PG&E And EV Overview

PG&E & Clean Driving
Almost 60% PG&E’s electricity comes from greenhouse gas-free resources, which means that driving using PG&E’s electricity emits less than half of the greenhouse gases as gasoline and we are getting even cleaner.

California & Clean Driving
Even if you do not have PG&E’s power, all of California has been cleaning up the grid with 20% renewables now and 33% by 2020.

* "Other" includes diesel oil and petroleum coke (a waste byproduct of oil refining) and "Unspecified Power" refers to electricity generated that is not traceable to specific generation sources by any available contract trail.

** As defined in Senate Bill 1079, which created California’s Renewable Portfolio Standard, an eligible renewable resource includes geothermal facilities, hydroelectric facilities with a capacity rating of 30 MW or less, biomass, selected municipal solid waste facilities, solar facilities and wind facilities. These figures are preliminary and will not be finalized until verified by the California Energy Commission.
EV Numbers And Locations

Total EVs Sold as of October 2013

Geographic Distribution of EVs in PG&E is Highly Concentrated

77% of PG&E’s EVs are located in only 5 counties
Upgrade Costs Are Minimal So Far, But This May Not Be Indicative Of The Future

- No Upgrade Necessary: 2,801 (95.7%)
- Upgrade Needed - General Load Growth: 113 (3.9%)
- Upgrade Needed - due to EV: 12 (0.4%)
## PG&E EV Rates Details

**Current Residential Rate**

**E-1**
- Basic residential rate
- One meter for house
- Tiered rate structure (higher incremental cost as usage increases)
- Baseline usage amounts allocated based on geography and season

**New Rates**

<table>
<thead>
<tr>
<th>One meter (both house and EV)</th>
<th>Two meters (separate house and EV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EV-A</strong></td>
<td><strong>EV-B</strong></td>
</tr>
<tr>
<td>- No tiers, just peak, off-peak and part peak TOU rate</td>
<td>- House still charged on E-1 (or other rate customer chooses)</td>
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<tr>
<td></td>
<td>- EV meter charged same as the EV-A rate</td>
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**Old Rates**

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<th>E-9A</th>
<th>E-9B</th>
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<tr>
<td>- Tiered, time of use (TOU) and seasonal rate structure</td>
<td>- House still charged on E-1 (or other rate customer chooses)</td>
</tr>
<tr>
<td>- Rate ($/kWh) dependent on volume of usage and time of usage</td>
<td>- EV meter charged same as E-9A rate</td>
</tr>
</tbody>
</table>

**EV customers are incented by PG&E to charge their vehicles on off-peak hours. Rate simplicity is important to allow customers to understand the operating cost benefits of driving on electricity.**
Customers charge off-peak in response to the rate financial incentives.
## Pilot Goals

- Evaluate the value of DR from PEVs
- Understand technical/communication functionality requirements
- Evaluate performance of PEVs as a DR resource
- Cost and Benefits of Second Life Batteries on the grid

## Planned Method

- Develop resource/operational requirements for vehicle batteries used to provide grid services
- Create solicitation for third parties to provide grid services from vehicle batteries, before and after their transportation life
- Enter into contracts with third parties to provide grid services from PEV batteries
A Few Key Obstacles Appear to be Standing in the Way of Faster Progress

- **Economics**
  - **High upfront costs** relative to traditional vehicles
  - **Incentives are fragmented** and can be complicated to obtain
  - Mismatched dealer incentives

- **Information**
  - **Limited public awareness and understanding of EVs**
    - Basic vehicle functionality
    - Total cost of ownership
    - Limitations / risks of EV ownership
    - Lifestyle compatibility
    - Vehicle capability

- **Infrastructure**
  - **Limited access to charging stations away from home**
  - Challenging to enable at-home charging in certain situations (e.g., multi-family and rental properties)
  - Fragmented EV services market
PG&E is Addressing the Economic Obstacles with a Wide Range of Current or Planned Activities

**Current activities**

- Introducing the **one of the lowest EV rates in the State**
- **Not charging the distribution upgrade costs to EV owners** for any upgrades that are caused by additional EVs
- Participating in the Low Carbon Fuel Standard program and generating credits for our customers

**Planned activities**

- **Piloting EV incentive and rebate programs** for smart-charging and second-life EV batteries that provide grid services
- **Demonstration of EV subtractive billing** to provide billing flexibility to customers

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Economics
### Current activities

- **New EV rates were deliberately simplified** to increase customer understanding of electricity costs

- Grassroots education effort for customers to learn about the new EV rates and the process to install a new charging station with PG&E

- Serving as members on national bodies such as the EDTA, EEI, and National Academy, and regional bodies such as the PEV Collaborative and the Bay Area EV Strategic Council to facilitate EV adoption

### Planned activities

- Sponsor EV outreach events that have ride-and-drives

- Building rate comparison tools
PG&E is Addressing the Infrastructure Obstacles with a Wide Range of Current or Planned Activities

<table>
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<tr>
<th>Current activities</th>
<th>Planned activities</th>
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<tbody>
<tr>
<td>• <strong>Streamlined and consistent service planning</strong> for EV charging infrastructure (e.g., Tesla Superchargers, DGS)</td>
<td>• Identifying optimal sites for public charging infrastructure</td>
</tr>
<tr>
<td>• Promotion of open Smart Grid standards</td>
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<tr>
<td>• Serving on the PEV Collaborative working groups to address the issues of workplace charging and multi-unit dwellings.</td>
<td></td>
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