

# Plug-in Electric Vehicles (PEVs) and their Impact on the Grid

*PG&E's Integrated, Multi-stakeholder Approach*

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Integrated Demand Side Management

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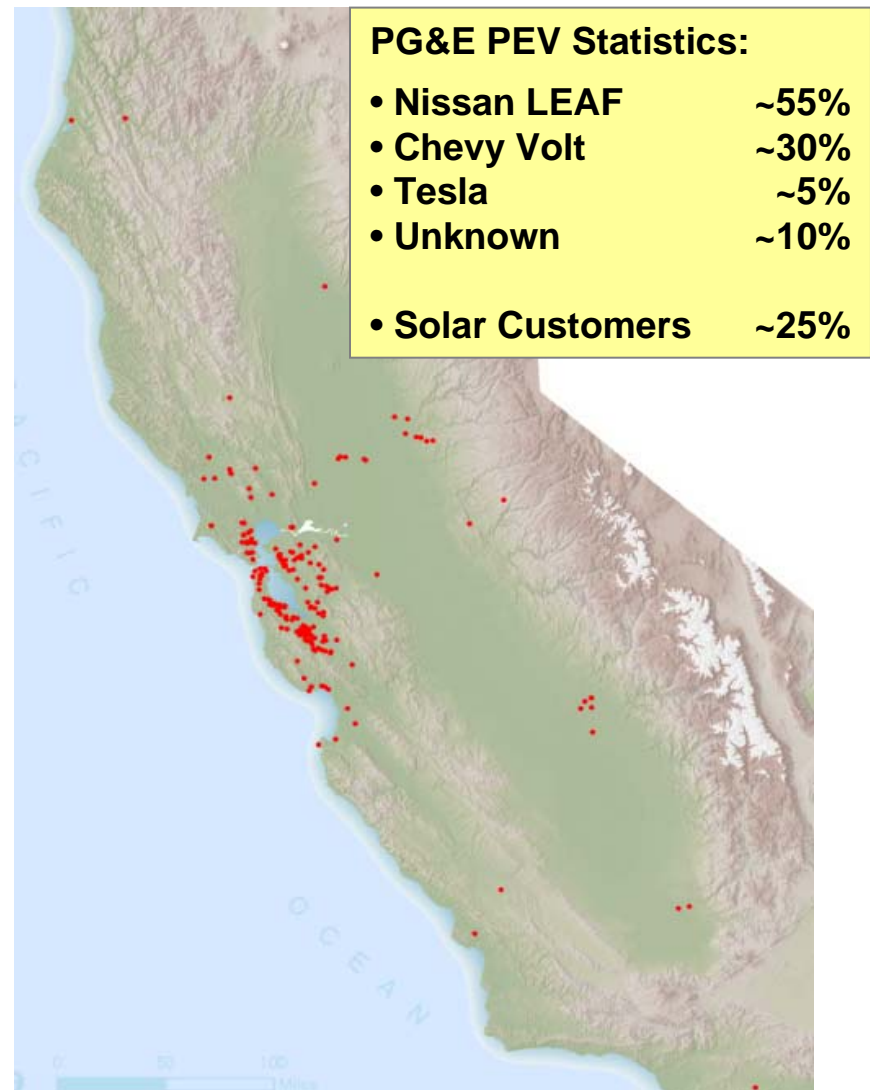
# Plug-in Electric Vehicles are Arriving



