

# Exhibit to Agenda Item #1

Provide the Board with external and internal presentations in support of SMUD's **Clean Transportation Strategy**.

Board Strategic Development Committee and Special SMUD Board of Directors Meeting

Tuesday, October 8, 2024, scheduled to begin at 6:00 p.m.

SMUD Headquarters Building, Auditorium

# The big picture

## Key Policy Milestones:

- By 2027 – 100% of state, local and agency fleet vehicle purchases must be ZEVs under the ACF Rule
- By 2030 – SMUD to see 6x increase in light-duty Electric Vehicles (EVs), 30x for medium/heavy-duty (MHD) EVs
- By 2035 – All new purchases of light-duty vehicles (LDV) must be zero emission (ZE)
- By 2042 – All new purchases of medium-heavy duty (MHD) vehicles must be ZE

## Building on Momentum:

25% EV sales share in 2023

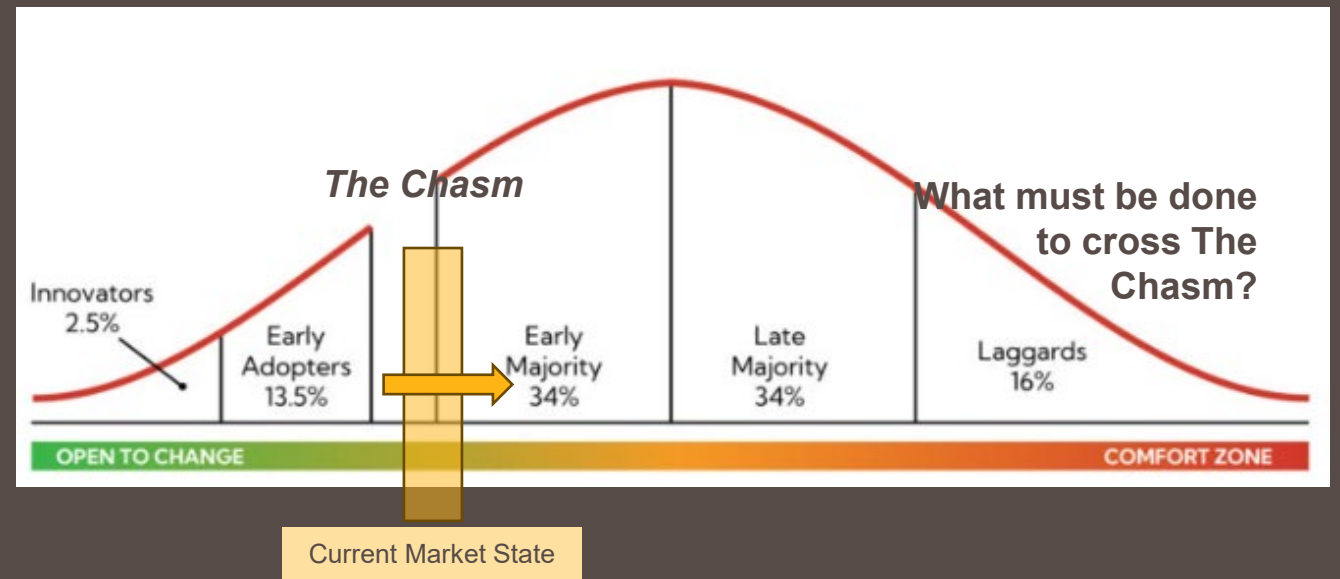
### Customer Experience

- Charging now #1 concern for new buyers
- More than 90% of charging is at home

### SMUD Progress Against CEC 2030 Goal

- DCFC: 38% complete
- Public & Workplace: 18% complete
- MFH: 2% complete

## The State of Light-Duty EV Adoption



ACF: Advanced Clean Fleets LDV: Light-Duty Vehicle MHD: Medium- and Heavy-Duty (vehicles) ZEV: Zero [tailpipe] Emissions Vehicle

# Impacts of Proposed Amendments to the CARB LCFS Rule

## Challenges:

- LCFS credit values currently at historic lows (~\$50)
- Wide variability in forecasts & potential budget impacts – forecasts range from \$50 to ~\$200 post enactment

