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Sacramento Municipal Utility District
September 16th, 2020

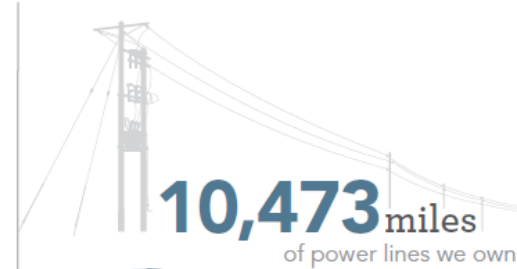
***Engaging Customer DER on a Utility Path to Carbon
Neutrality***

SMUD Overview

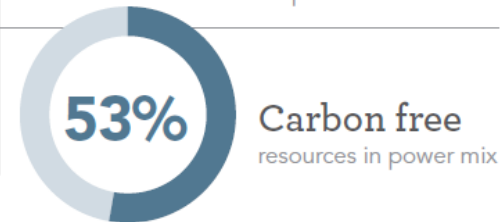
- Fifth Largest California Utility
 - 3,300 MW Record Peak
 - 11,000 GWh Sales
- Publicly-Owned; Governed by a seven Member Elected Board



Customers
residential + business:
628,952
(as of Dec. 31, 2017)



Number of SMUD
employees:
2,293



- 207 distribution substations and 600+ 12kV feeders in a highly integrated distribution system
- Full smart meter deployment; ADMS/DERMS under implementation
- Founding member of Balancing Authority of Northern California (BANC) and interconnected directly with CAISO and Pacific Northwest