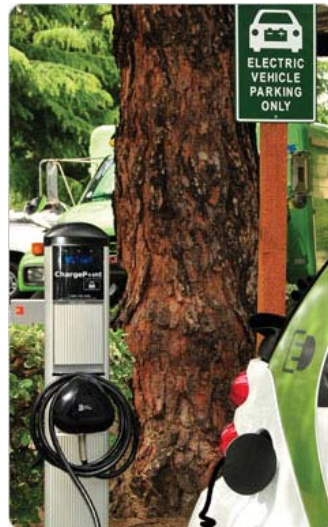
## Word's First Nissan LEAF



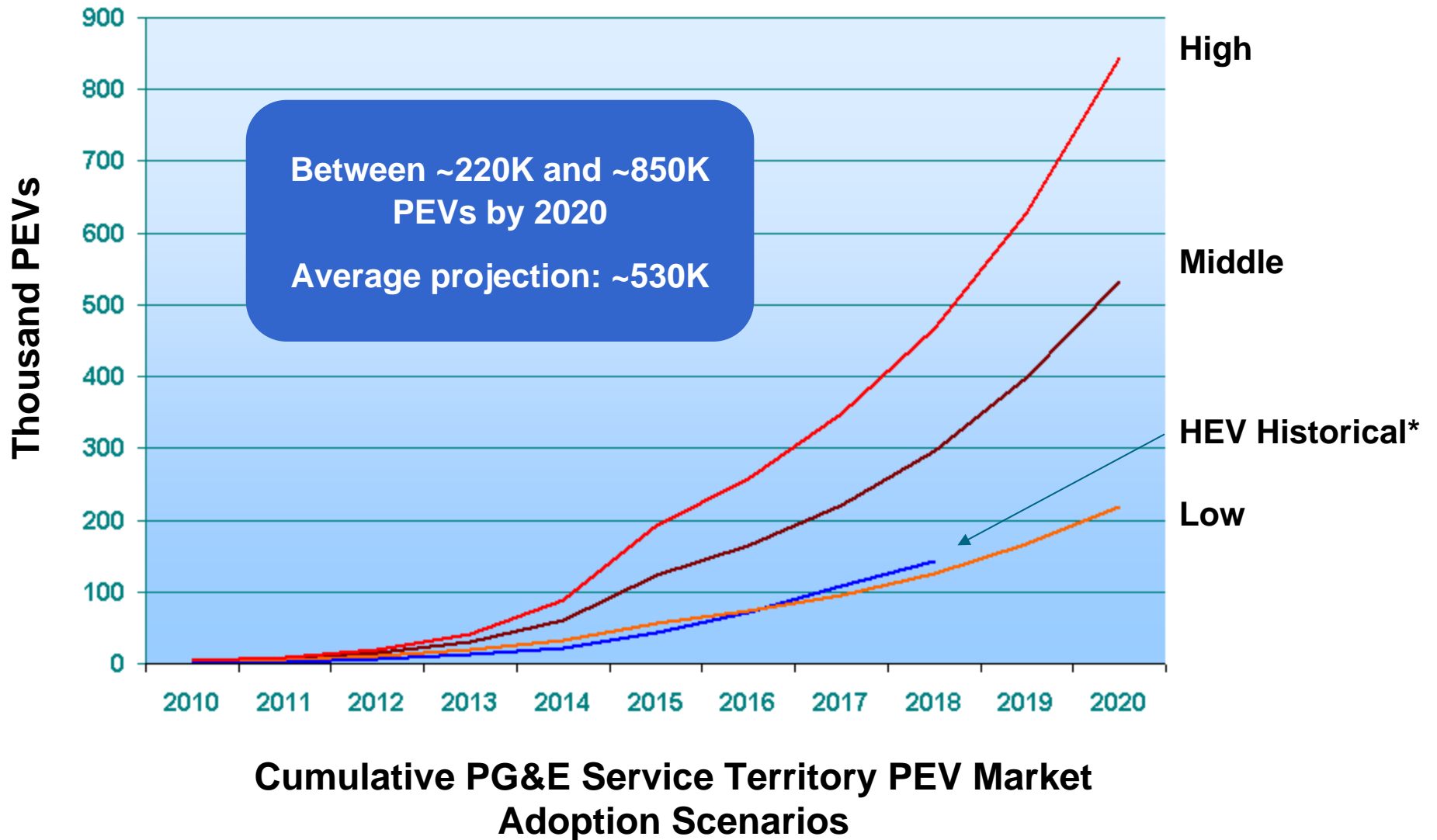
## PG&E Service Area PEV Density Map



## Public