

Exhibit to Agenda Item #1

Provide the Board an informational presentation and executive summary on the 2030 Zero Carbon Plan Progress Update.

Board Energy Resources & Customer Services Committee and Special SMUD Board of Directors Meeting

Wednesday, April 19, 2023, scheduled to begin at 6:00 p.m.

2030 Zero Carbon Plan

2022 accomplishments
2023 priorities

April 19, 2023

Powering forward.
Together.

Board Energy Resources & Customer Services Committee and Special SMUD Board of Directors Meeting



Agenda

- **Zero carbon overview** – *Joel Ledesma, Director Power Generation*
- **Utility-scale** – *Joel Ledesma*
 - New Tech
 - Proven Clean Technology
- **Customer Programs & Initiatives** – *Ed Hamzawi, Director Advanced Energy Solutions*
 - Program Portfolios
 - Communications, Marketing & Outreach
 - Community Impact Plan

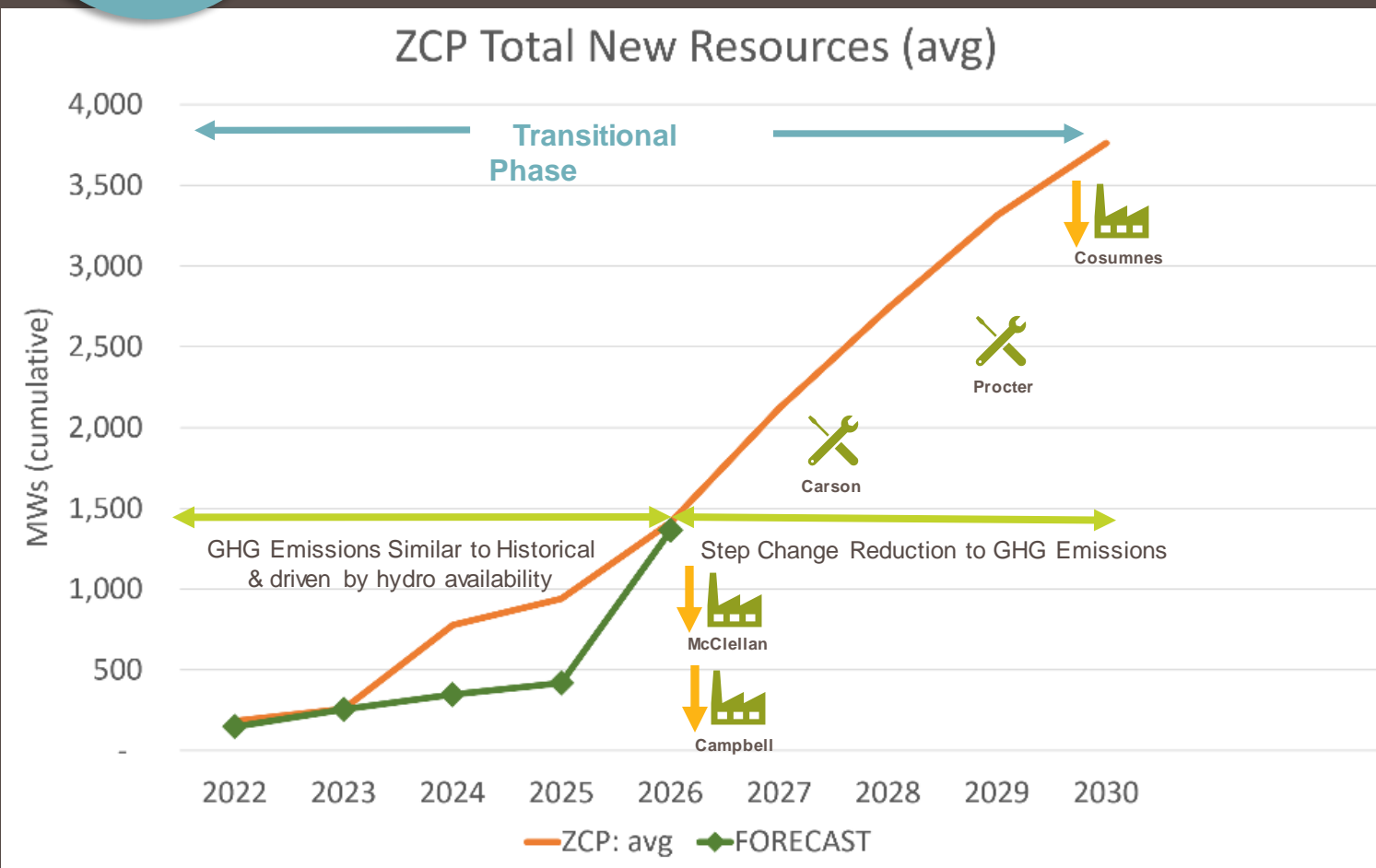
Zero carbon overview





Total new renewable resources (MWs) including storage & Distributed Energy Resources

