the NDA data elements were consistent with the ServiceNow data domain information. AQS also evaluated the education and awareness efforts related to the data sharing program and found them to be sufficient. However, opportunities exist to enhance the data sharing process and procedures involving sharing SCI with third parties.

While opportunities for improvement to the program were identified during this audit, the growth that the data sharing process has made since its start in late 2019 is very positive and impactful, and AQS commends everyone involved for their effort.

Data Sharing

Observations

Observation 1 Security Assessments for non Procurement SCI Data Sharing Requests			
Risk Ranking	Category	Department(s) Responsible	Planned Completion Date
Medium	Process Improvement	IT Strategic Initiatives and Operations Technology	10/31/2022

Criteria:
MP 07.03.01.122, Data Sharing states all requests involving the sharing of SCI (for primary or secondary purposes) with a third party requires a security assessment of the third party's system/data repository approved by SMUD's Information Security Team.

Conditions:
AQS selected a sample of five data sharing requests that involved the sharing of SCI with a third party to evaluate whether a security assessment was completed. As a result of our testing, we noted that one of the five items sampled did not have a security assessment completed. This SCI data sharing request did not involve a procurement.

Causes:
Within ServiceNow, the security assessment review is tied to the procurement workflow. Not all SCI data sharing requests involve a procurement, and the data sharing request form that is submitted in ServiceNow does not initiate a workflow or subtask for a security assessment review.

Effects:
Data sharing requests involving the sharing of SCI with a third party that do not involve a procurement are not being routed to Cybersecurity for a security assessment review.

Recommendations:
AQS recommends Data Governance enhance the data sharing process when sharing SCI with a third party to ensure that a security assessment of the third party's system/data repository is completed for data sharing requests that do not go through the procurement process.

Management Responses:
The Data Governance Program agrees with AQS's recommendation. Data Governance Program will mature the data sharing process by adding an additional workflow task to include the Information Security Team. They will have their own task to complete a security assessment. This will ensure that a security assessment can be completed on all data sharing request that requires SCI to be shared. It is anticipated that all corrective actions will be implemented by October 31, 2022.

Observation 2 Data Destruction			
Risk Ranking	Category	Department(s) Responsible	Planned Completion Date
Medium	Process Improvement	IT Strategic Initiatives and Operations Technology	10/31/2022

Criteria:
MP 07.01.01.100, Sensitive and Confidential Information and MP 07.03.01.122, Data Sharing state that prior to releasing any SCI there must be a fully executed NDA. SMUD's NDA template language requires a data destruction letter to be provided by the third party within 30 days of the termination of the contract/data sharing agreement.

Conditions:
AQS sampled five data sharing agreements with data sharing end dates that were within our scope period to evaluate whether SMUD received confirmation that SCI shared with a third party was appropriately returned or destroyed at the termination of the contract/data sharing agreement. As a result of our testing, we noted:

- 3 of 5 items sampled did not have the correct data sharing end date noted in ServiceNow and the data sharing is currently ongoing.
- 2 of 5 items sampled had data destruction letters provided by the third party during our audit testing and as a result of AQS' requests to the SMUD contact person identified within the NDA.

Causes:
MP 07.03.01.122, Data Sharing is silent regarding SMUD staff's responsibility to obtain the data destruction letter from a third party at the termination of the NDA as well as the process to retain that information. Also, there is currently no consistent tracking of the actual data sharing end date or periodic monitoring of terminated data sharing requests that involve sharing SCI with third parties to validate that SMUD staff have received the data destruction letters.

Effects:
SMUD may not receive affirmation from the third party that it has destroyed shared SCI per the NDA terms. Also, SMUD may not be able to easily ascertain which data sharing agreements have ended to know which third party should have provided a data destruction letter or, if we have received it, where that data destruction letter is being retained.

