Utilities and EVs

Council of State Governments

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About PSE

- 760,000 sq. mile service territory
- 1.1 million electric customers
- 760,000 natural gas customers

Alternative Fuels
- ~ 5,000 EVs in electric service territory
- ~ 900 NGVs in natural gas service territory
- Estimated 20,000 MWh/year (0.08% of electric load)
- Estimated 7.9 million therms of natural gas (0.8% of natural gas load)
Utility View of an EV
An Updated Utility View of an EV

Source: PSE Smart Grid Report
Power Supply Impacts

Electric Vehicle Impact
2020 - Average December Day

PSE System Load (MW)

High Case Electric Vehicles
Base Case Electric Vehicles
2020 December Average Day

PSE 2020 Vehicle Forecast
Base Case:  11,055 Vehicles
High Case:  21,783 Vehicles
Distribution System Impacts

Three Major Studies

- Feeder Models with PNNL found “average” circuits could support high penetrations of electric vehicles
- Targeted Feeder Modeling in high penetration areas found low voltage alarms at individual service first problem point.
- Transformer Models found minor Impacts
A growing evening peak demand may benefit from load shifts or the discharge of stored energy.

Net load (demand minus variable generation) declines as more renewable resources come online. With solar generation increasing in the morning, other generators will need to ramp down production.

A midday decrease in net load could result in excess energy generated on the grid, which would result in low or negative prices. Additional demand like PEV recharging could provide storage during over-generation.

As net load decreases during midday and increases in the evening, the longer and steeper ramp up after sunset will require generators to respond quickly.

Source: California Energy Commission
Policy Considerations & Caveats - Utility

- Collision of different regulatory and policy regimes (transportation, utility, environment, consumer)
  - Road taxation
  - Emissions reductions credits
  - Measurement
  - Regulation and utility role in public charging

- Locating EVs

- Utility Rate Structures
  - Differ by utility
  - Designed to reflect cost to serve

- Cost Effective Peak Mitigation
  - Will depend on utility/regional load and resource shapes
Industry Efforts

- Utility Programs
  - Separate rates and metering for some utilities
  - Pilot incentives from some utilities for equipment or demand response
- PSE Pilot Program
  - Determine customer locations and update load curves
  - Peak impact assessment versus other loads, renewables
  - Measurement technology evaluation
  - Peak mitigation options
- EPRI/Utilities/Auto manufacturers defining communications standards
- EV Project (now completed)
Contact Information

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