Work in progress vs 2030 Zero Carbon Plan



- Transitional phase now – 2030.
- Steep climb to achieve goals.
- Uncertain economy continues to create challenges.
- Developing pipeline of projects for future years.
- Greenhouse gas emissions (GHGs)
 - Prior to 2026: Similar to historical & driven by hydro
 - After 2026: Step change reduction after large local utility scale solar + battery projects come on-line



SMUD's Greenhouse Gas Emissions

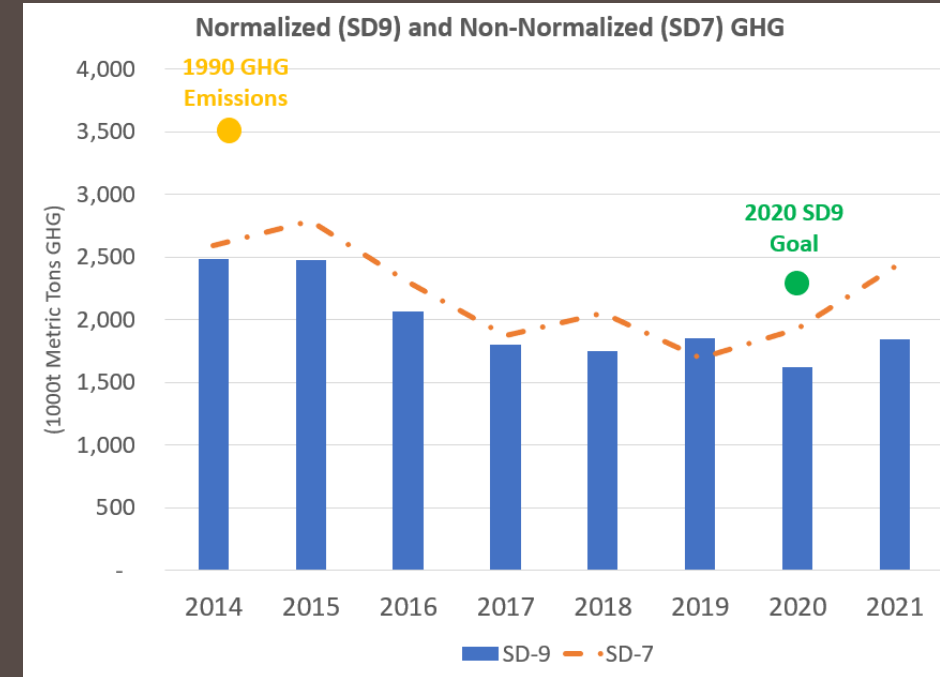
Growing our Carbon-Free Renewable Resources

- 2010-23: + 1000 MW
- 2021-23: + ~370 MW
- 2024- : > 1500 MW in various stages of planning & development
 - Many locally to support natural gas transition plan
- More to develop as part of the ZCP

Renewable Resource Additions 2010-2023

Resource Type	MW	Equivalent Annual GHG Emissions Reductions (MT)	Equivalent Light Duty Vehicles Removed from Road
Wind	378	512,014	110,586
Solar	442	290,865	62,822
Geothermal	151	441,908	95,445
Biogas/Biomass	19	47,541	10,268
Hydro	10	5,699	1,231
Total	1,000	1,298,026	280,351

