# Public Utilities & Transportation Electrification

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## Regulatory Process

**Legislative and Executive Action**

**2009 SB 626** – Utility Policy and Barriers Evaluation
**2013 Executive Order B16 – 2012** – Utility Support for 1 million Zero Emission Vehicles
**2015 SB 350** – Directs Utilities to apply for infrastructure project approval

**California Public Utilities Commission (CPUC) Rulemaking**

**2009 Rulemaking 09-08-009**

Decision 10-07-044 – Electric Vehicle Service Providers (EVSP) are not Public Utilities
Decisions 11-07-029 – Cost allocation for distribution system upgrades, EV Rate Design, and more
Decision 13-11-002 – EV Submetering Protocol and Pilot

**2013 Rulemaking 13-11-007**

July 2014 - Scoping Memo and Vehicle Grid Integration Filings
Decision 14-12-079 – Removes Prohibition on Utility ownership of Electric Vehicle Service Equipment (EVSE)

**Investor Owned Utility (IOU) Applications**

**2016 Vehicle Gird Integration Applications Decisions**– Funding passenger vehicle at multi-unit dwellings, workplaces and disadvantaged communities. The following are funds approved by CPUC.

**PG&E EV Charge Network** – $130,000,000 for 10,000 EVSE
**SCE Charge Ready** - $22,000,000 for 1,500 EVSE
**SDG&E Power Your Drive** - $45,000,000 for 3,500 EVSE and distribution circuit specific Vehicle Grid Integration Rate

**2017 SB 350 Applications** – Priority Review and Standard Review Projects Applications filed in 2017. The following highlight Standard Review Projects currently being considered by the CPUC.

**PG&E Fleet Ready** - $200,000,000 for Medium and Heavy Duty EVSE
**PG&E Fast Charge** - $22,000,000 for DC Fast Charge EVSE
**SCE** - $550,000,000 for Medium and Heavy Duty EVSE
**SDG&E** - $225,000,000 for Single Family and small multi-unit dwelling EVSE

## Revenue Requirement and Neutrality

A IOU's Revenue Requirement and a proposed Rate's Revenue Neutrality are two distinct regulatory notions. Both are useful in understanding the Regulator's Problem, balancing the competing interest of customer bill minimization and the IOU's rate of return.

The Revenue Requirement is the primary means of accomplishing these goals. It is defined as follows: $Revenue\ Requirement = Expenses + RateBase \times s$, where Expenses are the utilities cost of operations and maintenance, including the depreciation of capital assets, Rate Base is undepreciated capital expenditures, and s is the regulated rate of return. In the simplest case, electric rates can be defined as follows: $Rate = Revenue\ Requirement/kWh$. This case is complicated by the fact that there are different customer classes with different rates and different structural elements to rates. Tiered, Time-of-Use, and Demand Charges for instance.

Revenue Neutrality is a concept associated with designing new rates. A new rate is revenue neutral if the following hypothetical is true. If all customers in a customer class with access to the new rate were to switch to the new rate; the new rate and the old rate return the same revenue to the IOU. The Rate Design Model discussed herein allows for the testing of Revenue Neutrality.

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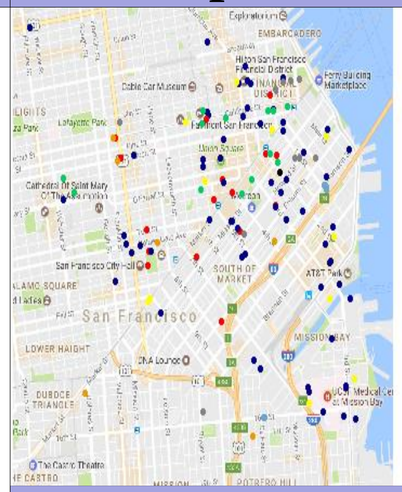
## Competition with Electric Vehicle Service Providers




Issue: Should regulated IOUs own EVSE?

Current IOU applications propose alternative models for infrastructure rollouts, make ready stub versus full IOU ownership or some combination.

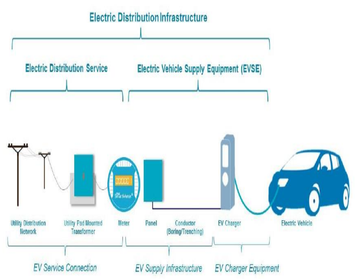
Key considerations: What innovation in pricing or service will market competition yield?

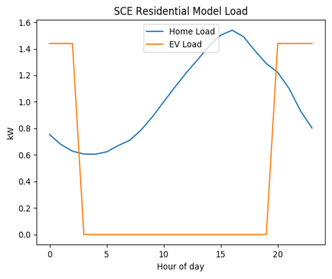
Are there lessons to be learned from past experience, such as retail electric choice?