SMUD's 2019 Integrated Resource Plan

NET-ZERO-CARBON
ELECTRICITY BY 2040

Electrification



\$1.7B



880k EVs

Renewables

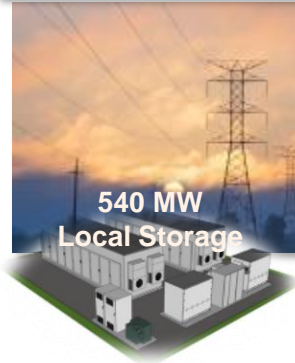


\$3.9B



290 MW
Rooftop PV

Reliable Power



540 MW
Local Storage

\$800M



Transmission
Batteries
Hydro
and Gas

Keep the lights on

Maximize Community Benefits



Affordable Rates
Local Energy
DAC Benefits
Local Air Quality



Lower GHG Emissions

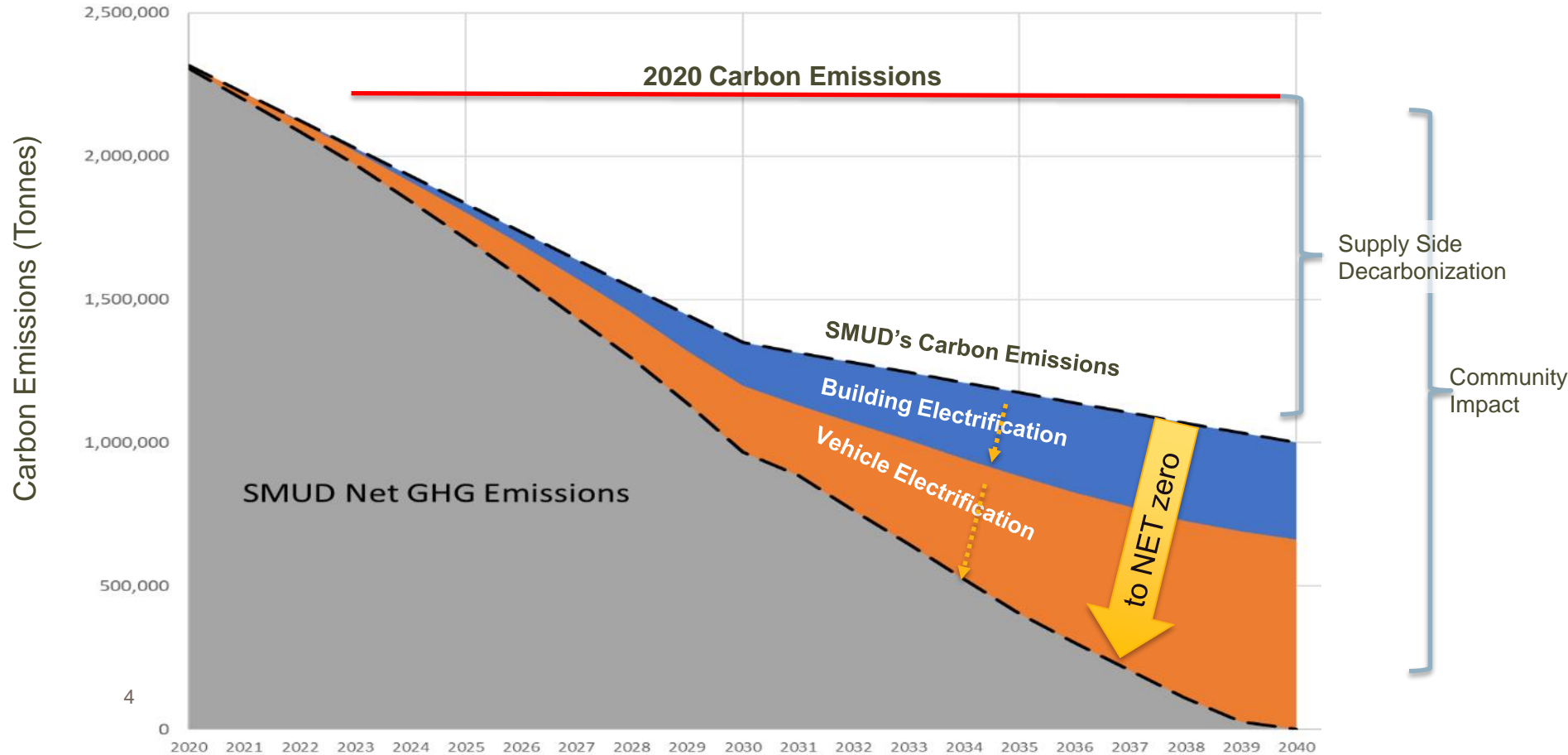


SMUD
70% Below 1990
Sacramento
64% Below 1990

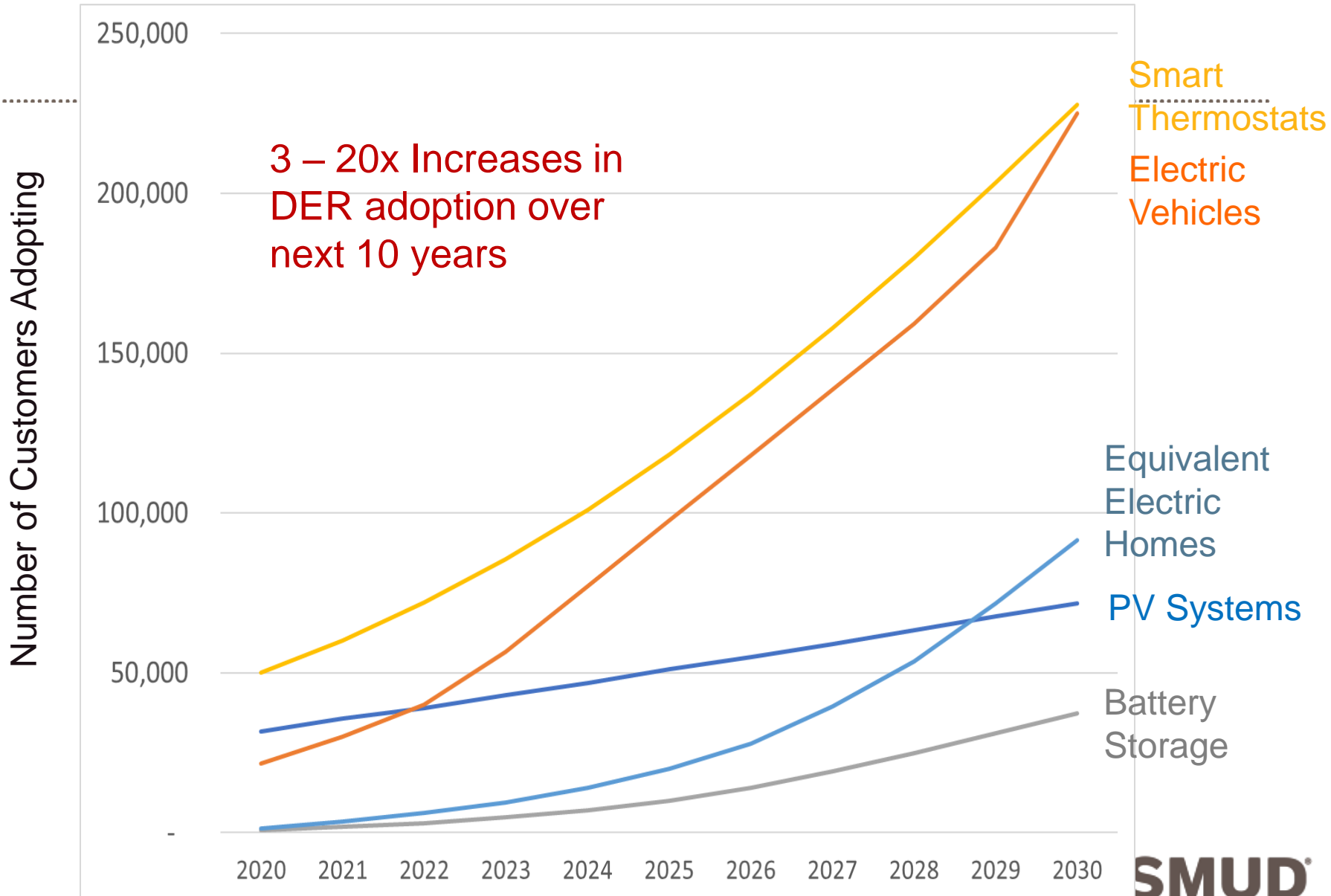


405k All Electric
Smart Homes

Plan to Achieve Net Zero Carbon

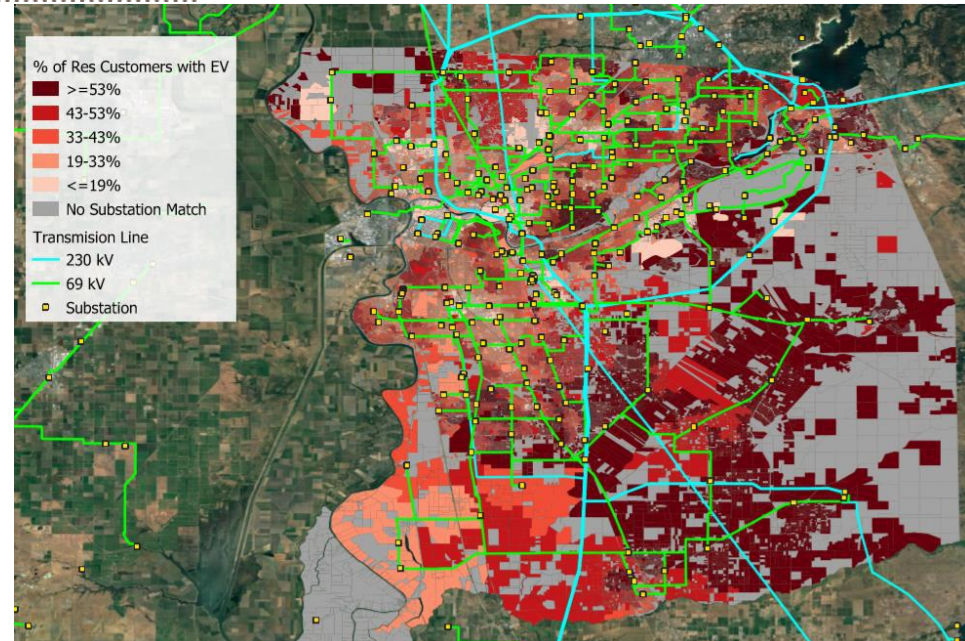


DER Adoption Forecasts in IRP



Integrated Distributed Resource Plan (IDRP)

