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CPUC Transportation Electrification & Vehicle-Grid Integration Programs

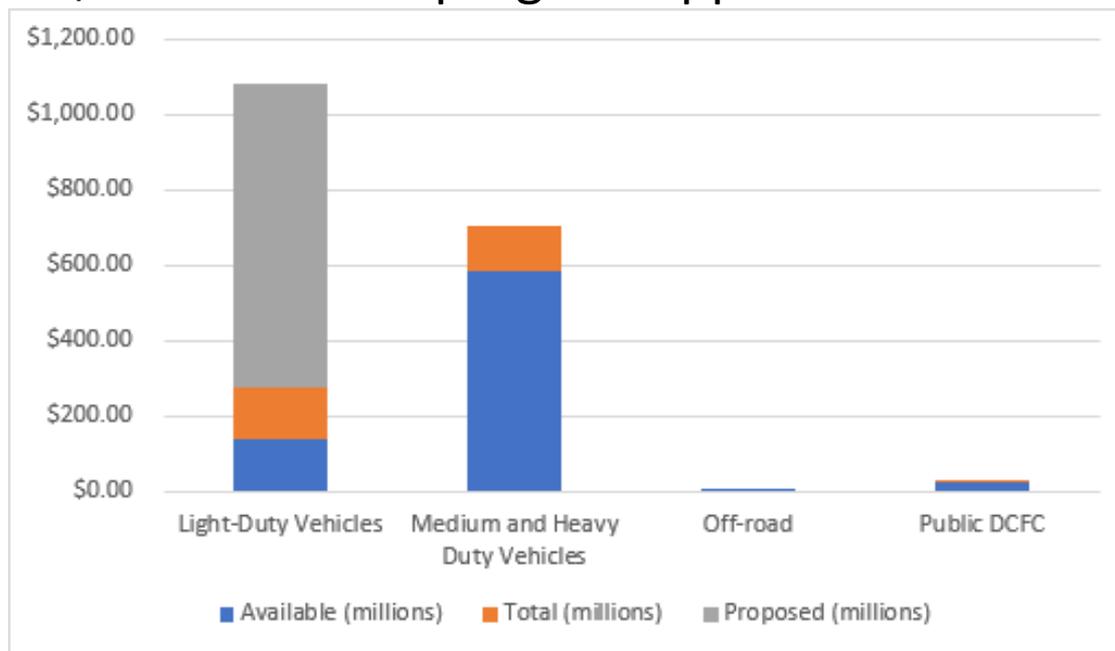
June 24, 2020

CEC/CPUC Joint Agency Workshop on VGI and Charging Infrastructure Funding



IOUs are currently implementing large TE programs

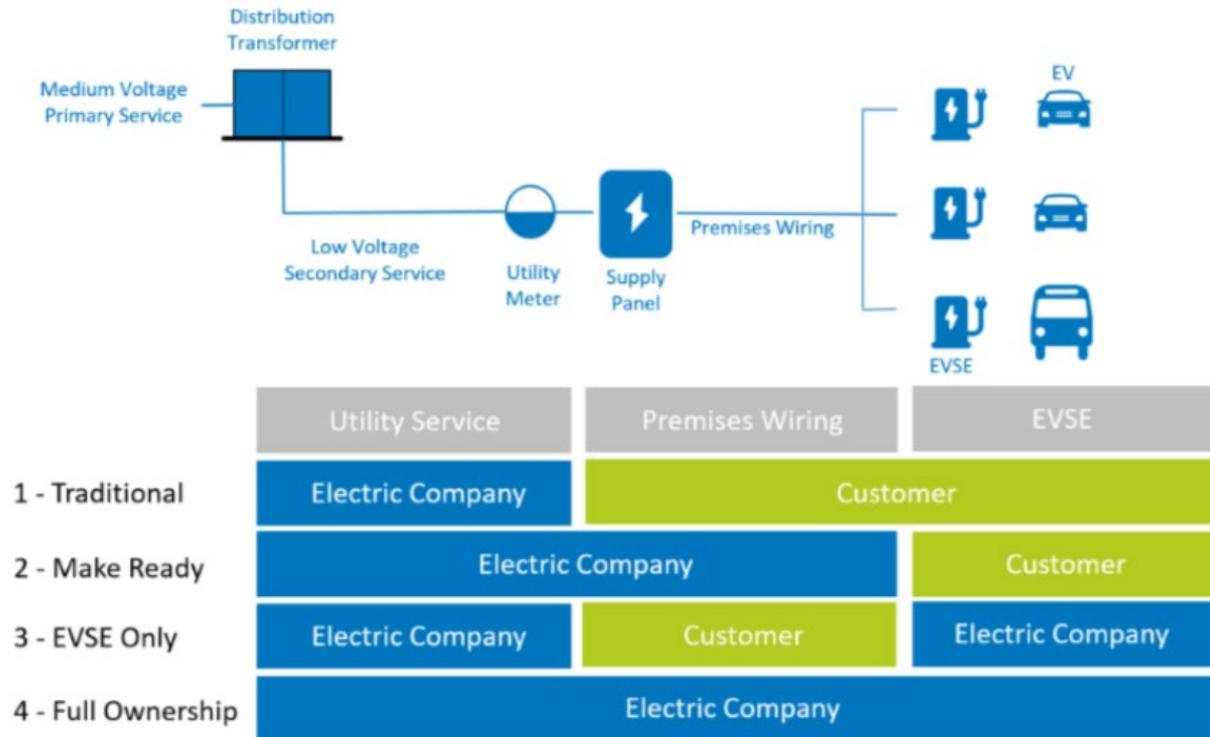
- The CPUC has authorized the IOUs to spend more than \$1 billion on programs designed to increase customer access to EV charging stations, and another \$800 million in program applications is under review



- 2016 Decisions authorized ~\$219M to install 6,932 Level 2 LDV charge ports
- 2018-2019 Decisions authorized \$42M on EV pilot programs; \$22.4M on 234 DCFC ports; and \$687M on infrastructure to support 2,170 M/HD charge ports and 18,000 M/HD vehicles