Recommendations:
AQS recommends Data Governance:

a) Work with Cybersecurity to enhance MP 07.03.01.122, Data Sharing regarding staff's responsibility to obtain the data destruction letter from the third party for SCI data sharing requests as well as where the letter should be retained.
b) Capture the actual data sharing end date for each data sharing request that involves sharing SCI with a third party.

c) Develop a process to periodically monitor that SMUD staff have received the data destruction letter from the third party.
Management Responses: a. The Data Governance Program agrees with AQS's recommendation. Data Governance will partner with Cybersecurity to revamp the MP 07.03.01.122 to identify the responsible staff and their role to obtain the data destruction letter from the vendor for SCI data sharing request as well as where the letter should be stored. Data Governance will also work with responsible staff to develop a communication plan to notify Data Owners and Category Owners of the changes and address any questions they may have. b. The Data Governance Program agrees with AQS's recommendation. Data Governance will update the process to require a start and end date before closing the request in ServiceNow. c. The Data Governance Program agrees with AQS's recommendation. Data Governance will develop an annual process to ensure business areas have received a data destruction letter from the third party after the end date. In addition, we will work with all business area who own data and inform them about the new process and to get it implemented within their processes. It is anticipated that all corrective actions will be implemented by October 31, 2022.

Observation 3 Ongoing SCI Data Sharing Requests			
Risk Ranking	Category	Department(s) Responsible	Planned Completion Date
Medium	Process Improvement	IT Strategic Initiatives and Operations Technology	10/31/2022
Criteria: NIST 800-53 CA-3(c) Information Exchange control language includes the review and update of agreements.			
Conditions: During our testing it came to our attention that there were several data sharing requests that did not have a data sharing end date populated within ServiceNow that were also listed as having a data sharing frequency of "Ongoing (12+ months)". AQS inquired if there was a process to monitor SCI data sharing requests with third parties that have an ongoing data sharing period/no data sharing end date and determined that no process is currently in place.			
Causes: A process has not been developed to periodically assess the continued need for data sharing requests that involve sharing SCI with a third party that have an ongoing data sharing period/no data sharing end date noted within ServiceNow.			

Effects: Not monitoring the population of data sharing requests that involve sharing SCI with a third party that have an ongoing data sharing period/no data sharing end date may result in SMUD continuing to share SCI with a third party that may no longer need the data. In addition, periodic monitoring would allow SMUD to confirm that the data sharing is still for primary business purposes and that the data being shared is still consistent with the data domain and categories listed in ServiceNow and the NDA.
Recommendations: AQS recommends Data Governance develop a process to periodically assess the continued need of data sharing requests that involve sharing SCI with a third party with an ongoing data sharing period/no data sharing end date.
Management Responses: The Data Governance Program agrees with AQS's recommendation. Data Governance will develop a process to track data share requests that have been listed as ongoing. A part of that process will be to use the ongoing requests that are being tracked to reach out to the business area to confirm that there is an ongoing business need to continue sharing the data. It is anticipated that all corrective actions will be implemented by October 31, 2022.

Observation 4 Affirmation of Primary or Secondary Business Purpose			
Risk Ranking	Category	Department(s) Responsible	Planned Completion Date
Medium	Process Improvement	IT Strategic Initiatives and Operations Technology	10/31/2022
Criteria: MP 07.03.01.122, Data Sharing states that Directors have the responsibility to affirm that a given business purpose is considered a primary purpose. In addition, it states that when sharing SCI with a third party, data sharing requests must be classified as for primary or secondary purposes as all secondary purposes require additional action to be approved.			
Conditions: AQS sampled five data sharing agreements where SMUD shared SCI with a third party to determine if there was evidence of the Directors' affirmation of either primary or secondary business purposes. For the five items sampled, we observed that there is no documented affirmation from the Director that the SCI data sharing request is for either primary or secondary business purposes within ServiceNow as well as no clear indication within ServiceNow or procedures that the Director's approval includes an attestation that the request is for primary business purposes. AQS subsequently reviewed the business purpose stated for each of the five sampled data sharing requests and determined that they were for primary business purposes.			

Causes: SMUD relies on an unofficial policy that SCI will not be shared with a third party for secondary business purposes and therefore all data sharing requests approved in ServiceNow are for primary business purposes.
Effects: Though there is an unofficial policy that SCI will not be shared with a third party for secondary business purposes, Directors may not be aware that their approval in ServiceNow is also attesting that the data sharing request has been properly classified as for primary business purposes.
Recommendations: AQS recommends Data Governance document/clarify within ServiceNow as well MP 07.03.01.122 that for data sharing requests involving sharing SCI with a third party, the Directors' approval in ServiceNow includes an affirmation that the data sharing request is for primary business purposes unless otherwise specified within the data sharing request.
Management Responses: The Data Governance Program agrees with AQS's recommendation. Data Governance will partner with the ServiceNow administrator to update the data sharing request submission screen to include the approvals that are required when SCI is involved. In addition, Data Governance will partner with Information Security to update MP 07.03.01.122 to document what approval is needed when SCI data is being requested to be shared. It is anticipated that all corrective actions will be implemented by October 31, 2022.