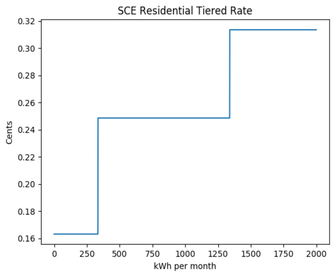
What data are available to analyze the current structure and performance of the market?

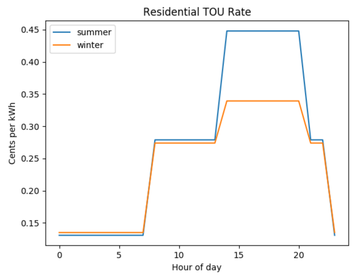
| EVSP | Station Count | Market Share |
|---|---|---|
| AeroVironment Network | 61 | 0.003 |
| Blink Network | 1685 | 0.091 |
| ChargePoint Network | 5959 | 0.322 |
| EV Connect | 22 | 0.001 |
| eVgo Network | 713 | 0.038 |
| GE WattStation | 631 | 0.034 |
| Greenlots | 288 | 0.016 |
| OpConnect | 113 | 0.006 |
| Other | 5862 | 0.316 |
| SemaCharge Network | 839 | 0.045 |
| Tesla | 2360 | 0.127 |
| Total | 18533 | 1 |

## EV Rate Design Model




Commercial customers, fleet owners and EVSP network operators, have expressed concerns about the effects of **demand charges** on the cost of EV charging. The images to the right represent the inputs used to simulate **DC Fast Charging** bills. In the upper left is hourly average load at a DC Fast Charge installation over a month. This data is derived from the EV Project summary data and used to reverse-engineer hourly charging profiles (4 days are overlaid on the upper right). These profiles were used to analyze the implications of the commercial EV rate currently proposed by SCE.

| | |
|---|---|
| Total EV Load: | 1917.50 |
| Station Load Factor: | 0.05 |

| Current EV 4 Rate | |
|---|---|
| Monthly Demand Charge: | $ 774.00 |
| Summer Charging Total Cost: | $ 1048.58 |
| Winter Charging Total Cost: | $ 922.55 |

| Proposed EV Rate | |
|---|---|
| Monthly Demand Charge: | $ 0.00 |
| Summer Charging Total Cost: | $ 430.48 |
| Winter Charging Total Cost: | $ 308.24 |

The **EV Rate Design Model** is a set of Python modules that read load and rate files and output billing information. The modules were developed to identify or verify policy and regulatory issues associated with EV Rate Design.

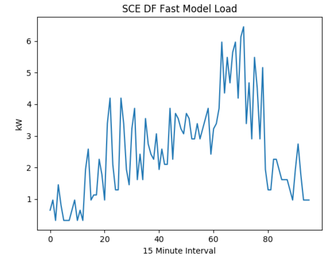
Compare the cost implications of the choice between default residential **tiered rates** and **time of use rates** (images to the left) absent the separate meter investment necessary for billing EV charging load on a different rate than home load. This analysis highlights the origins of and quantifies the benefits of the IOU **Submetering Pilots**.

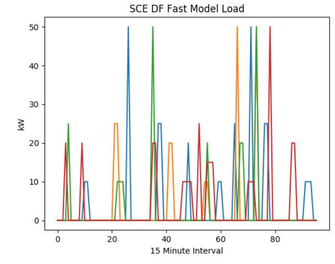
| Tiered Rate: Summer Month | |
|---|---|
| The Total EV Cost: | $ 73.22 |
| The Total Home cost: | $ 174.25 |
| The Total Electric cost: | $ 247.47 |

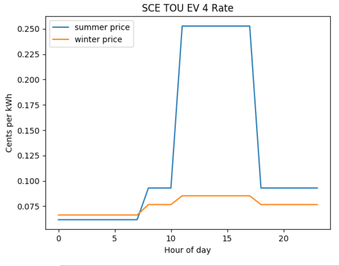
| TOU Rate: Summer Month | |
|---|---|
| The Total EV Cost: | $ 51.73 |
| The Total Home Cost: | $ 240.37 |
| The Baseline Credit: | $ 26.65 |
| The Total Electric Cost: | $ 265.45 |

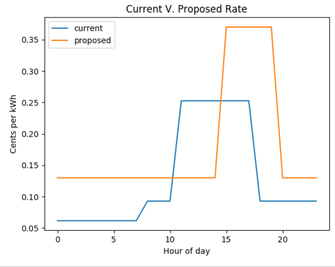
| TOU Rate: Winter Month | |
|---|---|
| The Total EV Cost: | $ 73.22 |
| The Total Home Cost: | $ 109.64 |
| The Total Electric Cost: | $ 182.86 |

| TOU Rate: Winter Month | |
|---|---|
| The Total EV Cost: | $ 52.16 |
| The Total Home Cost: | $ 131.56 |
| The Baseline Credit: | $ 27.22 |
| The Total Electric Cost: | $ 156.51 |

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