



Strategies for Meeting Future EV Charging Demand

EV Charging Workshop
Javits Center, New York, NY
April 2, 2015





Pacific Gas and Electric Company



Energy services for over 15 MM people:

- 5.2 MM Electric customer accounts
- 4.4 MM Natural Gas accounts

70,000 square miles with diverse topography, climates and customers

20,000 employees

A regulated investor-owned utility

Independent Transmission System Operator

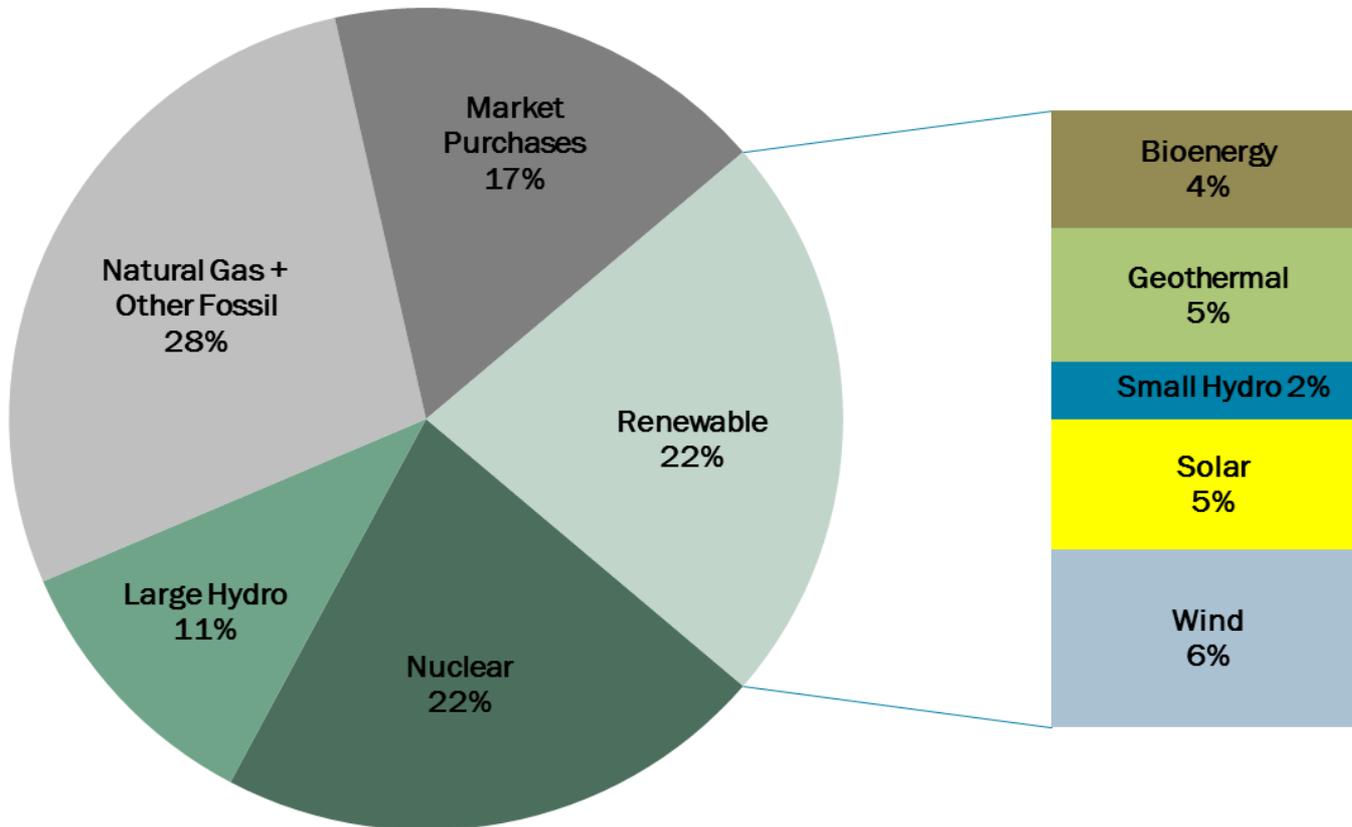
Ranked “Greenest” utility 2009 and 2010





PG&E's 2013 Electricity Mix

Figures represent % of PG&E's total bundled retail sales

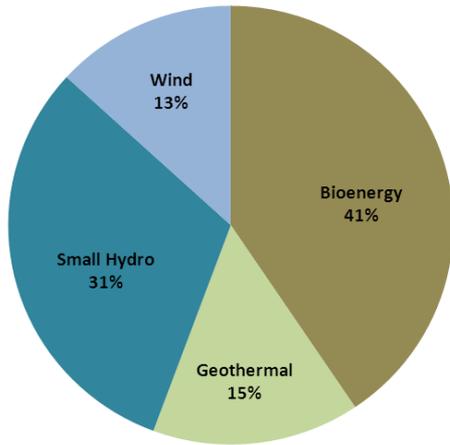




Resource Integration: Past, Present, Future

2002 Actual

