STEPS workshop: EV Infrastructure for Light Duty Vehicles, Freight and Transit: Utility Perspective on EV Infrastructure Requirements

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EVs and the Grid

• EV market increased from near zero to over 1.3 million EVs globally in five years
  - Overcame difficult “chicken-and egg” dilemma that stopped most alternative fuels with mostly home charging and build-as-you-go approach to away-from-home charging

• Based on 2008 State Alternative Fuels Plan (CEC and CARB) EVs compared to gasoline counterparts:
  - Emit approximately 70 percent fewer greenhouse gases
  - Emit over 85 percent fewer ozone-forming air pollutants and
  - Use 100 percent less petroleum.

• These reductions were based on a grid with about 15% renewables and will grow much larger when we reach 50% large renewables in 2030
  - Reductions today can be 100% in all categories with rooftop solar for EVs
The Grid Can Accommodate EV Adoption

• The electric system is huge
  - The system use of existing assets is about 40 - 45%
  - EVs can help make the grid more efficient by charging at off-peak times
  - Off-peak charging puts downward pressure on rates

• Large amounts of zero-emission power plants are being added which will dramatically change the definition of off-peak
  - Will be a very large future need for EVs to be charging in the day for most of the year to utilize solar power
SCE’s Transportation Electrification (TE) Efforts

• Established programs
  - Targeted market education and outreach (ME&O)
  - Six rates designed with TE in mind
  - Strengthening our distribution system
  - Testing and evaluation / codes and standards / fleet demonstrations
  - Trade associations (RD&D, policy, tech transfer, education)
  - EV pilots

• New programs in 2016
  - Charge Ready infrastructure pilot – make ready infrastructure and station rebates
  - Charge Ready Broad market education and TE Advisory Services for business customers
  - Light duty Low Carbon Fuel Standard credits (Clean Fuel Reward in late 2016)

• Upcoming
  - New PUC policies as accelerating widespread TE in all market segments is now a primary mission of the PUC
  - New SCE proposals to accelerate both light duty, freight and transit EVs
    ▪ Make readies
    ▪ Broad and targeted ME&O
  - New EV rate for above 500 kW demand
  - Low Carbon Fuel Standard for away-from home charging (fleets, workplaces, public, transit, forklifts)
  - Additional TE pilots
Utility Perspective on EV Infrastructure Requirements

- SCE’s new infrastructure pilot only serves workplaces, multi-unit dwellings, fleets and destination centers with long-dwell parking
  - Pilot serves about 33% of the market need
  - Accelerated adoption is required to meet state goals and SB 350
- To receive ratepayer-funded make readies for light duty EV, SCE’s new pilot requires:
  - Installation of 10 charging stations (5 in disadvantaged communities)
  - Demand response capability at the station, kiosk or circuit
  - Time of use rates for EVs from a separate service drop and panel
  - Charging stations and their providers to go through a qualification process
  - Site hosts to be responsible for selecting, owning and maintaining the charging stations and paying for a portion of the station costs
- Likely future efforts
  - Encouraging technological development
    - Two to four port stations with power sharing or sequencing
    - Demand response for medium and heavy duty EVs
    - Codes and standards for higher power charging
    - Lower cost technology and solutions
    - Exploring solutions to over supply from solar power in some months
    - Improved maintenance of stations
  - More attention to customer experience and satisfaction (e.g. better than gasoline)
Potential Future Efforts for SCE

- Encouraging technological development
  ▪ Two to four port stations with power sharing or sequencing
  ▪ Demand response for medium and heavy duty EVs
  ▪ Codes and standards for higher power charging
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