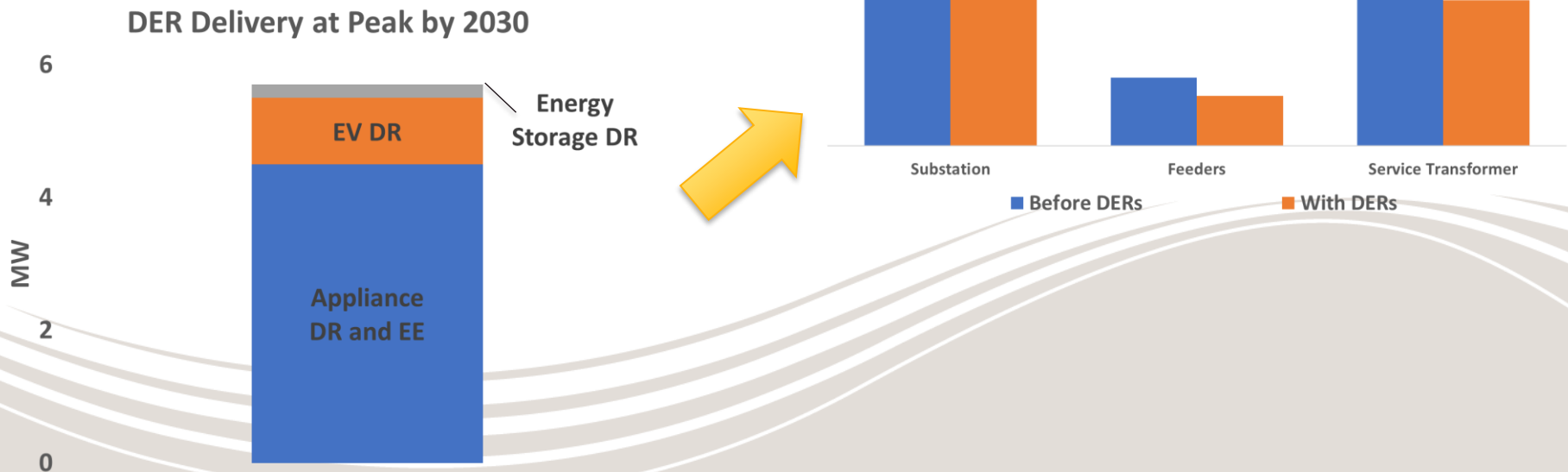
- Estimate costs, benefits and risks for Distribution System to support DERs and electrification
- Hosting capacity analysis
- Feeder-by-feeder adoption and load impacts
- Distribution load flow models
- Conventional methods to upgrade system vs DERs
- Supported by DNV GL and Energeia



Electric vehicle adoption by 2030 (Source SMUD & DNV GL/Energeia)

DERs can reduce costs

- DERs behind the customer meter deliver savings compared to conventional distribution system upgrades
- Need time for customer adoption



Net Metering Changes

- Draft E3 Value of Solar and Solar + Storage study recently released
- Examined 24 categories of value
- Examined customer and utility dispatched storage
- Current NEM rate overpaying \$25-41M/yr, \$92-94M/yr by 2030
- Utility dispatch of storage reduces overpayment today, but value still falls by 2030