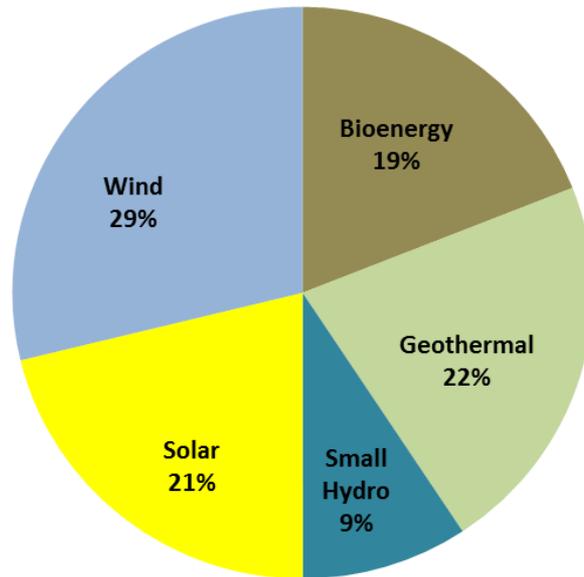
11% of total bundled retail sales



Total RPS-Eligible Procurement
7,504 GWh

2013 Preliminary

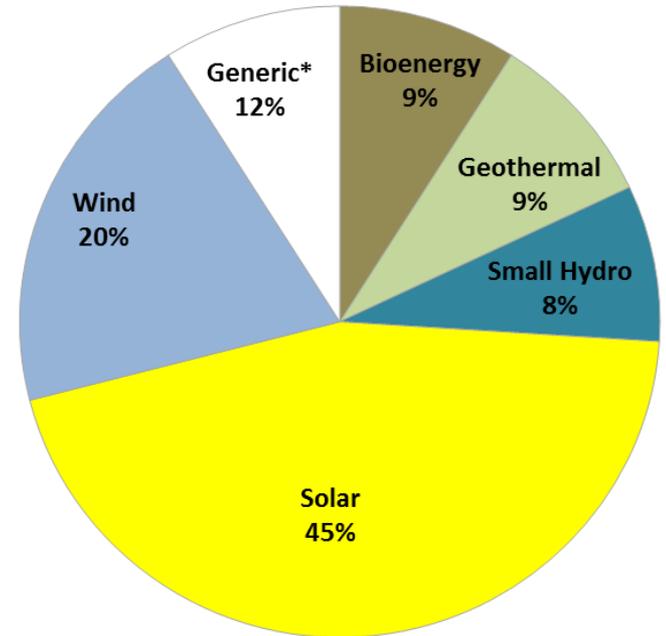
22% of total bundled retail sales



Total RPS-Eligible Procurement
17,030 GWh

2020 Projected

33% of total bundled retail sales

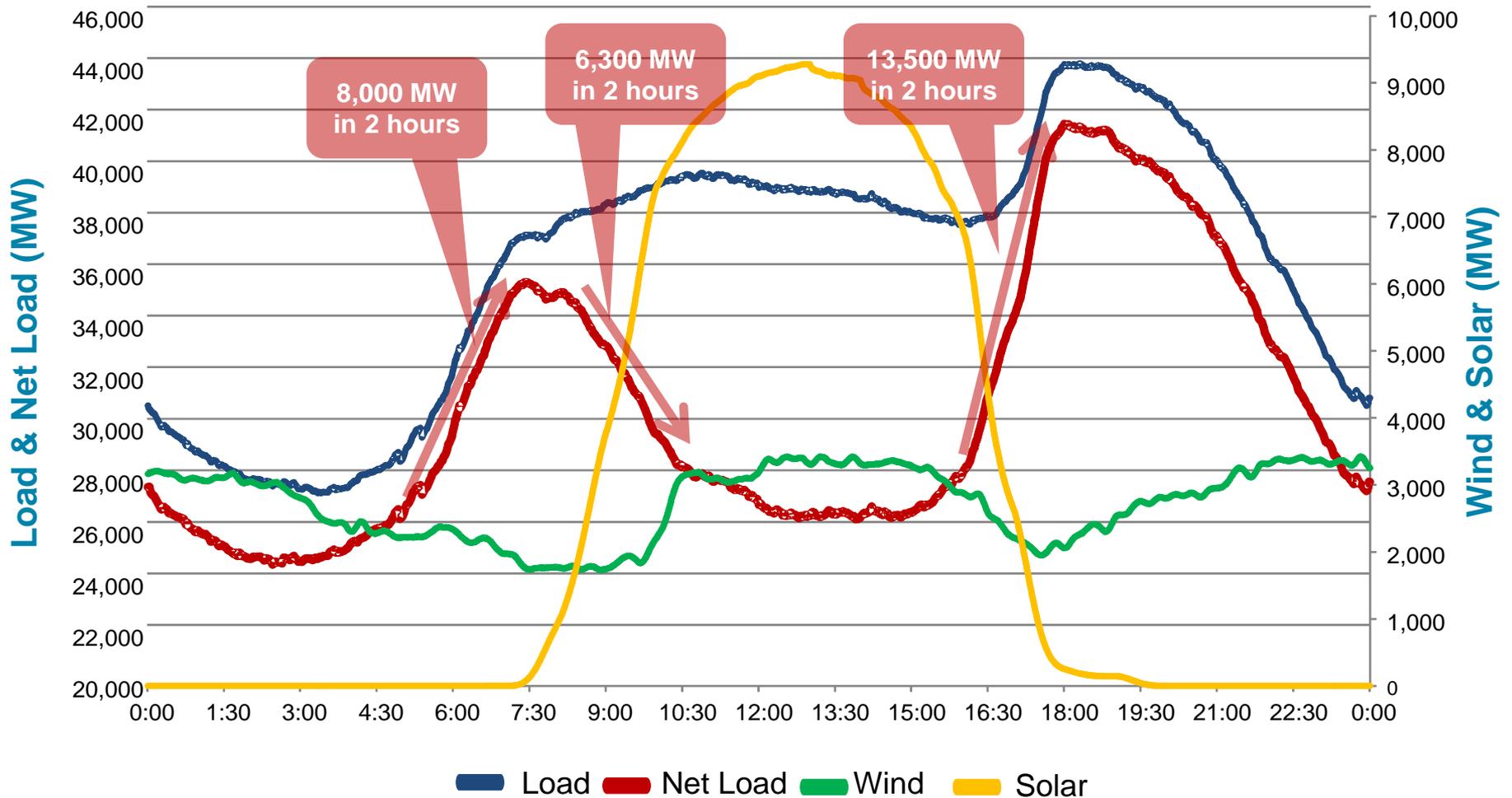


Projected RPS-Eligible Procurement
~26,500 GWh



Looking Ahead: Flexible Resources Are Important

Load, Wind & Solar Profiles – High Load Case January 2020





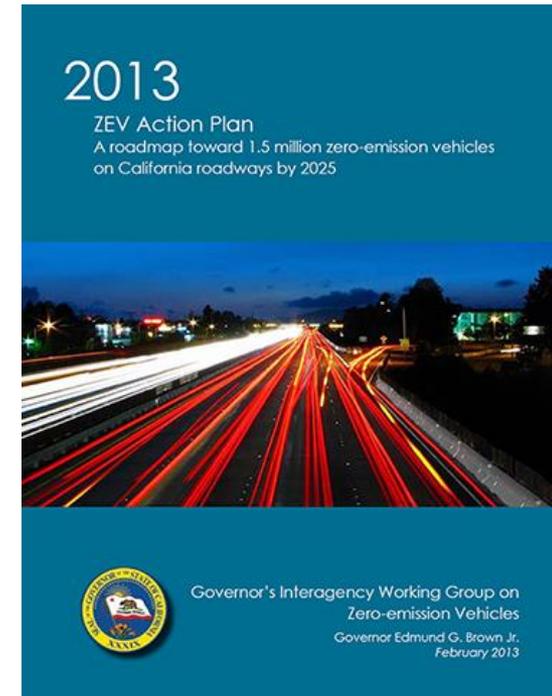
Electric vehicle market is gaining momentum, and California is focused on accelerating adoption

Electric Vehicle (EV) Market Conditions

- EV offerings are growing significantly each year (20+ models on the market today; 30+ planned for 2016)
- Sales growth limited by high vehicle cost and range anxiety
- EV adoption is outpacing infrastructure deployments

State Focus on EV Adoption

- January 2013: Governor Jerry Brown issued the Zero Emission Vehicle (ZEV) Action Plan calling for 1.5 million ZEVs in California by 2025, and the infrastructure to support 1 million EVs by 2020
- December 2014: California Public Utilities Commission (CPUC) repealed 2011 prohibition on investor-owned utility (IOU) involvement in EV infrastructure market
- January 2015: Governor Brown's inaugural address proposed to reduce petroleum use in cars and trucks by up to 50 percent by 2030