**Approximate GHG reductions based on SMUD's thermal fleet average carbon intensity factor of 0.39 MTGHG/MWh.*



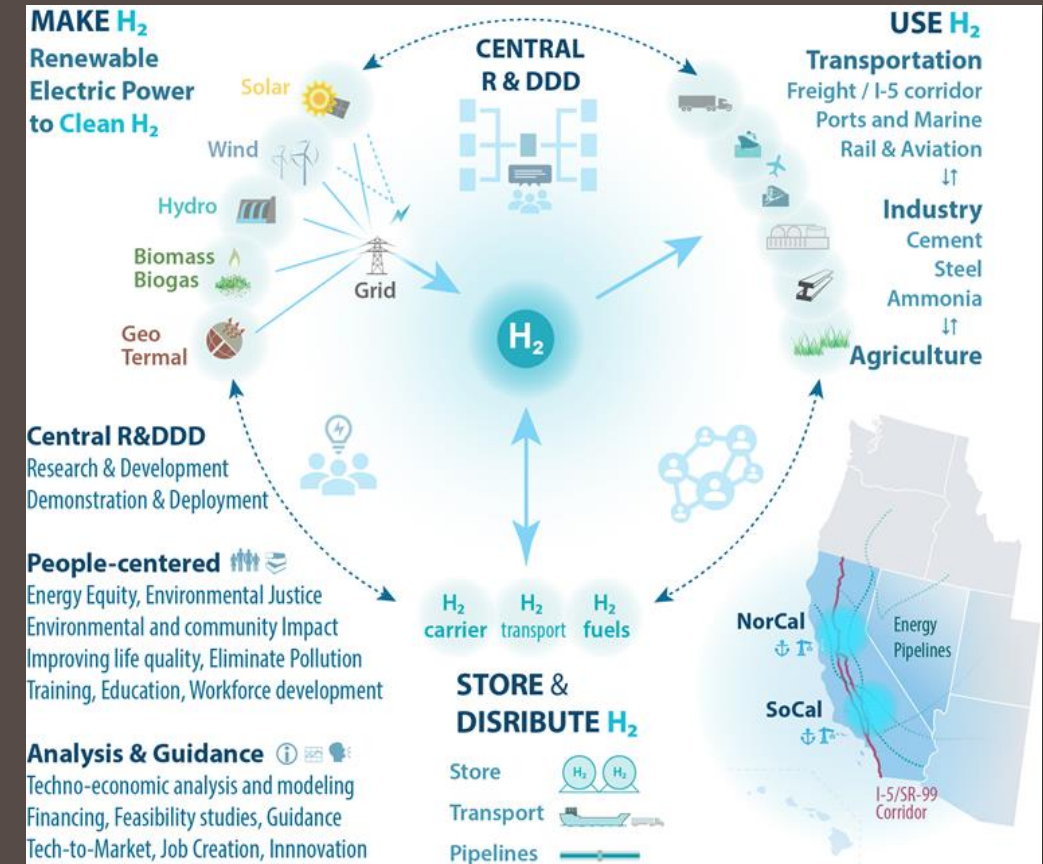
Utility-Scale



Hydrogen – ARCHES – State hub concept

New Tech

- Department of Energy (DOE) regional Clean Hydrogen Hubs (H2Hubs) program.
- **\$7 billion** to establish **8 -10** H2Hubs across U.S.
- Selection of regional hubs expected in fall 2023.
- ARCHES encouraged by DOE to submit full-length proposal.
- SMUD concepts are “alternatives” in the ARCHES proposal.
 - **Concept 1:** Electrolytic hydrogen production to support power, transportation & industrial applications.
 - **Concept 2:** Thermochemical conversion of biomass to hydrogen to support power, transportation and industrial applications.





Long-duration energy storage & carbon capture & storage

New Tech



Long-duration energy storage

- ESS partnership – Phase 1
 - Demonstration (4 MW/24 MWH).
 - Construction began April 2023.
 - Expected COD Fall 2023.
- Pursuing another technology to pilot.



Carbon capture & storage

- Exploring potential PPA for carbon capture with Calpine at Sutter Energy Center.



Calpine Sutter – 100 MW geothermal

Proven Clean Tech

- SMUD Board approval on March 16, 2022.
- Contract took effect on Jan. 1, 2023.
- 10-year power purchase agreement.
- 100 MWs of energy from Calpine's operations at The Geysers.
- Adds 100 MWs of geothermal energy to SMUD's portfolio, enough to power about 100,000 homes for a year. The addition of this renewable energy source is equivalent to removing 342,000 metric tons of greenhouse gas emissions.