Charging Programs



# Projected PEV Adoption



\* Shifted 10 years forward

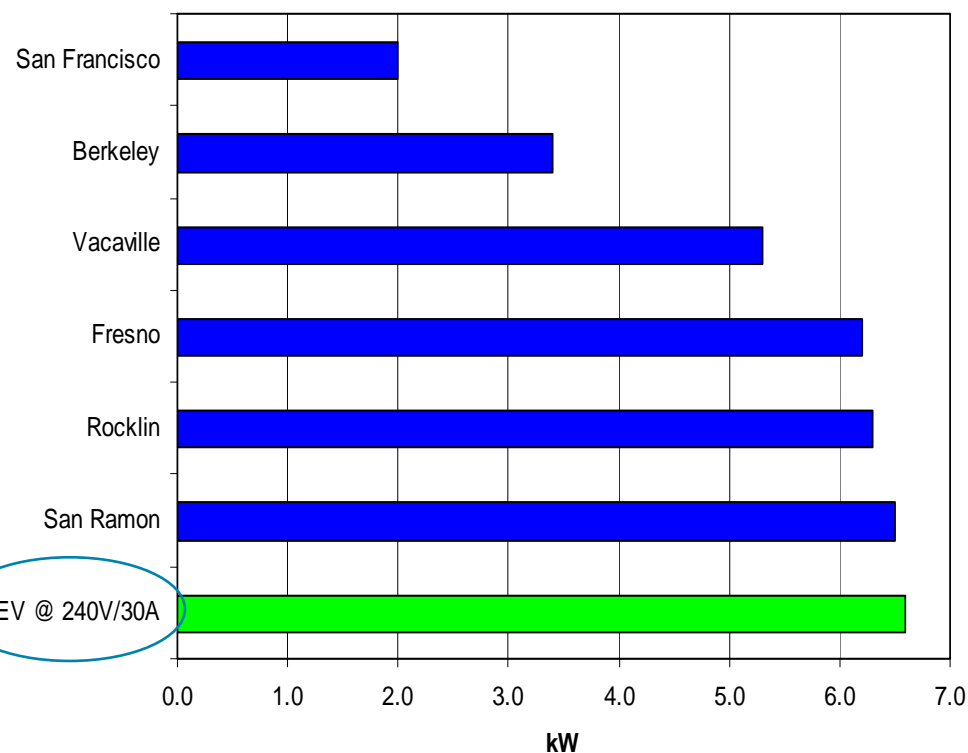
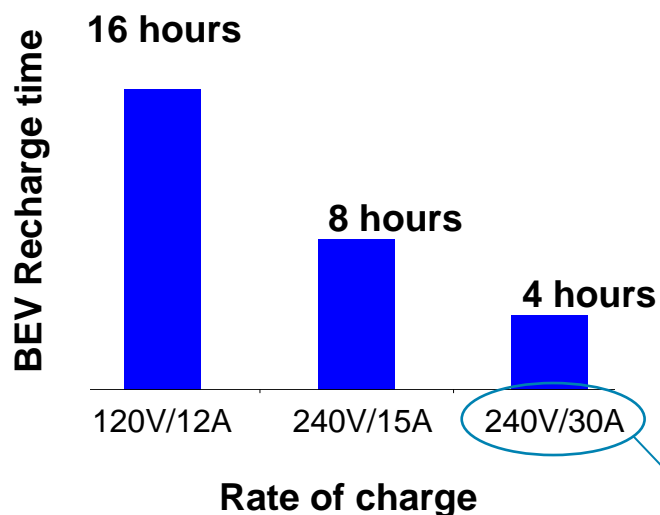