IOU TE program models cover a variety of infrastructure costs

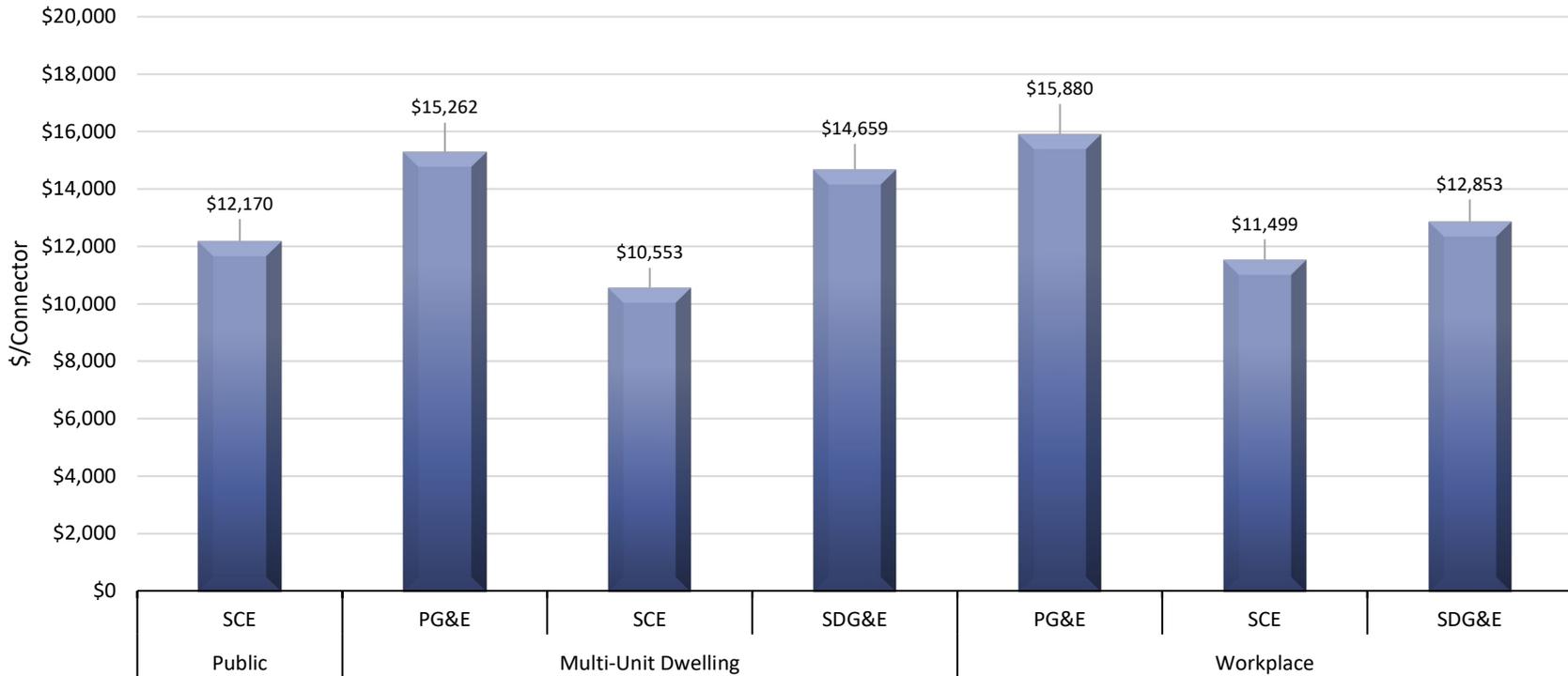


- California IOU TE programs provide IOU ratepayer funding for some or all customer-side infrastructure costs
- The CPUC does not authorize IOUs to fund vehicle rebates or offset the cost of customer vehicle acquisition, because other publicly-funded programs are designed to support EV procurement



IOU cost per port is relatively similar across site types in their L2 LDV programs

Average Project Costs Per Level 2 Connector By Market Segment
Investor-Owned Utilities