## Proposed CARB Changes

- Reduces SMUD's contribution to CFR program from 45% to 25%
- Authorizes use of holdback funds for upstream infrastructure
- Introduces 9% step-down in carbon intensity & auto-acceleration feature to bolster and re-stabilize credit prices

**If enacted,** SMUD would realize an **immediate 20% bump** from increased holdback to current \$10M clean transportation budget **plus upside from higher credit values**

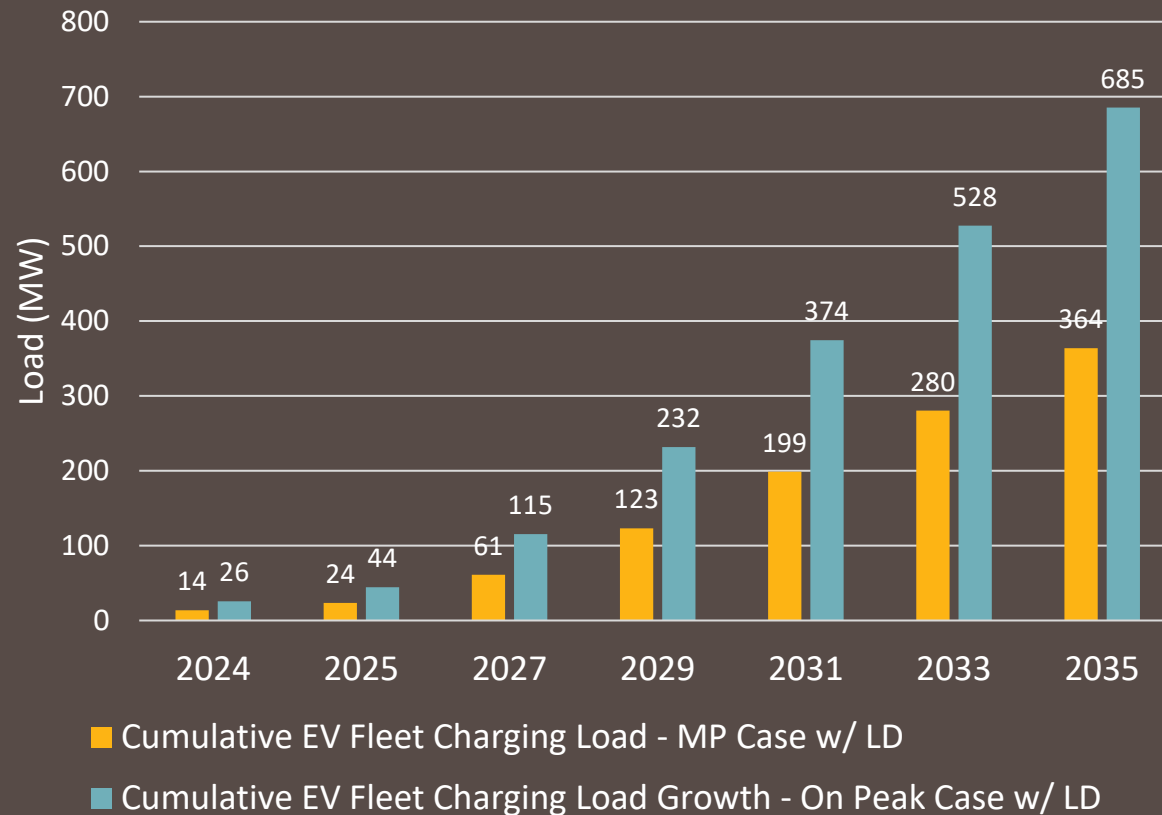
**CARB:** California Air Resources Board  
**CFR:** Clean Fuel Rewards

**LCFS:** Low Carbon Fuel Standard  
**MHD:** Medium & Heavy Duty (vehicles)

# Impacts of EV adoption on Fleet Load Growth

## Fleet Load Forecast

### Managed Peak (MP) vs On-Peak (OP) Charging



- Significant grid build out anticipated
- Currently seeing mild increase in service request load
- Substantial cost avoidance possible through managed charging
- Redoubling efforts to pilot & deploy managed charging & V2X technologies
- Opportunities for zero carbon and renewables integration

LD: Light-Duty (EVs)      V2X: Vehicle-to-Anything (devices, buildings, etc.)