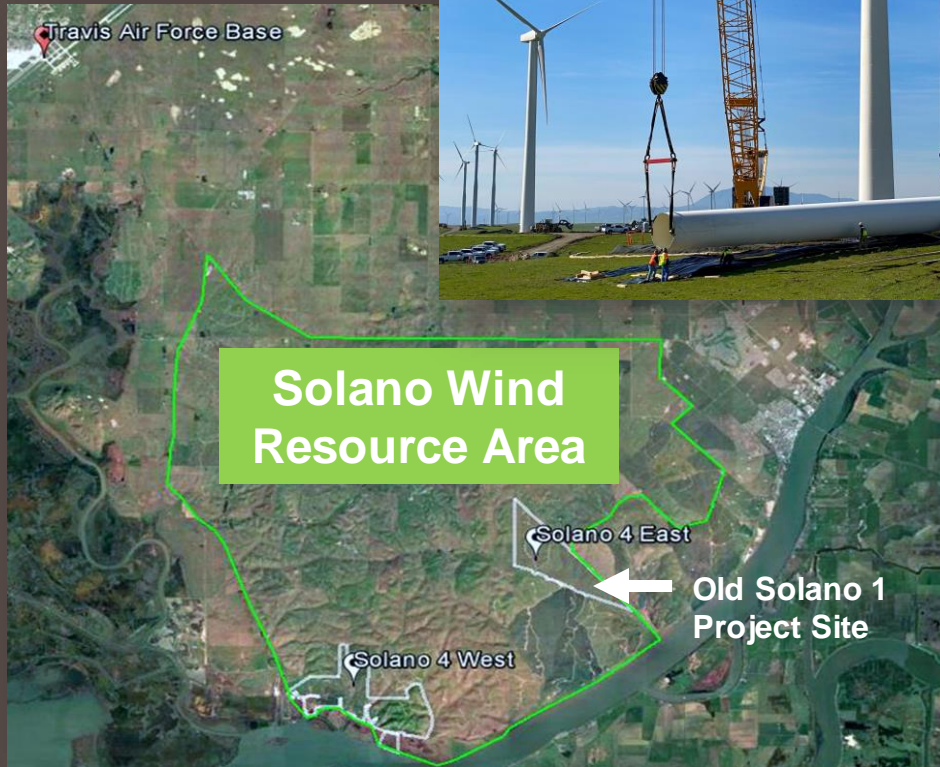


Located north of San Francisco, [The Geysers](#) is the single largest geothermal electrical operation in the world.



Solano 4 Wind project

Proven Clean Tech

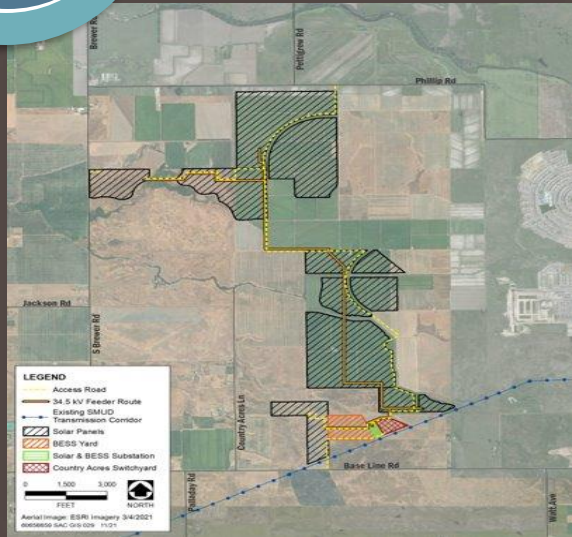


- **Decommissioning Phase: Solano 1**
(Completion May 2023)
 - Removing 23 wind turbines.
 - 0.66 MW each, 15 MW total.
- **Construction Phase: Solano 4**
(Begins April 2023)
 - Installing 19 wind turbines:
9 Solano 4 East, 10 Solano 4 West.
 - 4.5 MW each, 85.5 MW total.
 - Commercial Operation Date expected May 2024.
- **SMUD Solano assets**
(May 2024)
 - Solano 2, 3, & 4 will have a total installed capacity of 300 MW.