# PEV Charging Creates a Significant Increase In Load

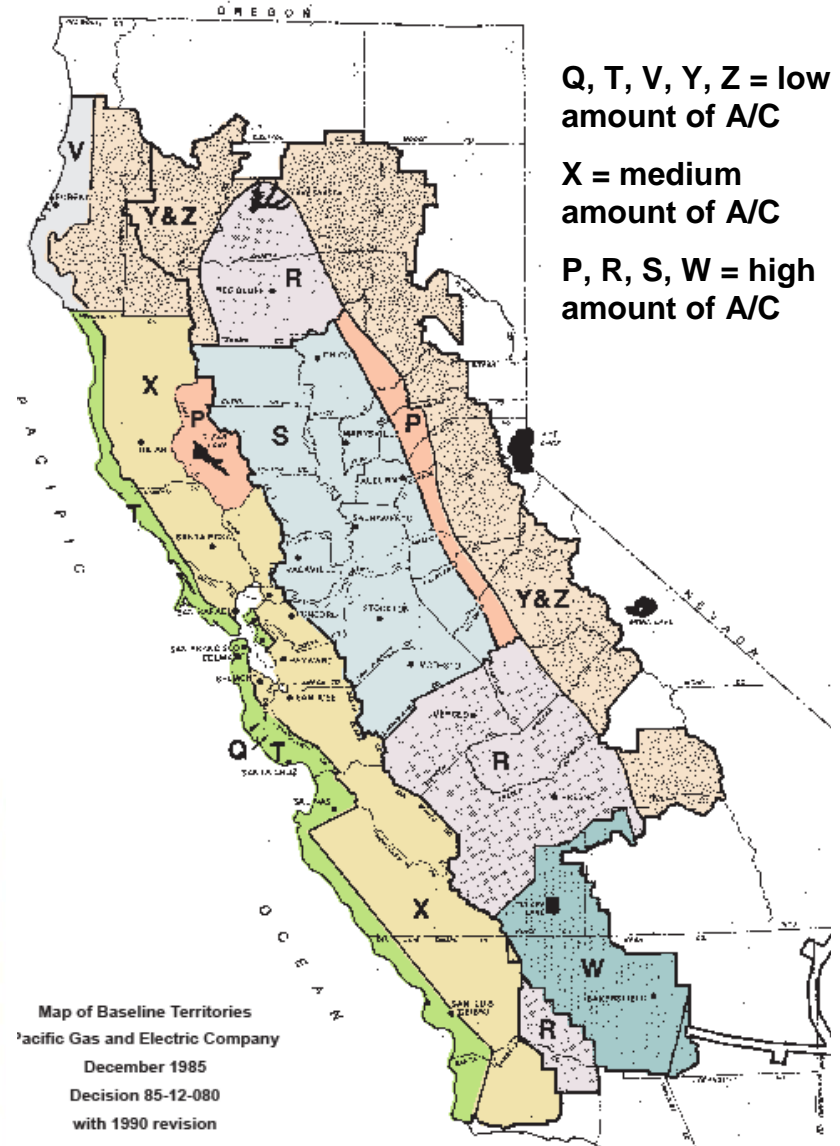
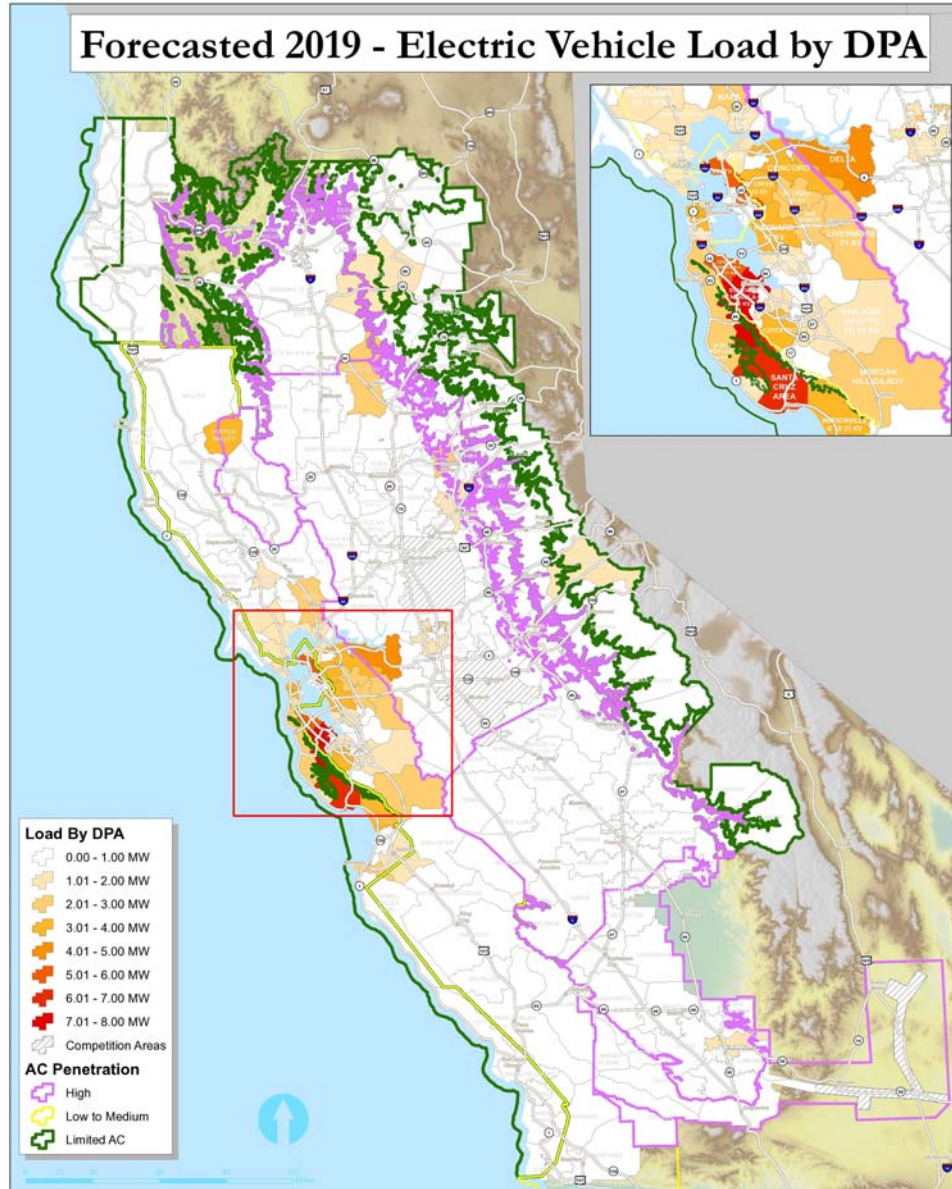
Customers will prefer a 240V charge to shorten recharge times