# SMUD's Enterprise EV Strategy



## Grid & Charging Infrastructure

Align grid and charging infrastructure to achieve 2030 electric vehicle goals



## Customer Education & Experience

Customers contact SMUD first as their trusted advisor and partner to seamlessly transition to electric mobility



## New Technology/Innovation

Embrace innovation to optimize customer investments that increase value for customers and the grid



## Equitable Access

Provide equitable access to affordable clean mobility



## Workforce Readiness

Robust workforce development supporting equity job creation



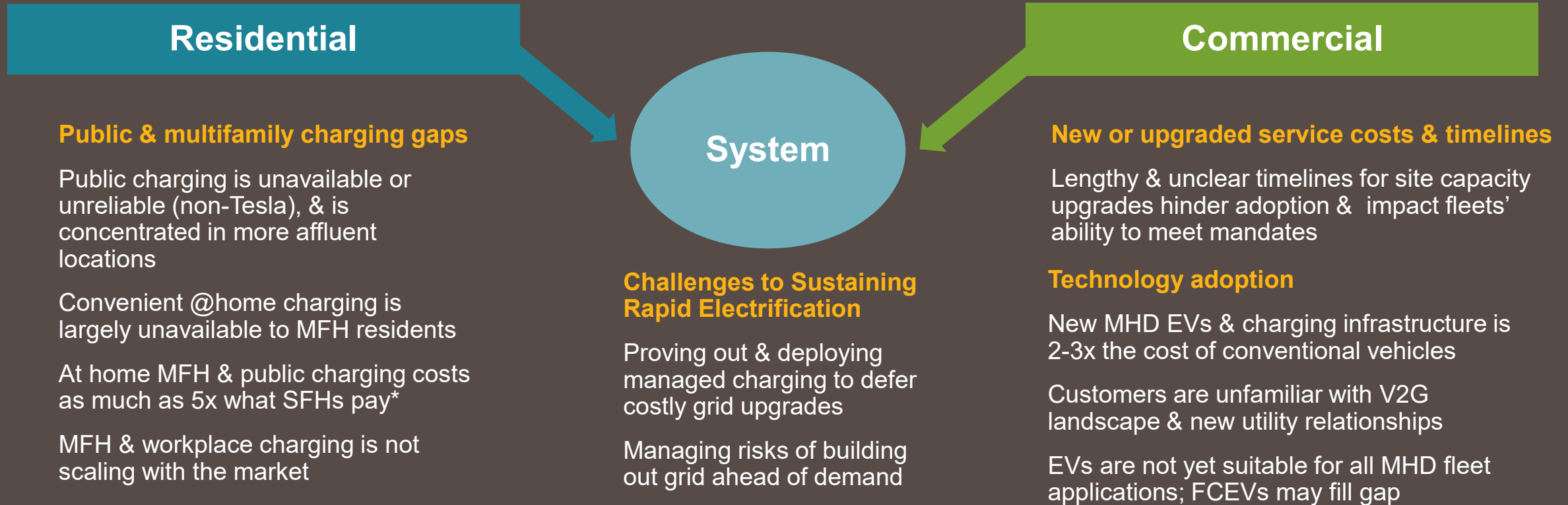
## Regional Collaboration & Investment

Work with regional partners to secure new investments and grants

# Strategy Evolution

		2018 – 2024	2025 on
<i>Challenge</i>	<b>Cust.</b>	Little awareness, high-cost premium, range anxiety, model availability, undertrained dealerships	Poor charging availability, reliability, affordability, & overall customer experience; meeting ACF decarbonization timelines
	<b>SMUD</b>	Understanding distinct needs of EV customers, developing tools, expertise, & processes to meet needs	Meeting the needs of Multifamily & fleet customers; enabling & scaling equitable & grid-friendly EV growth
<i>Targeted Customers</i>	<b>LDV</b>	Innovators, pre-"chasm" Early Adopters Higher income, Single Family Homeowners	Early Majority ("Crossing the Chasm") Broader income, Multifamily residents & renters
	<b>MHD</b>	Innovators (e.g., Pepsi Co)	Innovators & Early Adopters
<i>Strategy</i>		<ul style="list-style-type: none"> <li>• Increase awareness &amp; familiarize customers with the EV lifestyle</li> <li>• Inform &amp; incentivize customers &amp; dealers</li> <li>• Deploy tools &amp; resources</li> <li>• Shift charging from peak to overnight</li> <li>• Become a trusted advisor to customers</li> <li>• Address demand charge concerns</li> </ul>	<ul style="list-style-type: none"> <li>• Innovative charging solutions for low-income (LI) &amp; multifamily housing (MFH) residents &amp; MHD fleets</li> <li>• Grid-friendly end-to-end "Whole Solutions" for convenient, reliable, and affordable EV charging</li> <li>• Proactive planning for mass market ZEV adoption &amp; MHD market growth</li> </ul>

