Calculating the Economic Benefit of Switching to Time-of-Use Rates for EV Customers

INTRODUCTION

This study tries to understand barriers that EV customers encounter in realizing fuel cost savings, using

- Energy consumption interval data, aka "Green Button" data
- Clean Vehicle Rebate Project (CVRP) survey results
- Rate reconstruction across the three major investor-owned utilities in California including PG&E, SCE and SDG&E

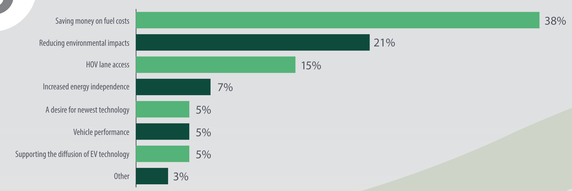
Nonoptimal tariff selection is important because the majority of EV buyers purchase an EV in order to save on fuel costs, however, the majority don't realize full savings because they do not opt in to special electric vehicle (EV) time-of-use (TOU) tariffs offered by the utilities.

CVRP REBATES BY MONTH

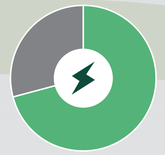
38% were motivated to purchase an EV to save on fuel costs

The CVRP program surveys new vehicle owners about their purchasing decision process.

PRIMARY MOTIVATION FOR PURCHASE



71% indicated that access to a knowledgeable dealer or salesperson about electricity rates was important, but...



During the EV purchase process, drivers indicated that

17% did not discuss electricity rates

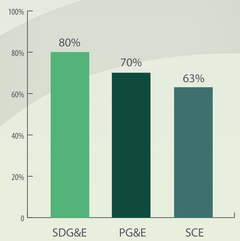
50% were unsure or not very knowledgeable

33% were knowledgeable

There is a high demand for education on optimal electricity rates at time of purchase and improvements could be made during this interaction.

After purchasing an EV, drivers indicated their

KNOWLEDGE OF SPECIAL ELECTRICITY RATES FOR PEV CHARGING



After the dealership about 70% indicate they know about special EV electricity rates.

TARIFFS

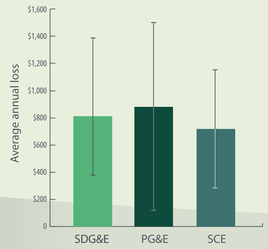
Which tariff to choose?

- EV TOU tariffs consider the window of time in which energy is consumed and reward customers for consuming when demand is low.
- Domestic rate (DR) tariffs are volumetric in that they only consider the amount of energy consumed in a billing period.
- Customers are largely left to figure their household energy consumption and potential savings on their own.

40% plan to switch to an optimal EV TOU tariff

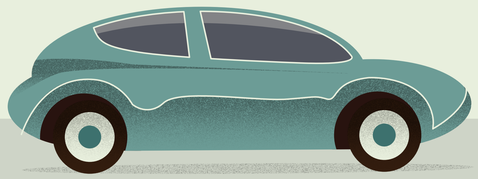
60% will remain on a domestic rate tariff

AVERAGE ANNUAL LOSS BY NOT SWITCHING FROM DR TO EV TOU

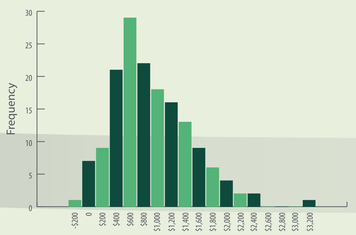


MOTIVATION REALIZATION

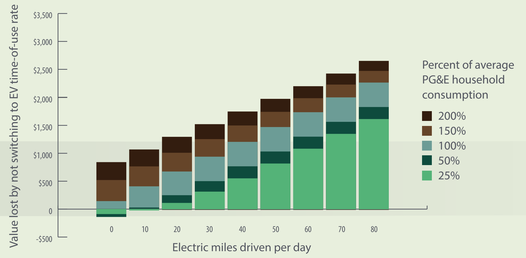
- The average customer in this sample saved $800 a year by switching to EV TOU and some recouped up to $3000.
- Green Button data served as the means to estimate these recouped utility costs.



DISTRIBUTION OF ANNUAL LOSSES BY NOT SWITCHING FROM DR TO EV TOU



PG&E SENSITIVITY ANALYSIS: EFFECT OF DRIVING DISTANCE AND HOME ENERGY CONSUMPTION ON TARIFF SWITCH SAVINGS



POLICY RECOMMENDATIONS

A: Continue to monitor and track EV customer motivations in order to better align policy and public interest.

B: Make sure EV dealerships are equipped to meet customer needs through education and outreach.

C: Provide tools so that customers can optimize cost of EV ownership including Green Button tools, workshops and education.

METHODOLOGY

1. **Gather Green Button files from CVRP PEV Survey**
   - 58 PG&E, 56 SDG&E and 46 SCE customers
2. **Tariff Parameters**
   - Geocode → utility climate zone → baseline allowance
   - Determine access to natural gas (heating)
3. **Electric Vehicle Specifics**
   - Look up each customer's EV (CVRP) and stats (EPA)
   - # EVs = 160, 53% BEV and 47% PHEV
4. **Behavior Assumptions**
   - Based on CVRP Survey
     BEV: 27.5 mi/day PHEV: 42 mi/day
   - Add daily EV load
   - Assume off-peak charging
5. **Calculate Time of Use (TOU) and Domestic Rate (DR)**
   - Based on September 2014 tariffs
   - Accounted for weekends/holidays, utility specific rates, baseline territory, heating source and full bundled costs
   - Assumed single meter at each household

Sources: All data represents CVRP survey statistics accessed November 2014. The Center for Sustainable Energy administers the CVRP on behalf of the California Air Resources Board.

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