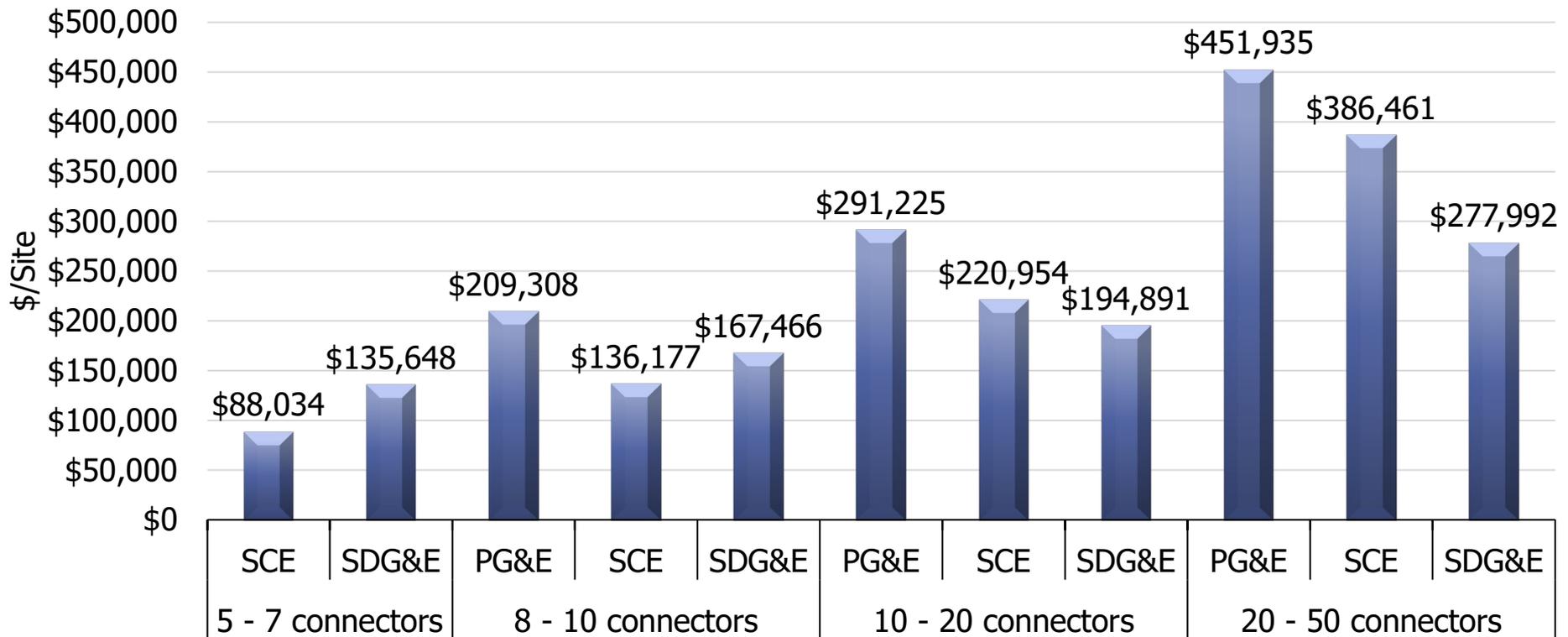


- Design & Engineering + Permitting + Utility Infrastructure & Customer Infrastructure + []
- PG&E: Cost of EVSE + Participation Payment; OR EVSE Rebate
- SCE: EVSE Rebate
- SDG&E: Cost of EVSE + Participation Payment