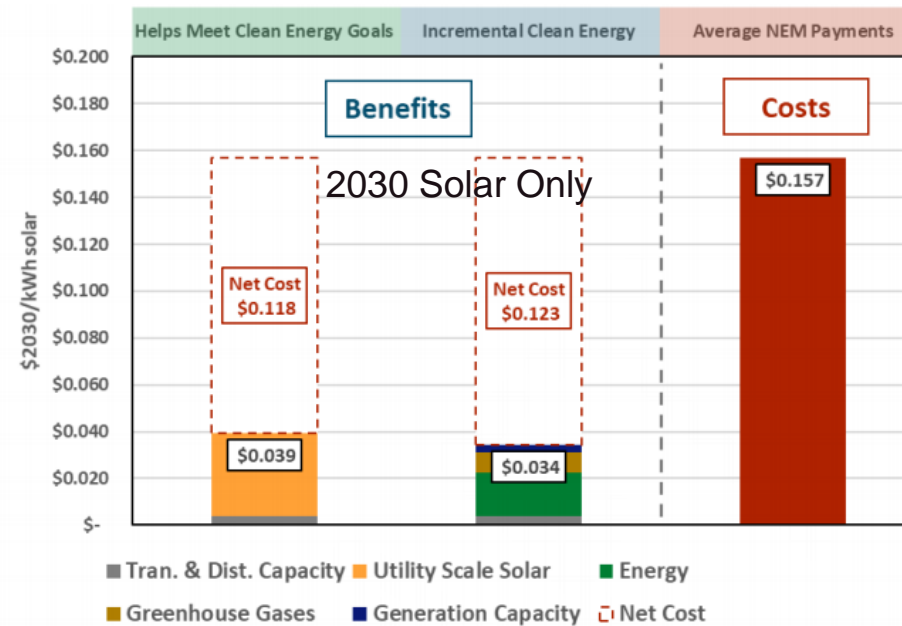


Figure 22. Ratepayer Benefits and Costs, Solar Only, 2030 Installations

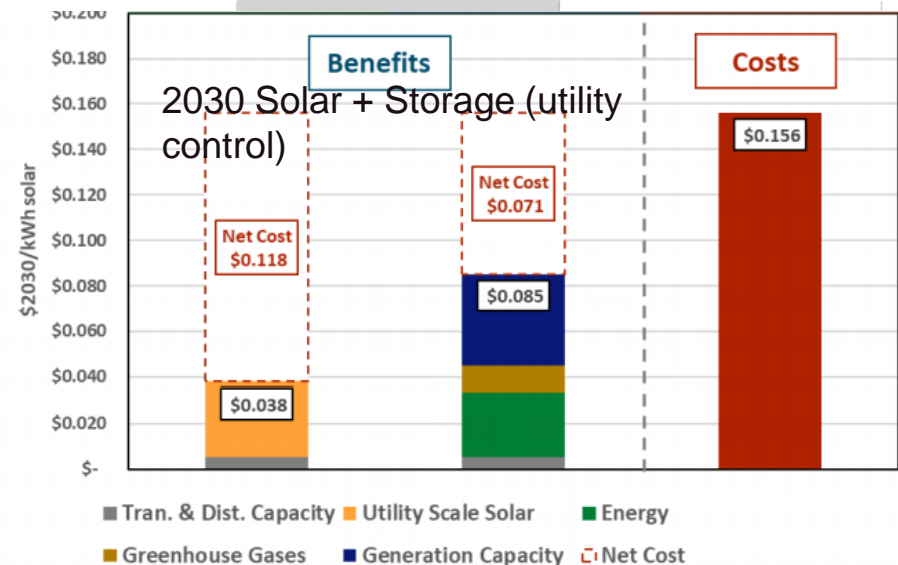
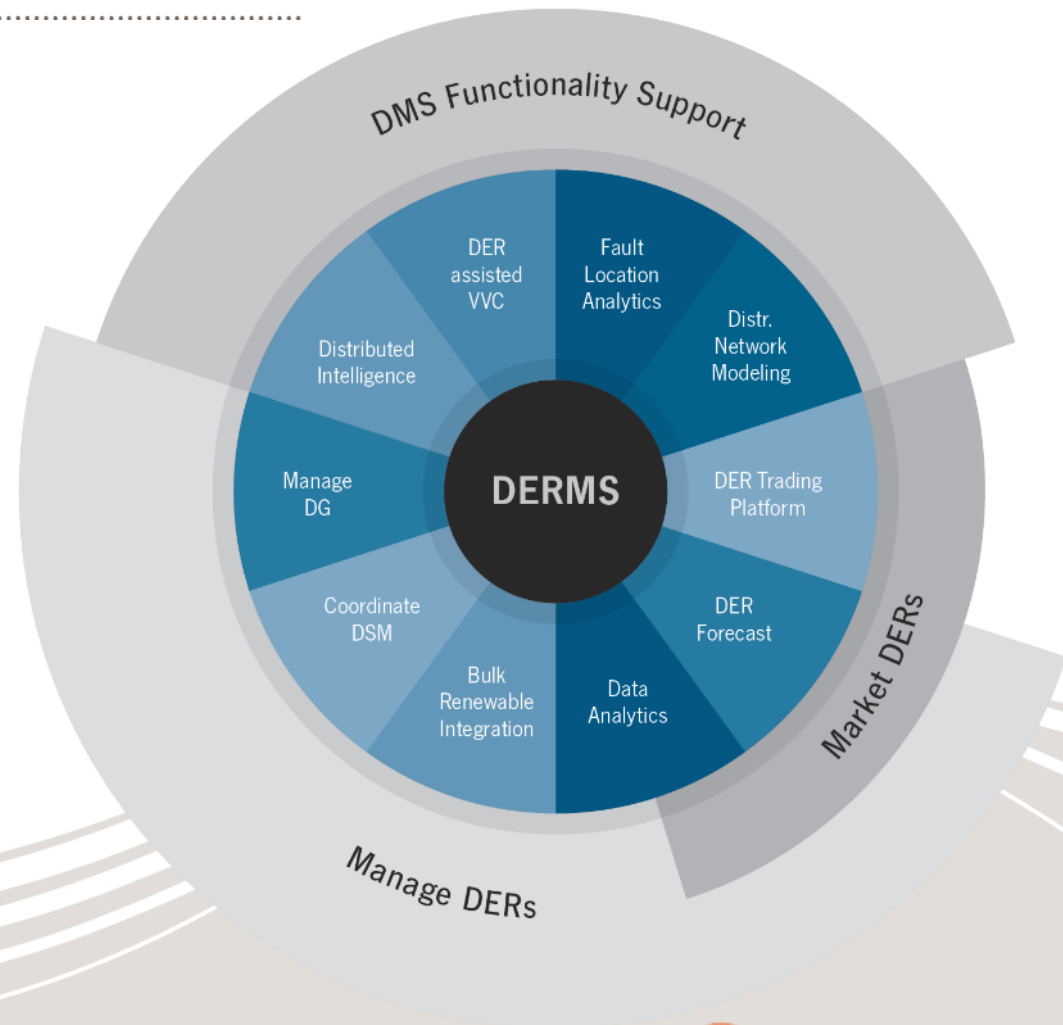


Figure 24. Ratepayer Benefits and Costs, Solar + Storage (Utility Control), 2030 Installations

DERMS Implementation

- SMUD developing DERMS system to connect DSO to DERs, enable visibility and dispatch
- Challenges with integrating to diversity of DER providers
- Need for standards adoption
- Still developing pricing and direct control approaches, net value proposition