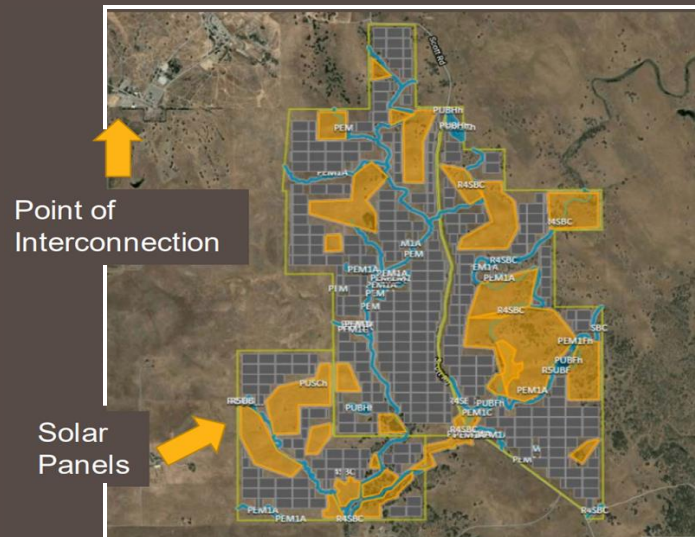
Solar & storage

Proven Clean Tech



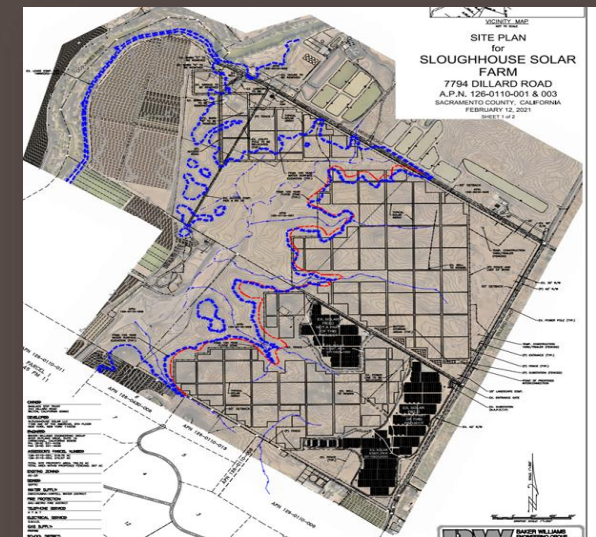
344 MW / 172 MW

Country Acres (PPA)



200 MW / 100 MW

Coyote Creek (PPA)



50 MW

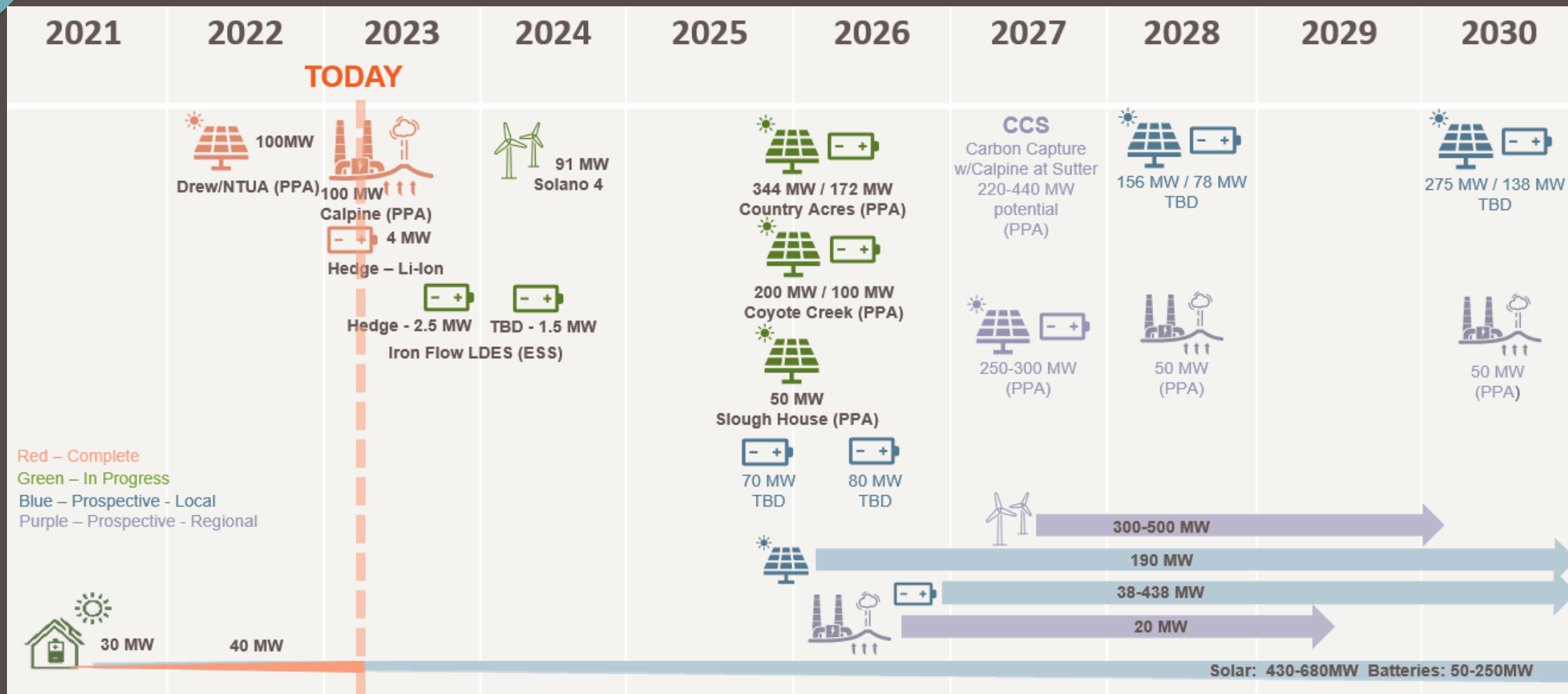
Sloughhouse (PPA)

All 3 projects in Permitting Phase. Commercial Operation Date forecast of early 2026.