Site costs suggest per port economies of scale, especially with coordinated EVSE procurement

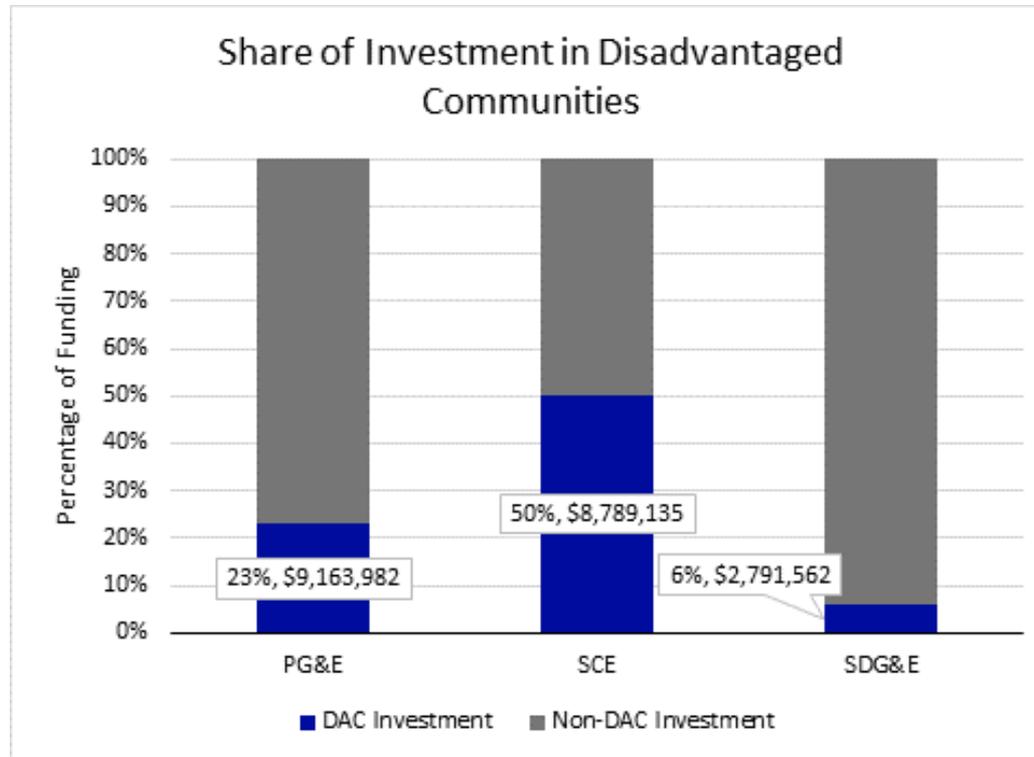
Average Level 2 Project Costs per Site by Connectors/Site Investor-Owned Utilities



