| **DOCKETED** |
|------------------|------------------|
| **Docket Number:** | 20-IEPR-02 |
| **Project Title:** | Transportation |
| **TN #:** | 233625 |
| **Document Title:** | Presentation - CPUC Transportation Electrification & Vehicle-Grid Integration Programs |
| **Description:** | Presentation by Carrie Sisto, CPUC |
| **Filer:** | Raquel Kravitz |
| **Organization:** | CPUC |
| **Submitter Role:** | Public Agency |
| **Submission Date:** | 6/23/2020 4:18:26 PM |
| **Docketed Date:** | 6/23/2020 |
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

Image sourced from Avista Corp.'s Electric Vehicle Supply Equipment Pilot Final Report available at https://encrypted-tbn0.gstatic.com/images?q=tbn%3AANd9GcSmJnhApz6rE7uIYQgW_LvTS6T-6UlYVOeXa1BW7diQQymeInb&usqp=CAU
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

- SCE
- PG&E
- SCE
- SDG&E
- PG&E
- SCE
- SDG&E

$12,170
$15,262
$10,553
$14,659
$15,880
$11,499
$12,853

- Public
- Multi-Unit Dwelling
- Workplace

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

<table>
<thead>
<tr>
<th>Connectors/Site</th>
<th>SCE</th>
<th>SDG&amp;E</th>
<th>PG&amp;E</th>
<th>SCE</th>
<th>SDG&amp;E</th>
<th>PG&amp;E</th>
<th>SCE</th>
<th>SDG&amp;E</th>
<th>PG&amp;E</th>
<th>SCE</th>
<th>SDG&amp;E</th>
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</thead>
<tbody>
<tr>
<td>5 - 7 connectors</td>
<td>$88,034</td>
<td>$135,648</td>
<td>$209,308</td>
<td>$136,177</td>
<td>$167,466</td>
<td>$291,225</td>
<td>$220,954</td>
<td>$194,891</td>
<td>$451,935</td>
<td>$386,461</td>
<td>$277,992</td>
</tr>
</tbody>
</table>

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
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

Image from SDG&E’s reply comments on ED Staff TEF proposal Sections 2, 3.1, 3.2, 3.3, 4 & 5 filed April 27, 2020
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