# Existing & Future Challenges



Strategy aims to **improve customer experience & mitigate future grid impacts:**

- To meet mass market LDV adoption in line with CA State goals (ACCII)
- To support early MHD adopters & proactively plan for ACF mandates

# Challenges & Strategy: Residential

**Challenge:** Prove out & scale grid-friendly charging solutions that improve convenience, affordability, & CX of EVs

## Near to Medium Term (2 – 5 years)



## Longer Term (5+ years)

### Grow & Improve Charging

- Build a SMUD-branded public EV charging network
- Launch network eRoaming platform, Pricing Program, & EV App
- Reposition SMUD eFuel to facilitate charger build out
- Set charger deployment targets
- Develop/procure map-based tools
- Right-size MFH charging solutions
- Add a workplace charging program
- Aggressively pursue and win grants
- Develop workforce training pipeline
- Attract inclusive economic development
- Develop internal capacity to advise customers

- Support expansion of full charging ecosystem serving all customers
- Activate grid interactive applications

### Prepare the Grid

- Launch managed charging program
- Add daytime period to our EV rate
- Pilot and launch initial V2G offering
- Integrate DERs & novel rates under a “Whole Solutions” approach

- Deploy expanded V2X solutions
- Are we achieving downward pressure on rates?

**CX:** Customer Experience

**DER:** Distributed Energy Resource

**V2G:** Vehicle-to-Grid

**V2X:** Vehicle-to-Anything (devices, buildings, etc.)



# Challenges & Strategy: Commercial

**Challenge:** Accelerate fleet electrification via scalable, grid-supportive software & hardware site energization options

## Near to Medium Term (2 – 5 years)



## Longer Term (5+ years)

### Fleet Energization

- Demonstrate & scale flexible energization ALMS solutions & integrate DERMs
- Develop specific vehicle-class hardware solutions to mitigate grid impact leveraging grants & partnerships
- Streamline fleet engagement via the SMUD eFuels Program to better align vehicle delivery & energization schedules

- Expand ALMS controls scheduling & integrate with DERMs
- Translate suite of grid-supportive hardware solutions to program delivery
- Integrate customer engagement process with system planning to enhance substation load forecasting

### Grid Integration

- Demonstrate V2G (or V2X) technical capabilities & deploy solutions to wider customer base to test operational integration
- Classify V2X applications by fleet type & associated grid value thru IDRPs process

- Scale grid-supportive & fleet-enabling V2X solutions to relieve nodal & sub-nodal system constraints
- Integrate V2X solutions to DERMs for DSO control & dispatch

**ALMS:** Automated Load Managed System  
**DERMs:** Distributed Energy Resource Management System  
**DSO:** Distribution System Operators

**IDRP:** Integrated Distribution Resource Plan  
**V2G:** Vehicle-to-Grid  
**V2X:** Vehicle-to-'Anything' (Buildings, cars, etc.)