Observation 5 Data Sharing Procedures			
Risk Ranking	Category	Department(s) Responsible	Planned Completion Date
Medium	Policy/Procedure	Cybersecurity	10/31/2022
Criteria: AP 01.01.02, Policies and Procedures states that administrative policies and management procedures promote consistency across departments, mitigate risks and protect the organization, clarify accountability for business outcomes, and communication expected behavior.			
Conditions: MP 07.01.01.100-Sensitive and Confidential Information, MP 07.03.01.122-Data Sharing, and the Data Sharing Process Reference Guide (which is linked within MP 07.03.01.122) needs to be updated to ensure they are in alignment and reflect current processes. For example: • MP 07.01.01.100 does not reference MP 07.03.01.122 within the "Sharing Information" section or in the "Related References" section.			

• The Data Sharing Process Reference Guide describes included and excluded categories for data sharing requests which is not discussed within MP 07.03.01.122. • The "Data Sharing Approvals" section of MP 07.03.01.122 is not in alignment with the Data Sharing Process Reference Guide and the current process. • MP 07.03.01.122 and the Data Sharing Process Reference Guide are not in alignment regarding anonymized data.
Causes: MP 07.01.01.100, MP 07.03.01.122 and the Data Sharing Process Reference Guide have not been updated to reflect the current data sharing process.
Effects: SMUD staff may not have a clear understanding of the Data Sharing process.
Recommendations: AQS recommends Cybersecurity update MP 07.01.01.100, MP 07.03.01.122 and the Data Sharing Process Reference Guide to ensure they are in alignment and reflect current processes.
Management Responses: Cybersecurity agrees with AQS' recommendation regarding Observation #5 – Data Sharing Procedures. Cybersecurity will ensure that the Data Sharing Process Reference Guide and SMUD policies addressing sensitive and confidential information and data sharing (currently MP 07.01.01.100-Sensitive and Confidential Information and MP 07.03.01.122-Data Sharing) are aligned with current processes, to include updates made as a result of the observations shared in this report. It is anticipated that all corrective actions will be implemented by October 31, 2022.

Appendix A - Observation Definitions

Observation: Audit observations are risk ranked using the guidance below and focused on policy, compliance and operational improvement opportunities of the audited area.

Risk Rankings:

Extremely High

- Material loss of assets or financial impact; or
- Severe legal, regulatory or compliance sanctions; or
- Cessation of business services for the foreseeable future; or
- Critical impact in achieving SMUD's goals and objectives; or
- Major deterioration in customer metrics and surveys. Irreparable negative media coverage and damage to SMUD's reputation; or
- Widespread loss of confidence from employees. Unable to fill critical positions for a long period of time

High

- Significant loss of assets or financial impact; or
- Significant legal, regulatory or compliance sanctions; or
- Widespread disruption of service levels and interruption of business functions; or
- Significant delays or modification of operational goals and objectives; or
- Significant deterioration in customer metrics and surveys; Significant negative media and erosion of trust; or
- Significant loss of confidence from employees. Significant increase in unanticipated employee separations. Slight impact to fill critical positions

Medium

- Moderate loss of assets or financial impact; or
- Moderate legal, regulatory or compliance sanctions; or
- Moderate operational impact to service levels or business disruption; or
- Moderate delays or modification to goals and objectives; or
- Moderate decline in customer metrics and surveys. Modest negative media; or
- Moderate loss of confidence from employees. Moderate increase in unanticipated employee separations. Little to no impact to critical positions

Low

- Minor loss of assets or financial impact; or
- Minor legal, regulatory or compliance sanctions; or
- Minor operational impact to service levels and business activity; or
- Minor delays or modifications to goals and objectives; or
- Slight decline in customer metrics and surveys. Limited public criticism; or
- Minor loss of confidence from employees. Slight increase in unanticipated employee separations. No impact to critical positions

Components:

Criteria – The standards, measures, or expectations used in making an evaluation and/or verification (the correct state)
Conditions – The situation that you found, supported by evidence and characterized by facts, measurements, examples, etc. (the current state)
Causes – The reasons for the difference between expected and actual conditions
Effects – The actual or potential risks or exposure the organization faces if the causes and the conditions continue.