

Vehicle to Everything (V2X) Update

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Powering forward.
Together.



From March 16, 2022 Board Presentation

Flexible pathway to zero carbon

~\$2.5 billion investment

Natural gas generation repurposing
Retire 2 power plants by 2025 and retool remaining 3 to minimize emissions

Proven clean technology

- Expand SMUD's renewable and battery storage resources by 3.5x
>3,000 MW of new renewable energy & storage – equivalent to energy needs of more than 600,000 homes
- Support customer resources
Growing rooftop solar and batteries

90% reduction of greenhouse gas emissions

~\$2 billion investment

New technology & business models

Pilot & scale new projects and programs

- 2x savings from energy efficiency & building electrification
- Energy storage & demand flexibility
- Virtual power plants & vehicle-to-grid technology**
- New grid-scale technologies

Financial

- Pursue grants & partnerships
- Limit rate impacts to rate of inflation

Thousands of new regional clean tech jobs

Maximize community benefits

- Keep affordable rates & reliable power
- Improve local air quality & overall community health
- Reduce regional impacts of carbon – drought, wildfires & extreme weather
- Create regional clean tech jobs
- Strengthen all communities
- Support under-resourced communities
- Involve our customers & community in this transition

Goal:

Eliminate CO₂ from SMUD's power supply

100% Zero carbon by 2030

2022 - Plan

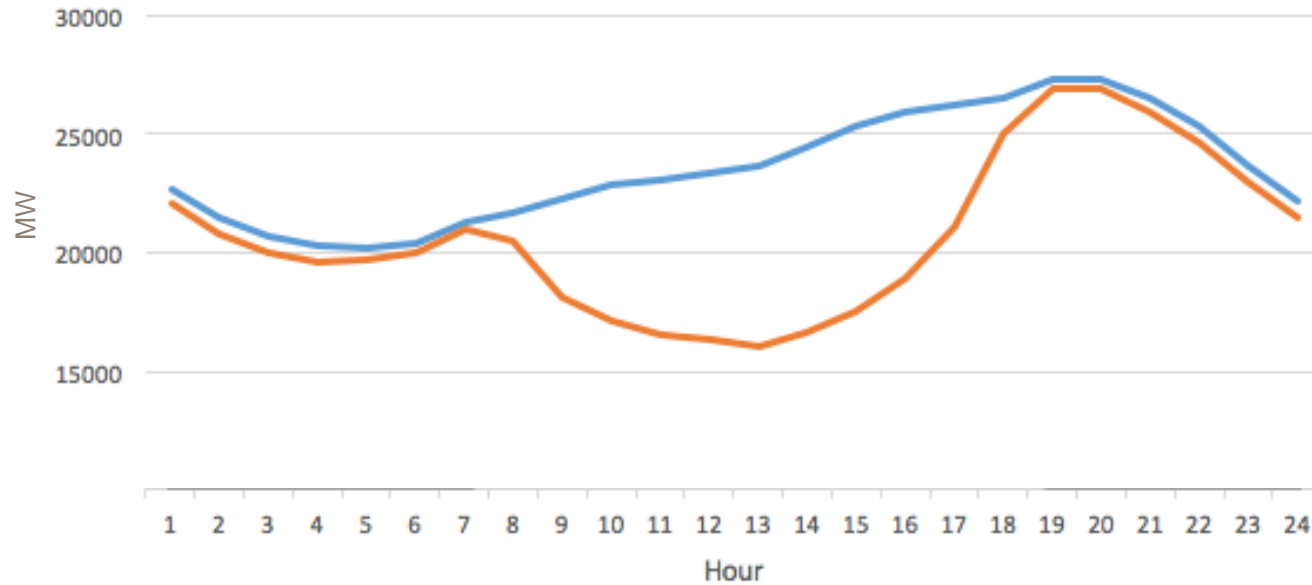
Present 2030 Zero Carbon Plan in an Integrated Resource Plan packet for the Board's approval to submit & file with the California Energy Commission to:

- Memorialize the 2030 Zero Carbon Plan
- File earlier than SB350's 5-year requirement - SMUD's last filing was in 2019



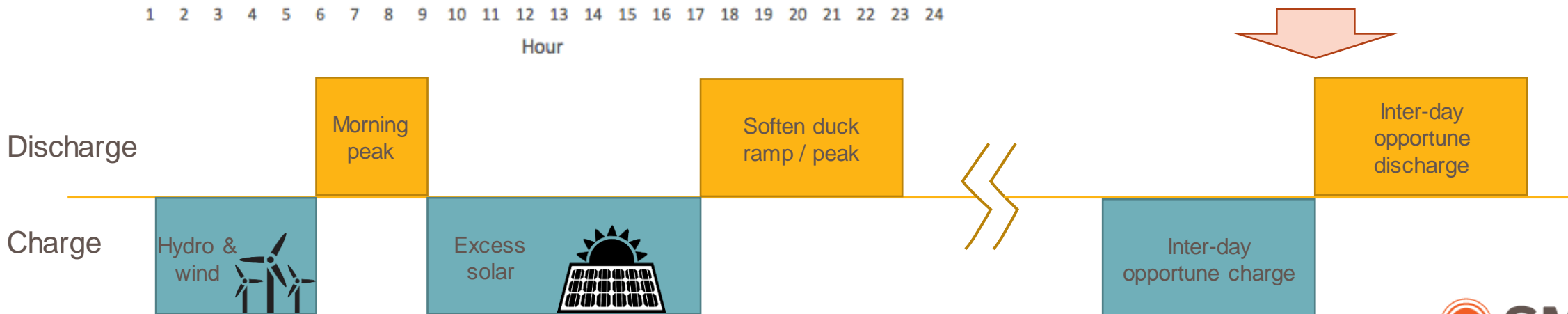
V2G charge/discharge opportunities

Intra-day operation (in relation to the duck curve)