- Design & Engineering + Permitting + Utility Infrastructure & Customer Infrastructure + []
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Funding set-asides for underserved communities could be improved

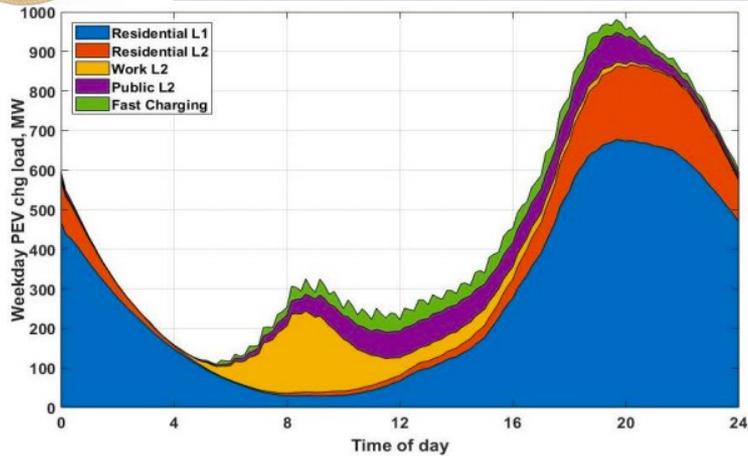


- DAC definition may not always be the most appropriate measure of communities facing the highest barriers to TE
- Charge Ahead California (SB 1265, 2014) requires specific efforts to increase access to TE for low- and moderate-income customers
- Other equity issues may not yet be considered adequately in current IOU TE programs

Notes: DACs are identified as in the top quartile of CalEnviroScreen 2.0 scores on a statewide basis for SCE and SDG&E and as in the top quartile of CalEnviroScreen 3.0 on a PG&E service territory basis



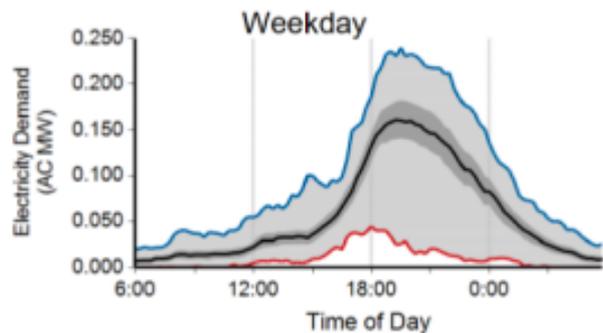
Appropriate infrastructure siting and rate design can minimize impact of incremental EV loads



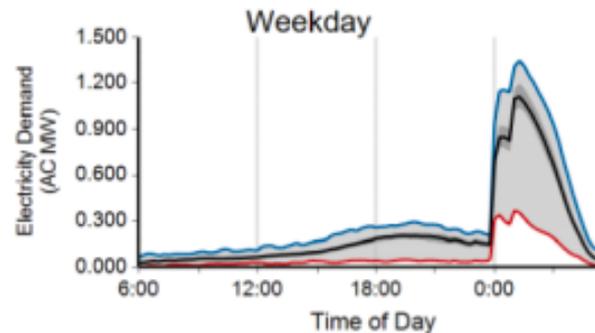
- The CEC's March 2018 PEV Infrastructure Projections report indicated personal EV charging will predominantly occur at home
- Increased workplace and public charging options could increase midday charging opportunities