2022 accomplishments / 2023 priorities

Proven Clean Tech

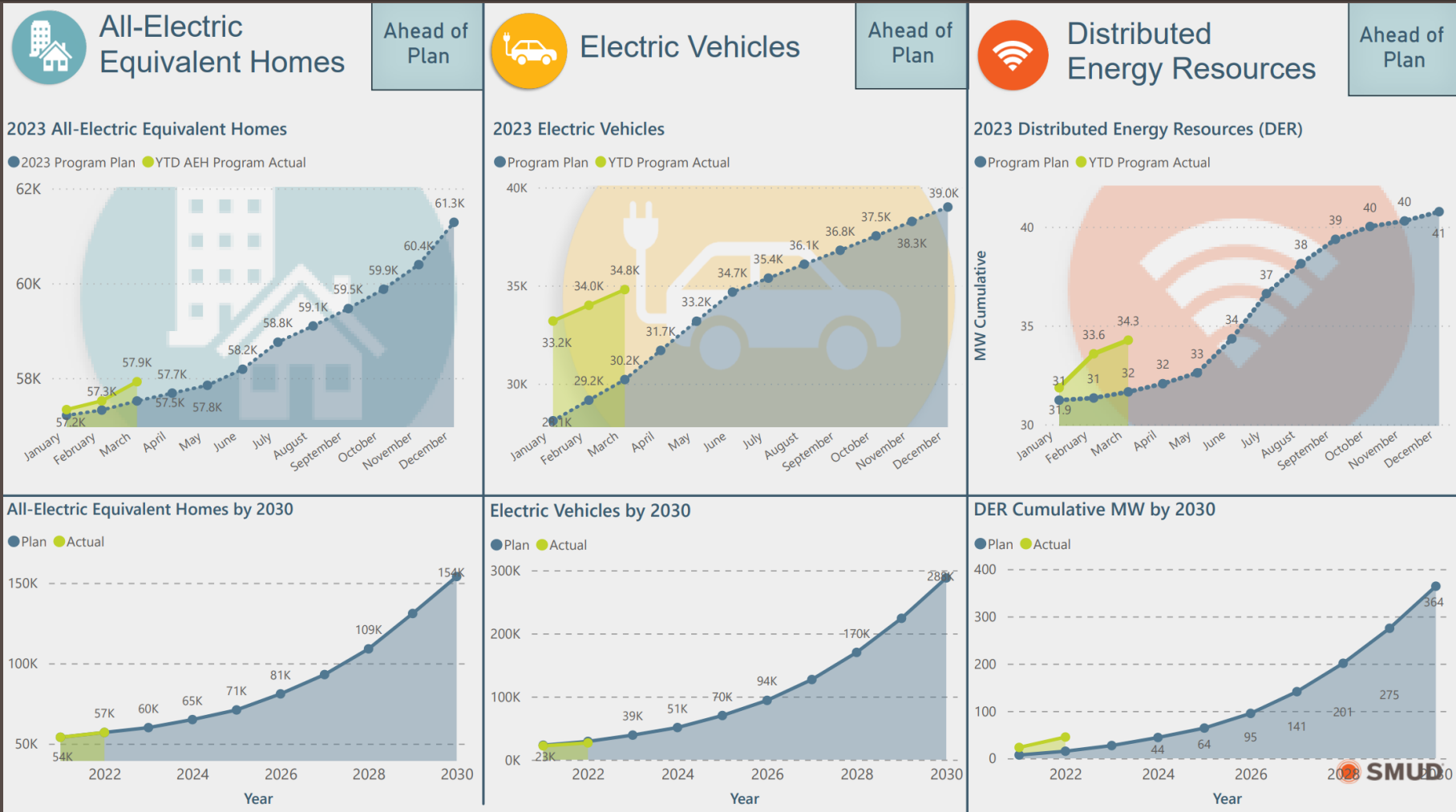


Customer Programs & Initiatives



2022 accomplishments / 2023 priorities

Customer Zero Carbon Program Portfolios





Key metrics & milestones

Building Electrification and Energy Efficiency

	2022 Final	2023 March Actual	2023 Goal
Heat Pump HVAC Conversions	2,109	510	2,180
Heat Pump Water Heater Conversions	897	191	1,000
Induction Cooktop Conversions	256	84	300
All Electric New Homes & Multifamily Units Constructed	1,299	158	750
Multifamily Units Retrofitted	954	0	500
Commercial Retrofit Projects	311	44	500
All Electric Equivalent Homes (Cumulative)	57,000	57,925	61,287

