The Role of Electric Transportation in the Integrated Grid

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The Vision – An Integrated Grid

Integration of:
Electricity,
Telecommunications,
and Customer Local
Energy Networks

The Integrated Grid makes Local Energy Optimization
Part of Global Energy Optimization
Efficient Electrification – part of the integrated grid

Mobility

Heating and Cooling

New Applications
Electrification (including transportation) becomes part of the grid modernization challenge

- Planning models
- Flexibility and capacity resources
- Non wires solutions
- Integrating efficient electrification
- Tariff Structures/Market Design
Making every customer part of the solution

Standards-Based Connected Devices to Enable Clean Energy Technologies

Water Heaters
Pool Pump
EV Charger
Battery Storage
Solar Inverter
Thermostat

EMCB
Getting Flexibility from Electric Vehicle Charging
California

The problem -

Utility investment in charging infrastructure

<table>
<thead>
<tr>
<th>Program Name</th>
<th>SDG&amp;E</th>
<th>SCE</th>
<th>PG&amp;E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>3,500 charging stations</td>
<td>1,500 charging stations</td>
<td>7,500 charging stations</td>
</tr>
<tr>
<td>Budget</td>
<td>$45M</td>
<td>$22M</td>
<td>$130M</td>
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<tr>
<td>Markets</td>
<td>Multifamily and workplaces</td>
<td>Multifamily, workplaces, and public</td>
<td>Multifamily and workplaces</td>
</tr>
<tr>
<td>Disadvantaged Communities</td>
<td>≥ 10% charging stations in disadvantaged communities</td>
<td>≥ 10% charging stations in disadvantaged communities</td>
<td>≥ 15% charging stations in disadvantaged communities</td>
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<tr>
<td>Program Start Date</td>
<td>Expected mid-2017</td>
<td>May 27, 2016</td>
<td>Expected mid-2017</td>
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</tbody>
</table>

Source: CPUC

A scenario for electric vehicle charging participation in flexibility needs (2025)

Fast charging infrastructure
Ireland

Ireland decarbonization strategy

Ireland's Transition to a Low Carbon Energy Future 2015-2030

Produce clean energy

Integrate clean energy

Use clean energy - Integrate the electrification of heat and transport

Locations of wind farms on and around the island of Ireland