# Hydrogen & FCEV: What we know today

## Cost Trends

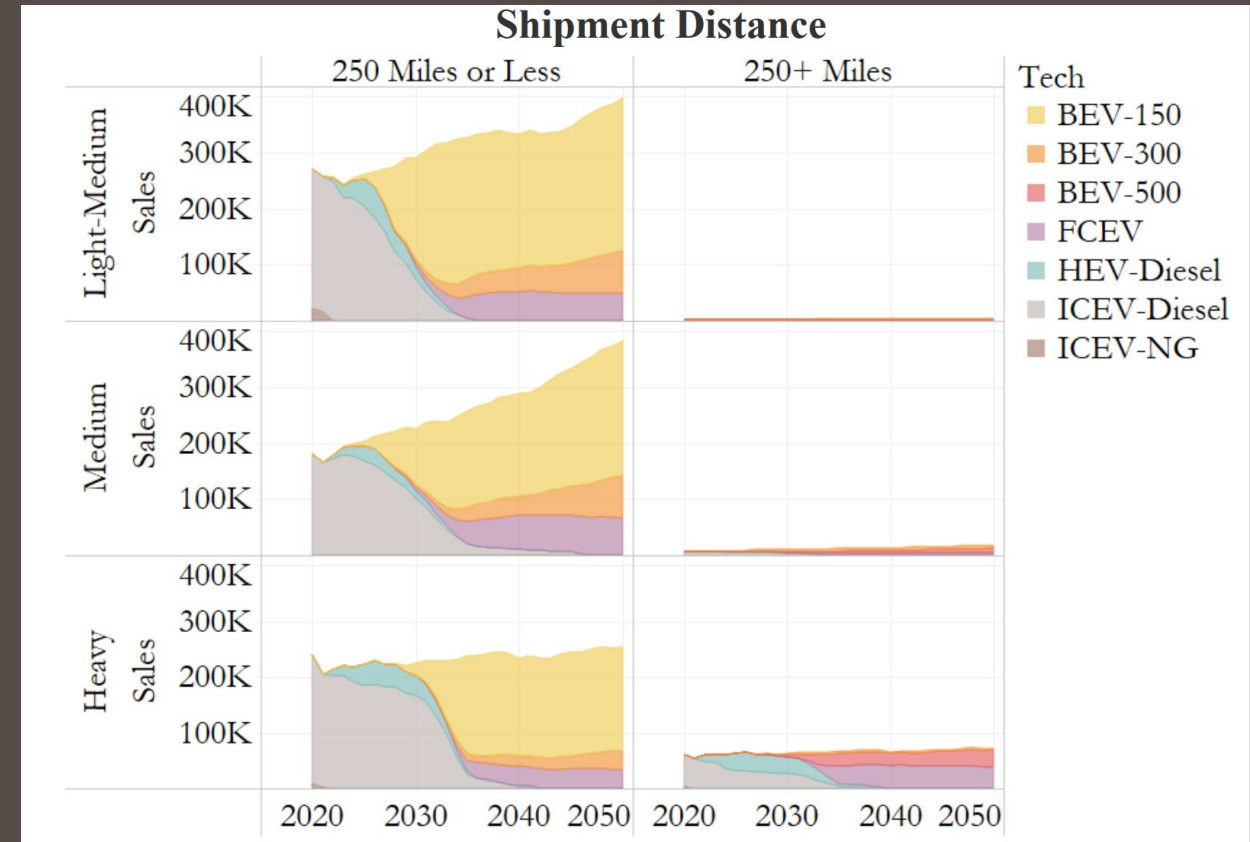
- H2 fuel cost must **decrease ~82%** to <\$6/kg-delivered to reach BEV cost parity

## Technology Trends

- FCEV end-to-end efficiency is **~3x lower** than BEV
- High CAPEX & immature H2 production & transport network may impede widespread adoption

## Market Trends

- NREL studies estimate MHD EV sales 20x greater than FCEV in 2030, 5x in 2050
- FCEV most suitable for 500+ mile applications



**BEV:** Battery Electric Vehicle  
**FCEV:** Fuel Cell Electric Vehicle

**NREL:** National Renewable Energy Laboratory  
**MHD:** Medium-Heavy Duty

# Meeting the Challenges of Tomorrow

**Beyond 2025**, the industry faces **two key challenges** in clean transportation space:

- Meeting capacity needs for mass market zero emission LDV adoption in line with State goals (ACCII)
- Supporting early MHD adopters & proactive grid planning for ACF mandates

**To meet these challenges, we will focus on:**

- End-to-End “Whole Solutions” that deliver convenient, affordable, & grid-friendly charging to underserved customers and MHD fleets
- Early customer engagement, increased transparency, & streamlined processes
- Proactive planning & investment for mass market LD ZEV adoption & MHD ZEV growth
- Innovating to secure external funds that magnify impact & solve for key segments

**ACCII:** Advanced Clean Cars II

# Questions?