PEV charging is a large load for PG&E customers, comparable to average peak summer load of a single home

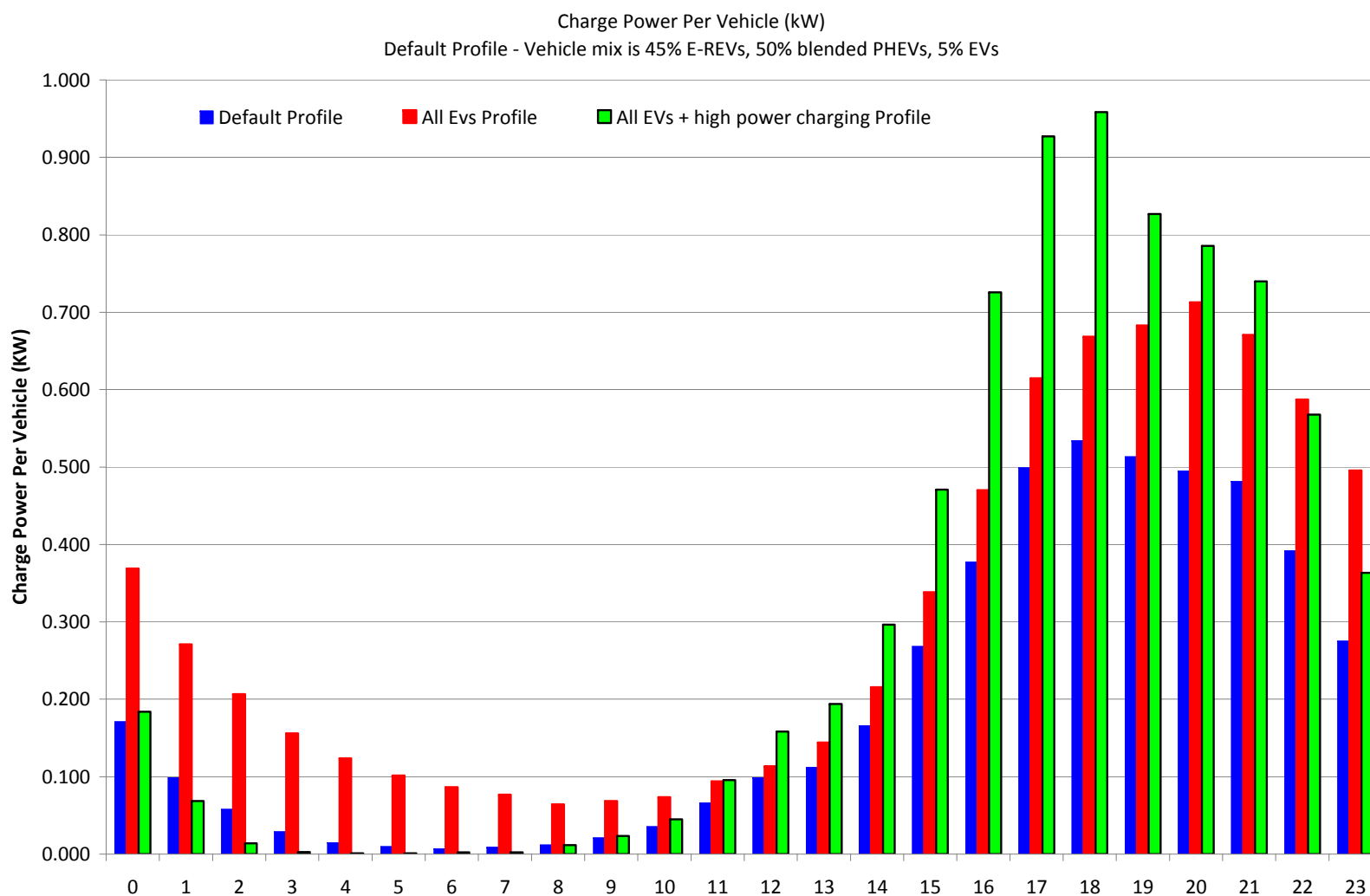


# PEV Density Differs by Location



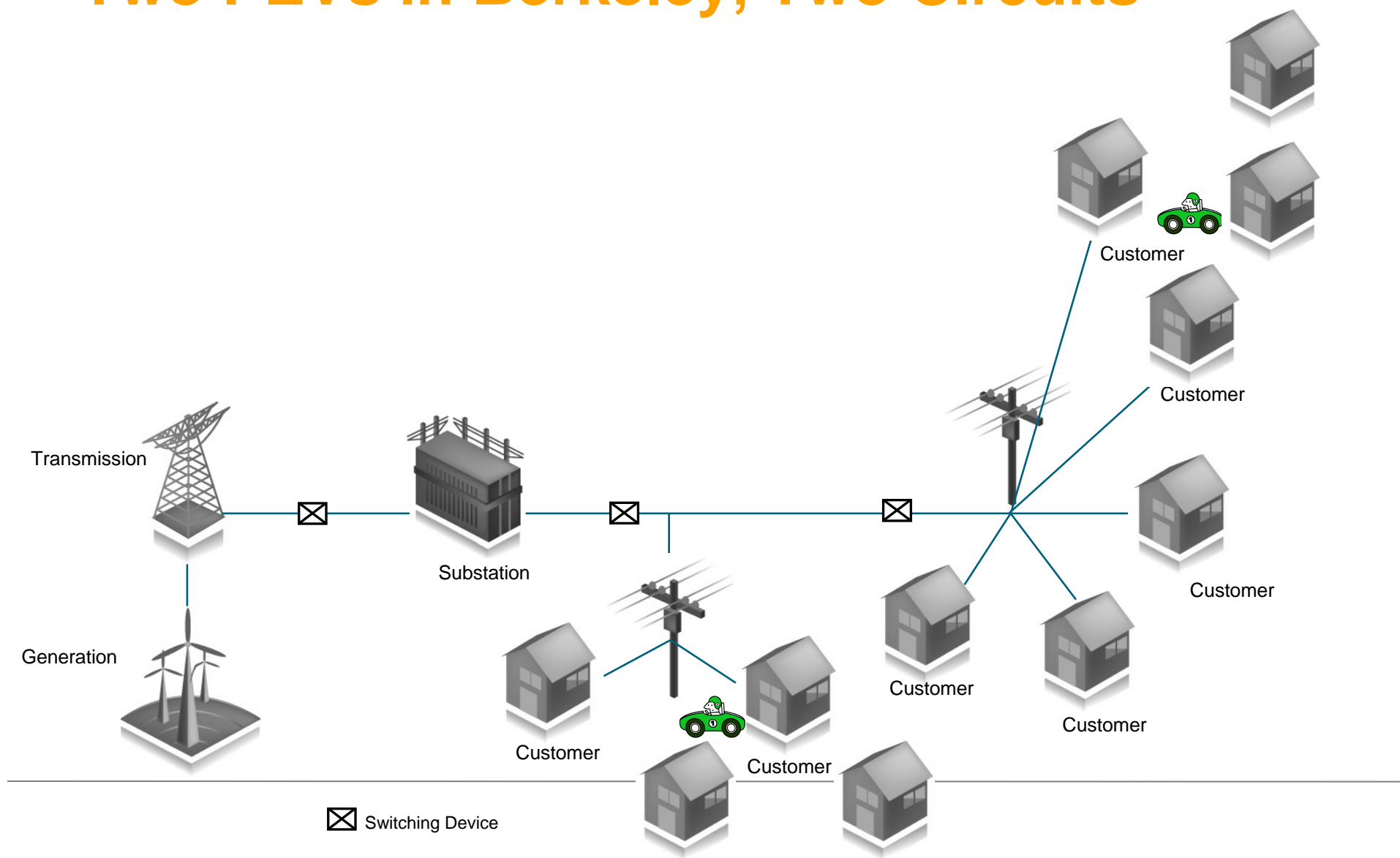


# Left Unmanaged, PEV Load Will Add to Peak Electric Demand



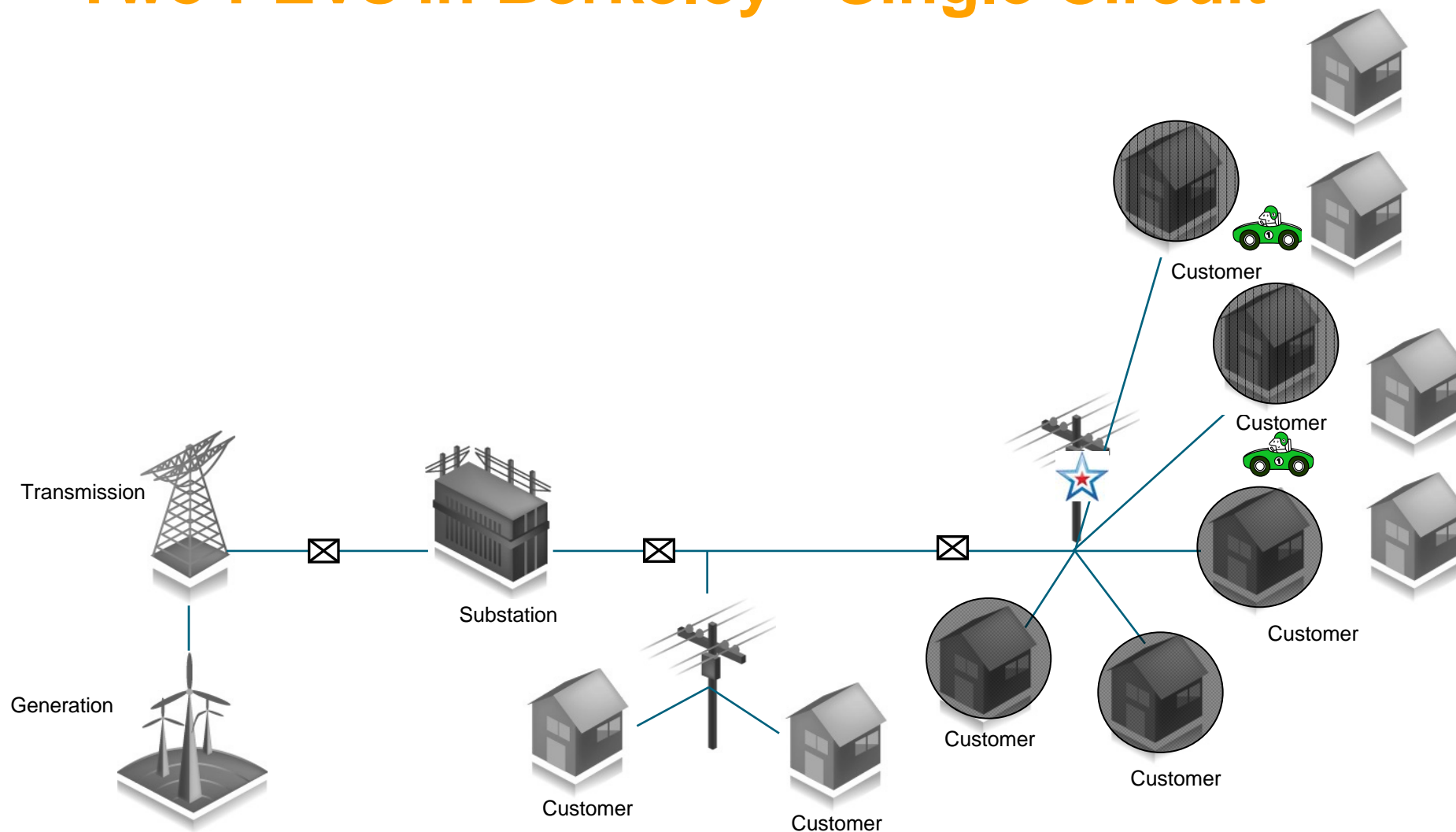


# Clustering Exacerbates Issue: Two PEVs in Berkeley, Two Circuits





# Scenario 2: Two PEVs in Berkeley - Single Circuit



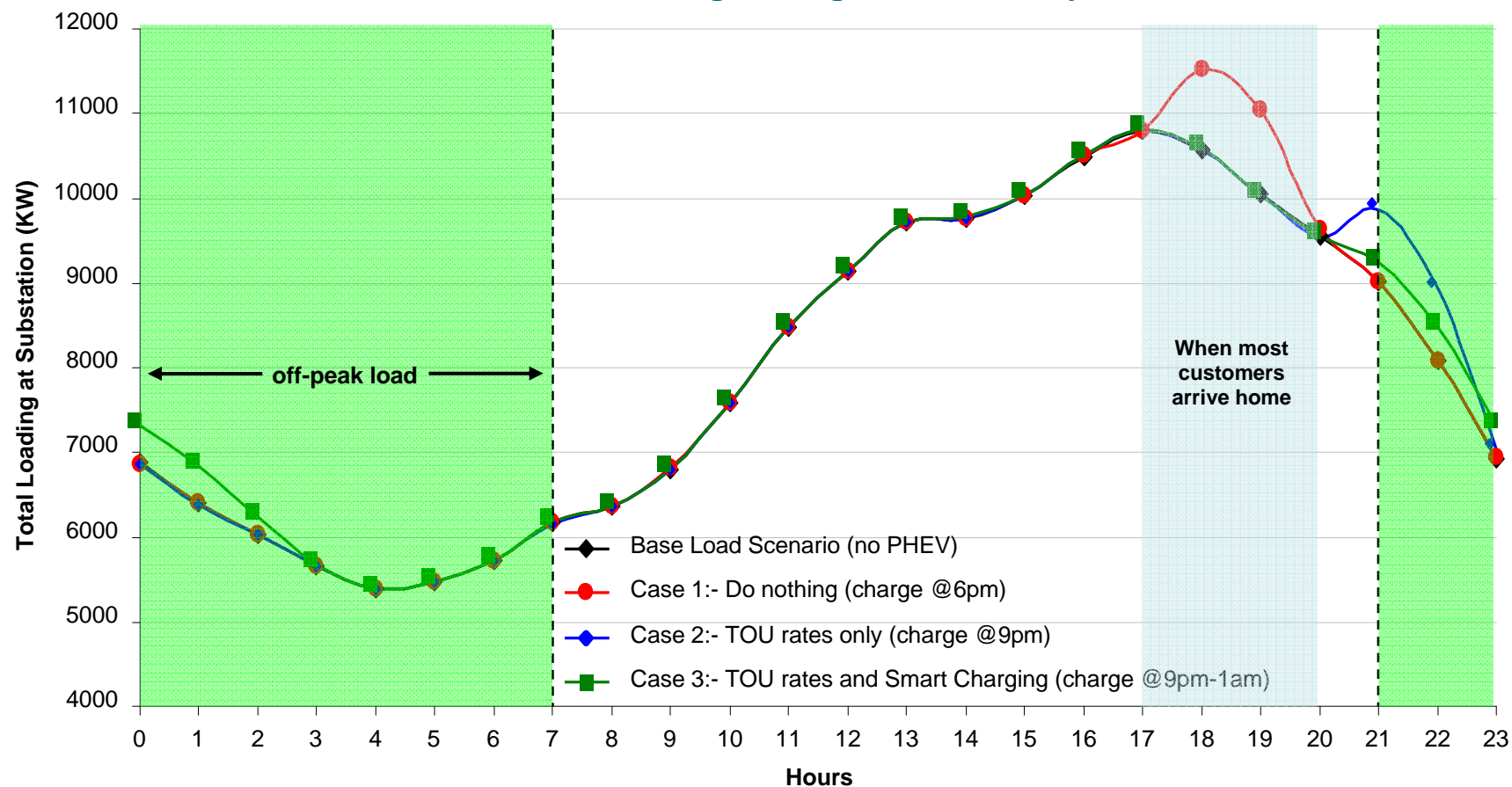
☒ Switching Device





# TOU Rates Only Will Not be Sufficient

## 24 Hour Total Loading of Single Feeder - July 27, 2007

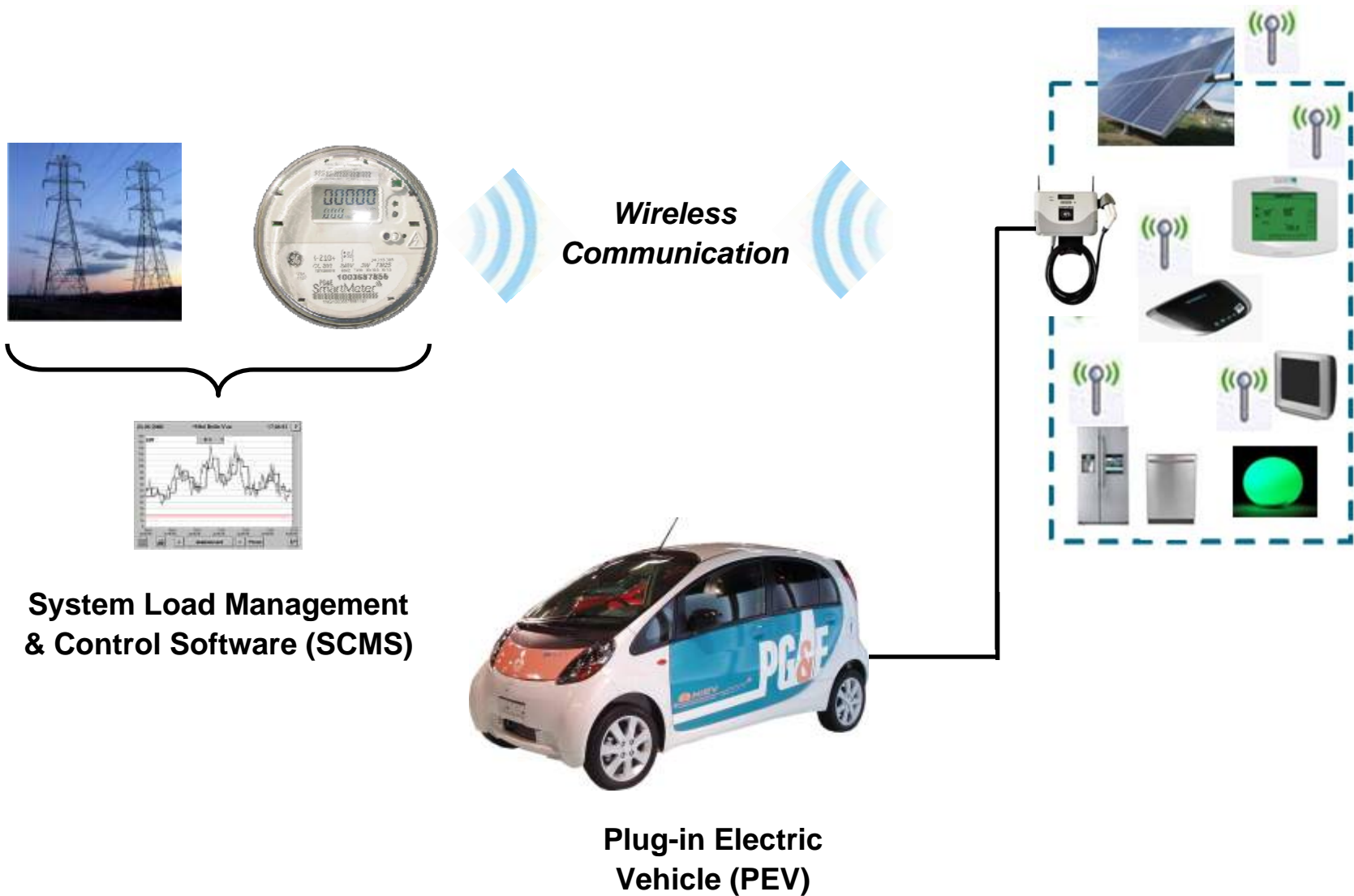


Source: EPRI.

Note: Feeder of Northeastern utility feeder during urban summer peak with 2,778 residential customers. PEV penetration = 10%.

Case 1 – 3 charge @ 240V, 12A

# Future Solution: Smart Charging





# Short-Term: Getting to Plug-in Ready

*It is imperative to operationalize a safe, efficient, consistent, and Scalable process that benefits PEV customers*

## Internal Process Alignment

- Service Planning
