SMUD Board Panel 2: DERs and the Edge of the Grid

Beth Reid | CEO | breid@olivineinc.com
Leverage Distribute Energy Resources (DER) to Increase Grid Reliability

Customers are adopting DERs at a fast rate

Solar & wind generation are intermittent and non-dispatchable

Control DERs to enable faster shift to zero-carbon supply


Source: California ISO - Today's Outlook
Harness a Virtual Power Plant (VPP) to Meet 2030 Zero Carbon Goals

VPP Economic Dispatch Engine

- VPP Cost Curve Engine
  - Site Dispatch
  - Targeted Load Dispatch
  - Granular Telemetry

- Households
  - Municipal Facilities
  - Churches/Schools
  - Commercial/Industrial
  - PV
  - AC
  - EV
  - EWH
  - HPWH

- Microgrids
  - Real Time Automation Controller
  - Data/Control
  - Availability Cost Curve
  - Cloud Dispatch
  - Direct Dispatch
  - Cloud Microgrid Interface

- Grid Services
  - Market History
  - Weather Data
  - Site Load History
  - Site Specific Parameters

Olivine DER™ Platform & Management System (DERMS)

Clean Energy
Reduce Pollution
Reduce Cost
Lower Energy Load
Community Engagement + Education

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Diverse Portfolio of Technologies Working Together is Key

Customer loads are made up many components & vary throughout the year

Combine the unique characteristics of multiple technologies across customer segments to increase flexibility & control

- Batteries
- Community Solar
- Smart Thermostats
- Heat Pump Water Heaters
- Pool Pumps
- EV Chargers
- Flexible Building Loads
- Lighting
- Electric Plug Loads

Source: Office of Energy Efficiency & Renewable Energy - End-Use Load Profiles
Provide Value to Utility, Customers & Community

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Communicate Value & Impact to Customers to Increase Engagement

Olivine engages community participants through their mobile and web apps
Provide Equity Clean Energy Access to Everyone

Disadvantaged & Low-Income Communities in SMUD’s Territory

Strategies to Engaged Members of Disadvantaged and Low-Income Communities

- Behavioral Demand Response Options
- Technology Rebates
- Additional Program Incentives
- Targeted Outreach

Implementation of Olivine Communities in DACs

- Fresno Energy Program (PG&E’s DAC Pilot)
- Clean Power Alliance (CPA) Power Response Program
- Richmond Advanced Energy Community (upcoming)
Community Vision for SMUD

- Residential
- Small & Medium Businesses
- Large Commercial & Industrial
- Municipal Buildings

- New DERs
- Existing DERs

- Batteries
- EV Chargers
- Smart Thermostats
- Heat Pump Water Heaters Pool Pumps
- Flexible Building Loads
- Community Solar

- Electric Plug Loads
- Lighting
- Behavioral Demand Response

Virtual Power Plant

- Clean Energy
- Grid Services
- Reduce Cost
- Lower Energy Load
- Community Engagement + Education
- Reduce Pollution

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Future of Leveraging Distributed Energy Resources (DERs)

- Increased direct control of devices -> increased event performance and reliability
- DERs monitoring and responding to price signals
- Additional smart devices that can be controlled such as smart electricity panels and smart appliances
- Behind-the-meter batteries exporting energy to electrical grid
- Vehicle-to-home (V2H), vehicle-to-building (V2B), vehicle-to-grid (V2G)
- Increased community solar deployments
- Microgrids capable of islanding during periods of grid stress or outages
- Deployment of virtual power plants
- DERs providing additional grid services such as spinning reserves, non-spinning reserves, and frequency regulation
- Something about front-of-the-meter?