- Even simple TOU rates can help mitigate grid impacts from incremental EV load impacts

Blue line = maximum demand Black line = median demand Red line = minimum demand



Dallas/Ft Worth
(standard rates)

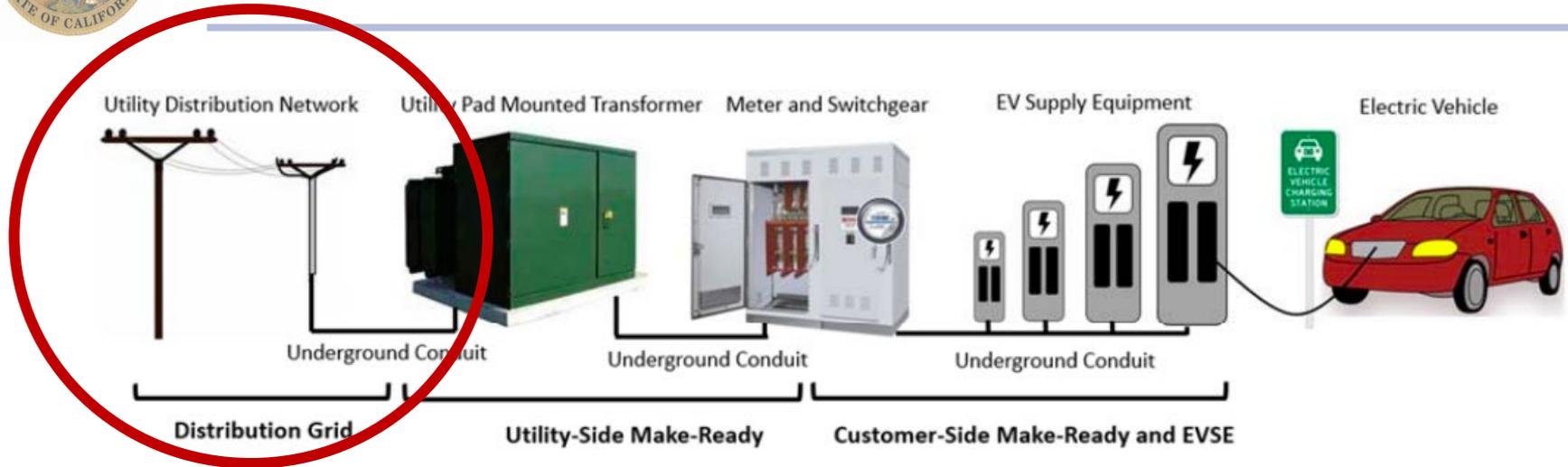


San Diego
(time-of-use rates)

Source: Idaho
National Laboratory



TE programs may not cover all TE utility-side infrastructure costs



- Infrastructure upgrades beyond the transformer are typically part of the IOUs' regular customer service, but may not be considered in publicly-funded TE programs
- Major T&D upgrades may be needed to accommodate the magnitude of EV load projected to meet existing state ZEV adoption and GHG reduction goals
- Alignment across publicly-funded electrification programs and VGI efforts should be a priority to scale the upstream upgrades appropriately



Targeted public funding for TE is still needed to meet state goals

- CPUC Energy Division staff Transportation Electrification Framework proposal aims to focus the IOU program scope
 - Incorporate learnings from 2017 and 2019-2020 VGI Working Group
 - Include strategies identified in VGI Roadmap update
- IOUs can leverage existing planning processes to identify needed infrastructure upgrades to support new load expected from widespread TE
- Establish parameters to maximize program benefits to ratepayers while reducing costs
 - Each time an IOU TE program is folded into rates, \$/kWh rates may increase in the near term
 - Need to track and improve modeling of anticipated TE infrastructure costs and incremental TE kWh sales
 - Tipping point for when incremental TE kWh sales could = reduced \$/kWh costs is still unknown