In progress:

- Relaunch of Home Electricity Reports
- Community Impact Plan offerings
- HPWH SMUD Energy Store turnkey solution
- Carbon free loans





2022 accomplishments / 2023 priorities

Community Impact Plan: Ensuring no community left behind

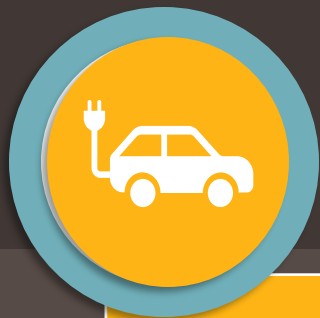
2022 accomplishments:

- **Residential Neighborhood Electrification** – Gardenland (150+ measures).
- **Commercial Business District Electrification** – Partnership with Sacramento Hispanic Chamber of Commerce (ARPA funds) in Gardenland.
- **Regional Workforce Development** – 90 people received workforce education, 105 people received training & skills development, & 16 people in job placement.
- **Inclusive Economic Development** – expanded partnerships with 14 Property Business Improvement Districts.

2023 priorities:

- **Carbon Free Loan program** – Financing options for median-income customers.
- **Residential & Commercial Electrification** – North Highlands, Meadowview, Gardenland.
- **Shine Awards** – Increased investment to ensure reach.
- **Community Ambassadors** – Targeted outreach and education.





Key metrics & milestones

Transportation Electrification

	2022 Actual	2023 March Actual	2023 Goal
Residential EV Chargers Installed	577	300	500
Commercial EV Chargers	349	42	355
Residential EV Rate Participants (Cumulative)	17,229	19,027	22,620
E-Fuel Solutions Projects	-	0	4
Managed Charging Pilot Participants (Cumulative)	297	330	1000
# of Light Duty EV's in Service Territory (Cumulative)	32,396	34,796	39,000



In progress:

- Expanding home charger contractor network
- ChargeReady Community (REACH) project
- SMUD Energy Store home charger installation offering
- Vehicle-To-Grid (V2G) research and pilot projects



Vehicle to Grid (V2G) Research & Pilots

Electric school bus V2G

- 24 Chargers & buses deployed at Twin Rivers Unified School District.
- Awaiting charger commissioning then testing.
- Seeking additional candidate school bus fleets.



Light-duty V2G

- Initial testing completed - fleet Nissan Leaf with Fermata bidirectional charger.
- Federal grant applications partnered with GM, Nissan and Ford.
- Customer pilots in planning.





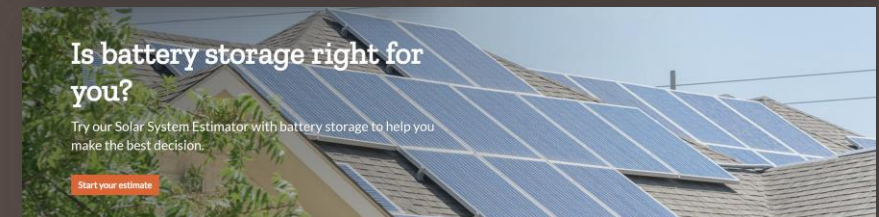
Key metrics & milestones

Load Flexibility and Battery Storage

	2022 Actual	2023 March Actual	2023 Goal
My Energy Optimizer Smart Thermostats (Cumulative)	12,503	16,119	16,000
My Energy Optimizer Starter Batteries (Cumulative)	144	218	306
My Energy Optimizer Partner+ Batteries	-	0	400
Peak Conserve (NextGen ACLM) enrollments	-	0	2,000
PowerDirect Commercial Customers (Cumulative)	36	42	82
Total MW (Cumulative)	30	34	41

In progress:

- My Energy Optimizer Partner+ Battery launch
- My Energy Optimizer Thermostat Critical Peak Pricing expansion
- Peak Conserve (Next Gen ACLM) launch
- PowerDirect small-medium businesses expansion





