Exhibit to Agenda Item #1

- a. Provide the Board an overview of Virtual Power Plants (VPP) and application within the industry.
- b. Brief the Board on SMUD's VPP pilot.

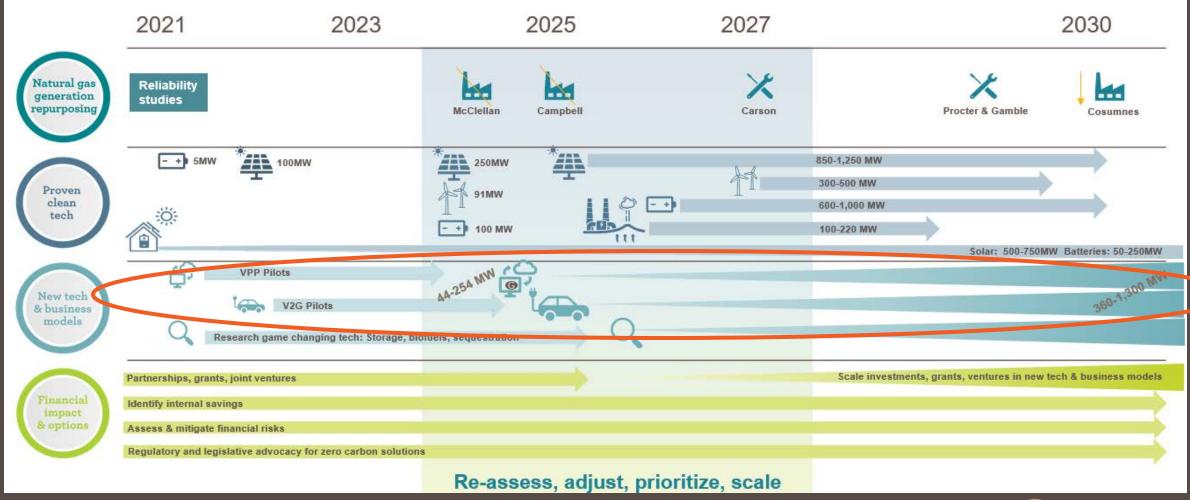
Board Energy Resources & Customer Services Committee and Special SMUD Board of Directors Meeting

Tuesday, June 16, 2021, scheduled to begin at 5:30 p.m.

Virtual Meeting (online)



Virtual Power Plants in the 2030 Plan





SMUD's Virtual Power Plant Journey





Upcoming Virtual Power Plant Pilots

 Multi-DER Virtual Power Plant

- Vehicle to Grid & EV Managed Charging
- Storage Based Virtual Power Plant





Multi-DER Virtual Power Plant

- Technology aggregator to provide load flexibility through automated device response and incentives
 - Residential Thermostats, EVs, Batteries
- Optional Critical Peak Price (CPP) rate to provide customer benefit and additional price signals
 - Pilot will include control groups and non-CPP incentivebased groups
- Day ahead/Day of event notifications
- Future Integration with DERMS for streamlined operation



2021
RFQ Released and CPP Rate

Customer Enrollment. Operation Begins Summer 2022 Performance Evaluation and Consideration of Technology Expansion

2023

Quantify Operational Confidence, Consolidate Solutions and Optimize



Storage Based Virtual Power Plant

- Near real time dispatch of behind the meter batteries through a 3rd party aggregator
- Intended for residential and commercial customers
- Initial battery incentive up to \$2,500 for residential customers
- Participation payments based on grid benefits
 - Final benefits dependent upon aggregator costs



2021 Launch Aggregator RFP Aggregator Integration and Preliminary Customer Enrollment

Operation of VPP, Technology & Aggregator Expansion

Quantify Operational Confidence, Consolidate Solutions and Optimize



Vehicle to Grid Pilots

- Vehicle to Home, Building, or Grid (V2H, V2B, or V2G) adds the capability of discharging EV energy out the charger
 - V2G supplements EV charge management (traditional load flexibility or demand response) and introduces VPP capabilities
- Currently planning a V2G demonstration with Twin Rivers Unified School District
 - ~1 MW of discharge capable electric school buses
- Exploring additional Commercial and Residential Light Duty V2G project opportunities







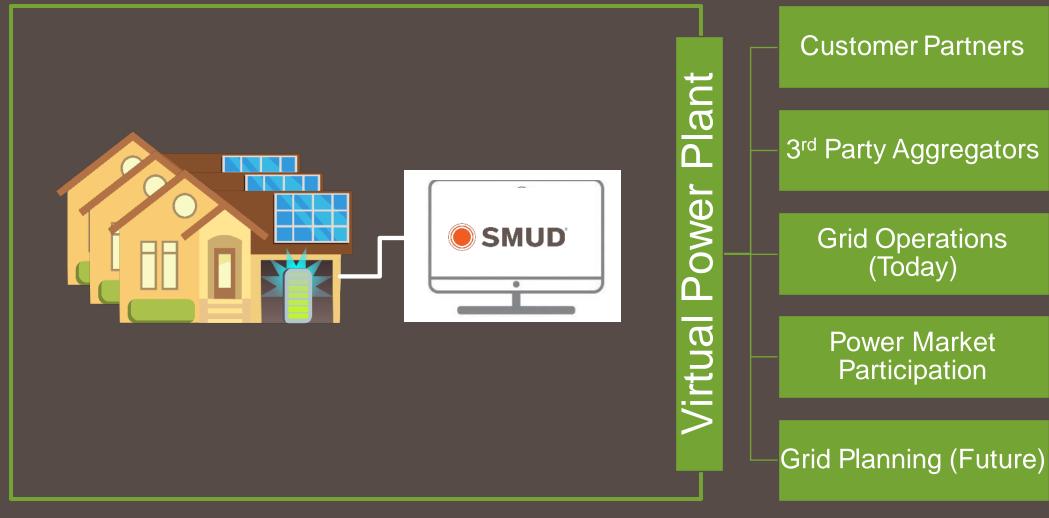
2021
Scope demonstration projects

2022 Launch demonstrations & scope pilots

2023 Launch pilots Pilot evaluation and planning for expansion



Moving VPPs From Idea to Implementation





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To Scale Up, Normal Processes Need to Adapt

Load and Adoption Forecasting Grid Integrated **Operations** Resource (Including **Planning** DERMS) (IRP) Distribution Customer Engagement Resource and **Planning Enrollment** (DRP)

June 16, 2021

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Historical Consideration

Construction Time

Specific Purpose

Single Partner

SMUD Owned

20+ Year Equipment Life

Interconnection

VPP Differentiation

Customer Recruitment

Value Stacking

Aggregations

Customer Owned

5 – 20 Year Equipment Life

Interoperability





Questions?