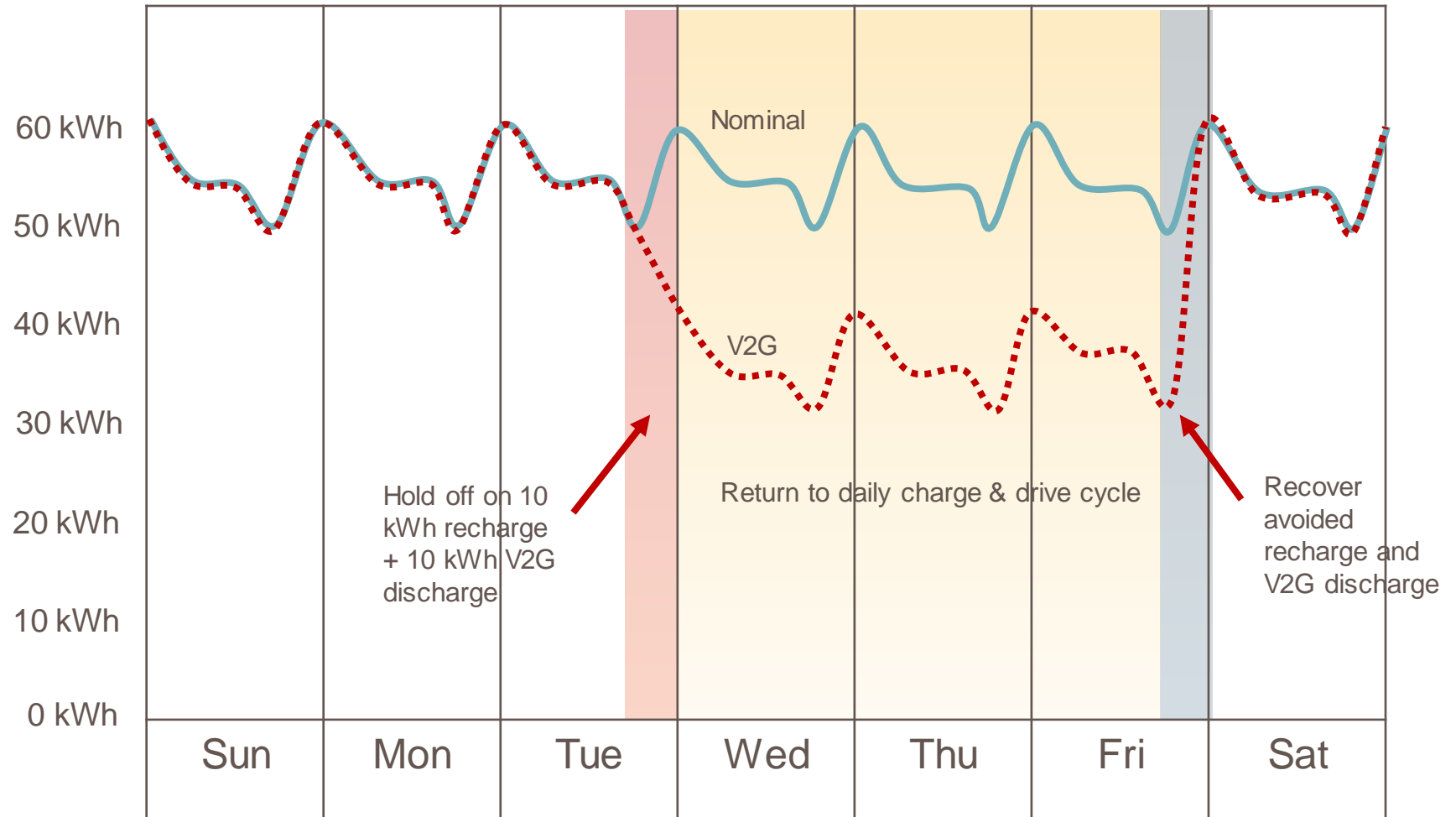
Inter-day operation (for reliability)

- Typical EVs cycle ~20% of SOC for daily driving (~10 kWh/day from 60 kWh battery)
- Typical solar paired batteries use ~65% of SOC for daily rate arbitrage (~6.5 kWh/day from 10 kWh battery)
- V2G is a better candidate for holding inter-day charging & discharging function than solar paired batteries without impacting customer utility
- Inter-day / long duration energy storage was a reliability gap identified in the Zero Carbon Plan



V2G as an inter-day utility resource

- Chevrolet Bolt and Nissan Leaf are available with 60 kWh batteries. Battery sizes trending higher
- Average daily battery discharge for commute is 8-12 kWh/EV/day
- Newer EVs can sustain daily commute without recharging for several days when starting with a fully charged battery. EVs can wait to replenish V2G discharge of about 10 kWh.
- Staggering V2G could resemble long duration energy storage



V2X Activity at SMUD

Projects in Execution

- V2G Electric School Bus Project with Twin Rivers Unified School District
- Light duty V2X testing with SMUD fleet EV(s)
- Residential managed charging pilot (steppingstone for residential V2X)

Projects in Planning

- Extension of V2G pilot to other school districts
- Fleet and residential V2X pilot (budgeted for planning)

Other

- Actively seeking clarity around agency guidance (CEC and CPUC) on V2X interconnections and activity in technical standards groups (UL, IEEE, SAE)

V2G Electric School Bus Project with TRUSD

- Awarded CEC BESTFIT grant
- Grant Partners: Twin Rivers Unified School District, Ford Pro, Cadmus, SMUD
- Vehicles: Up to 57 ebuses, mixed vendors + other Light Duty
- Locations: TRUSD Grand Ave Bus Yard, McClellan, others TBD
- VGI services: ALM, V1G, V2G
- EVSE: Proterra, Rhombus, Ford Pro + other
- Bus Yard Construction Complete – Aug 2022
- Project completion – Q3 2024



Thank you