SMUD Board Climate Emergency Declaration

July 16th, 2020

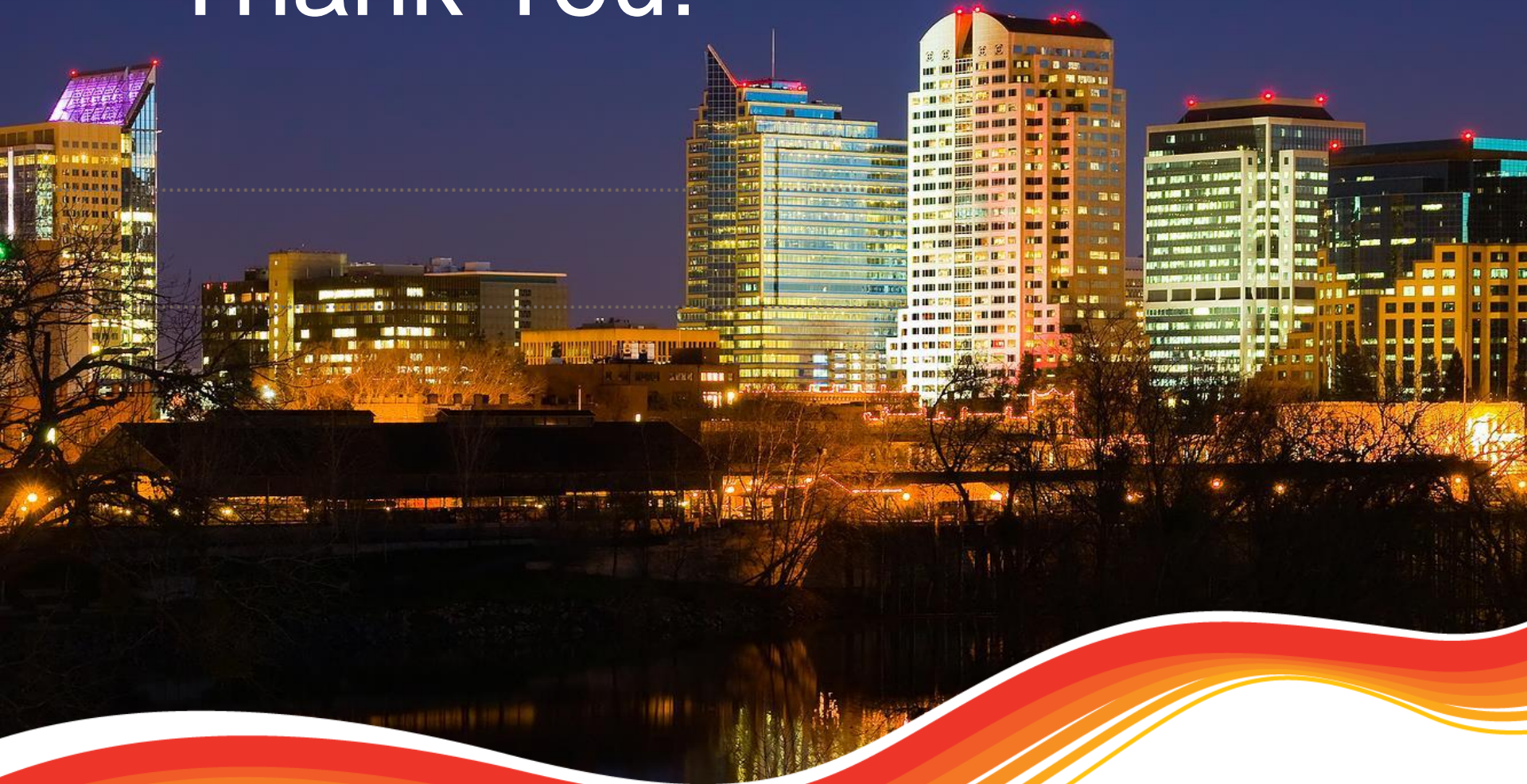
Section 2. The Board of Directors commits to work towards carbon neutrality by 2030 and to collaboratively find creative solutions to eliminate GHG emissions until a safe atmosphere is restored.

Section 6. The Board of Directors directs staff to report within 180 days on clear, actionable and measurable strategies and plans to reach SMUD's climate emergency goals.

Challenge will be replacing 1,000 MW of local gas generation providing 40-50% of current energy with zero emission alternatives by 2030, while maintaining reliability

Assessing DER Aggregation, H₂, P2G, CCS, Biomethane, Market, Bulk Wind (incl. offshore), Solar, Geo, long-duration storage

Thank You!



Powering forward. Together.

