DOCKETED	
Docket Number:	23-IEPR-05
Project Title:	Accelerating Distribution Grid Connection
TN #:	250050
Document Title:	Presentation - Distribution Planning Process
Description:	3.C Harry Marks, SMUD
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Organization:	Sacramento Municipal Utility District SMUD
Submitter Role:	Public Agency
Submission Date:	5/8/2023 12:27:55 PM
Docketed Date:	5/8/2023

System Planning

Distribution Planning Process

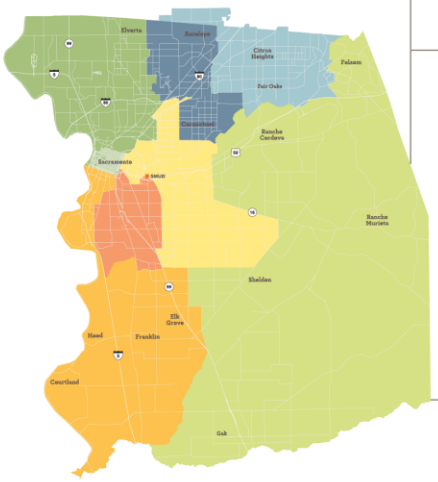
May 9, 2023

Powering forward. Together.

SMUD

About SMUD

6th largest community-owned **in the U.S.**



75+ Years

Est. 1946

Power mix that's on average about **50%** **carbon-free***

100%

Zero carbon by 2030

The most ambitious goal of any large utility in the United States

~645,000 Customers

~2,300 Employees

7 member Elected Board of Directors

Rates among the lowest in CA. On average **45%** lower than PG&E

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SMUD's Zero Carbon Plan: A flexible road map

Natural gas generation repurposing

Replace 2 power plants with renewable and storage resources 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

~$2.5 billion investment

~$2 billion investment

New technology & business models

Pilot & scale new projects and programs

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

Financial

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

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

Thousands of new regional clean tech jobs

Goal:

Eliminate CO_2 from SMUD's power supply

CO_2

100%

Zero carbon by 2030

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Distribution Capacity Planning

Ensure SMUD's distribution system has sufficient capacity to safely, reliably and cost effectively serve the needs of our customers

- 10-year integrated forecast
  - *Load (including building electrification)*
  - *EV Forecast*
  - *DER*
- Local jurisdiction general plans and specific area plans
- Tentative maps
- Customer development plans
- Planning and system criteria
- System performance data

Distribution System Five-Year Forecast

System Average Annual Load Growth	Adjust for the 1-in-10 weather scenario	Distribution Scenario
• 0.6% to 1% (unmanaged 1-in-10 weather scenario) based on SMUD's Load Research & Forecast	• Daily high temperatures of 110 degrees • Daily low temperatures at or above 70 degrees • Multiple days under these conditions	• Core load growth • Incremental and new large commercial loads • Building electrification (BE) (spread evenly) • EV (spread evenly) • DER

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Distribution System Five-Year Capacity Plan: Planning Criteria

Serve load	• Serve load under peak conditions without exceeding 100% of equipment's rated capacity • Serve load under peak conditions and during an N-1 scenario without exceeding equipment's emergency rated capacity
Flexibility	• System feeder ties that provide operational flexibility to minimize restoration time during outages and to perform routine maintenance
Efficiency	• Maintain near unity power factor at the distribution level
Stability	• Deliver service voltages within ANSI Standard C84.1
Coordination	• Install facilities in coordination with development • Coordinate capital investments with aging infrastructure replacements and other capital maintenance programs and initiatives

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Future Distribution Forecasting & Modeling

- Integrated Load Forecasting Tool
  - Timing, location and amount of electrification
    - Site specific Building Electrification and EV growth to distribution system forecasts
    - Leverage CARB and DMV EV data
    - Incorporate Light, Medium and Heavy-Duty (MHD) impact analysis
  - DER impact – combined solar and battery storage

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Planning for Electrification

Load forecasting and DER impacts

Interconnection process

Key investments ahead of demand

Outreach and education

Local, state, and federal partnerships

Load flexibility and managed charging

Workforce development

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Questions?