Key metrics & milestones

Green Pricing

	2022 Actual	2023 March Actual	2023 Goal
Residential Greenergy customers	65,257	66,296	69,000
Commercial Greenergy customers	1,621	1,582	1,600
Neighborhood SolarShares homes (Cumulative)	489	489	796
Commercial SolarShares Customers / Accounts	30 / 436	30 / 437	30 / 436
Total Qualifying GWh Sales	762	160	770
# of trees planted	9,525	2,302	10,000



In progress:

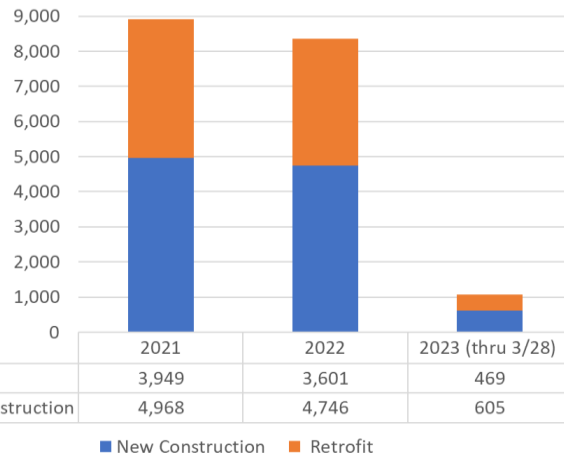
- Development of Existing Home SolarShares program
- Planning for Commercial Renewable Shares offerings
- Planning for Community Solar for schools & nonprofits
- Expanding community tree plantings



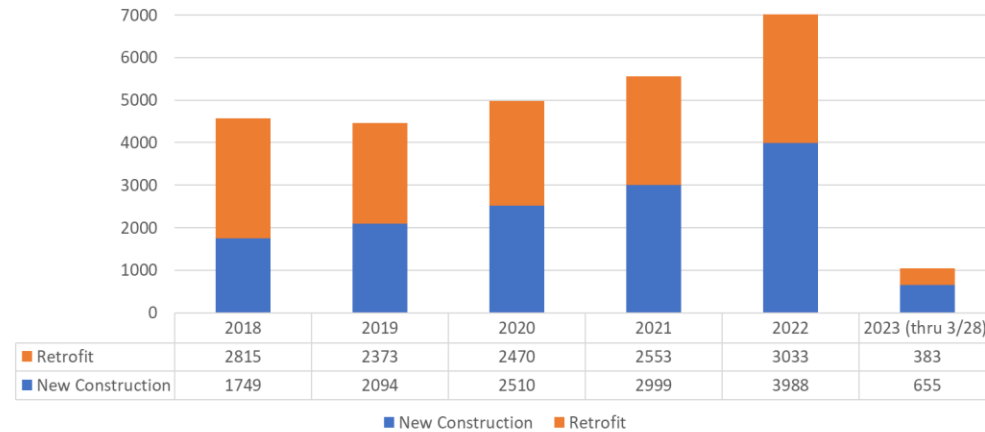
2022 accomplishments / 2023 priorities

Solar: Behind the Meter

Solar Applications



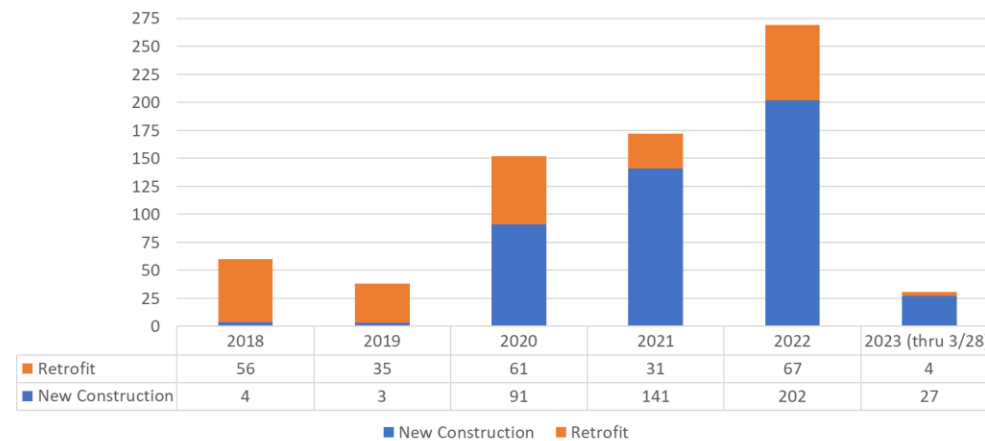
Solar Installations - Residential



Solar MWs



Solar Installations - Commercial



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