- Call Center Operations
- Metering & Billing
- Marketing
- Solar Customers
- Commercial Accounts



## External Stakeholder Alignment

- Cities and Counties
- League of Cities
- PEV Coalition Groups
- Environmental Groups
- Regulators
- Media and Non-Profits



## Technology Readiness

- Standards
  - SAE J1772
  - SAE J2836, 2847
  - NIST SEP2.0
- Public DC Fast Charger
- Collaboration with OEM
- Installation of public chargers



# Customer Outreach and Education

PG&E is committed to educating, training, and providing expertise



MANAGE MY ACCOUNT
CUSTOMER SERVICE
SAVE ENERGY & MONEY
ENVIRONMENT
EDUCATION & SAFETY

## Electric Vehicle Rate Plan Comparison Calculator

Input your zip code to view the most common rate plans and usages in your neighborhood [Print](#)

**About your home** [Clear Inputs](#)

**Your Home's Zip Code (Required)**  
 SAN FRANCISCO

**Territory Code / Description**  
 Coast

**Your current rate schedule**  
 E1 - Res. Services  
[How do I find this?](#)

**Your Average monthly Kwh usage during summer (May-Oct) ?**  
  
[How do I find this?](#)

**How do you heat your home?**  
 Electric/Natural Gas  
[Why does this matter?](#)

**Your Average monthly Kwh usage during winter (Nov-Apr) ?**  
  
[How do I find this?](#)

**About your car**

**Which PEV are you interested in ?**

**When will charge this PEV?**  
 Off-Peak  
[Why does it matter?](#)

**Current Car Driving and Gasoline Usage**

Daily Miles Driven	MPG	\$ Cost per Gallon
30	22	\$ 3.00

**Your Calculation Results**

The PG&E Electric Vehicle Rate Plan Comparison Calculator has evaluated your rate options as summarized in the graph below. \*

Scenario	Summer Cost	Winter Cost
Current Electricity Costs (Home Only) on E1	\$47.71	\$47.71
Home + PEV on E1	\$47.71	\$43.19
Home + PEV on E9A	\$43.19	\$54.37
Home On E1 PEV on E	\$54.37	\$54.37

Monthly Kwh usage - PEV

Range per Full Charge (miles)

Battery Charges Per Month

KWH used per full charge (L2)

Total Kwhs

Monthly Gasoline Usage for Extended Range

Miles Per Day

Miles Per Month

MPG - Extended Range

Gallons Per Month

## Plug-in Electric Vehicles

Gear up for a greener driving alternative

Cruise toward a cleaner fuel economy

Californians are often the first to try out innovative ways to protect the environment. So it's no surprise we're gearing up for a greener driving alternative: plug-in electric vehicles (PEV). PEVs are quiet, environmentally friendly, and energy efficient. Let us help you move into a gasoline-free future!

**Is an electric vehicle right for me?**  
Review the basics about PEVs.

**Is my home or business plug-in ready?**  
Take these steps to become Plug-in ready.

**Need more answers?**  
Check out answers to commonly asked questions about plug-in electric vehicles.

Plug-In Ready Resources

- Frequently Asked Questions**  
Review frequently ask questions.
- Installation Guide**  
Download a step-by-step guide to upgrade your electric service at home.
- Pricing Plans**  
Switch to the best pricing plan for you.
- Incentives and Rebates**  
Take advantage of tax incentives and rebates.

Visit us @ [www.pge.com/electricvehicles/](http://www.pge.com/electricvehicles/)

# PG&E is Committed to PEVs