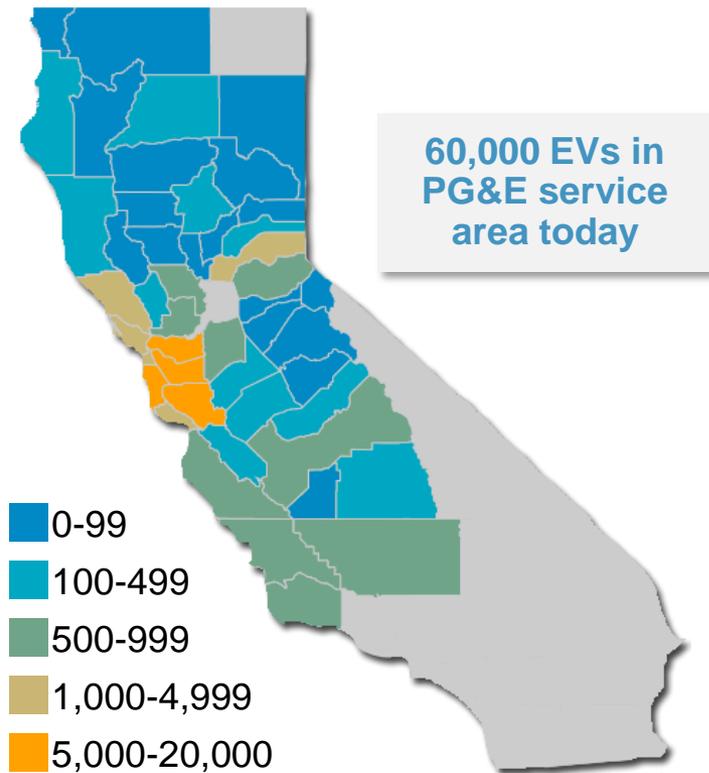




PG&E and California are seeing strong EV market growth, but infrastructure barriers to adoption still exist

Cumulative EV Sales by County¹

PG&E Service Area



PG&E's service area is adding **2,200** new EVs per month. Adoption has been strongest around the Bay Area.

0.7% of 2014 new vehicle sales in USA were electric vehicles

3.2% of 2014 new vehicle sales in CA were electric vehicles

4.5% of 2014 new vehicle sales in PG&E were electric vehicles

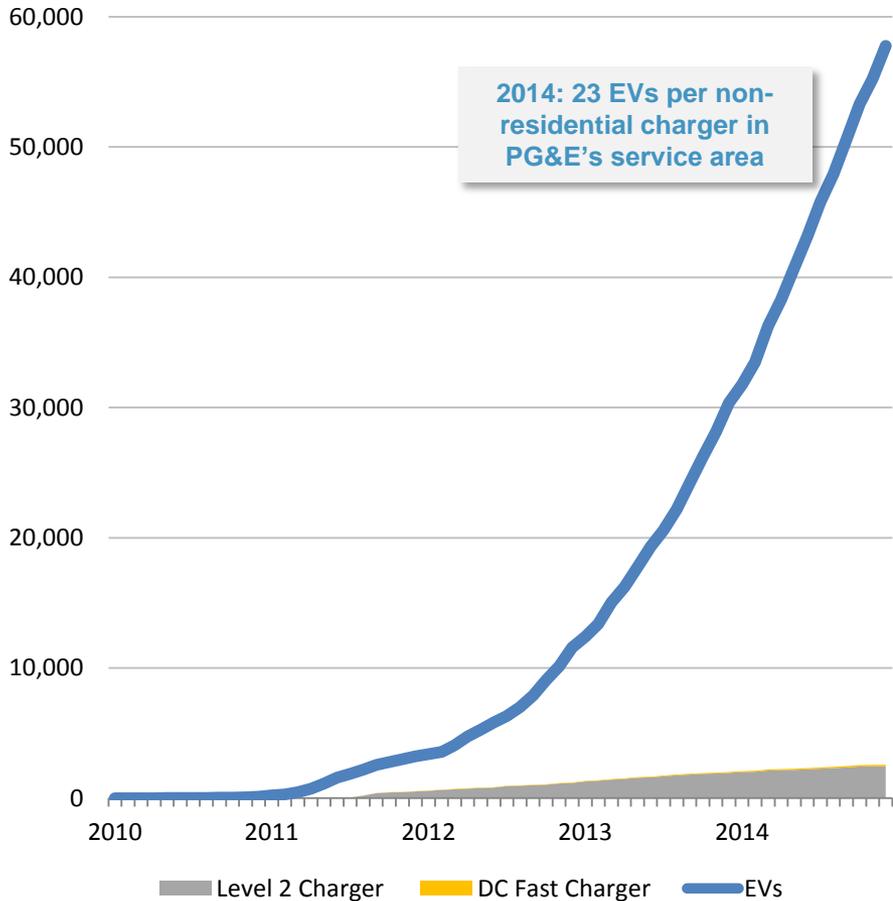
10% of 2014 new vehicle sales in Santa Clara County were electric vehicles

1. EPRI, R.L. Polk Data, Dec. 2014



Public charging infrastructure is not keeping pace with EV adoption in California

Cumulative EV registrations¹ and charger deployments² in PG&E service area



Key EV challenges today

- Higher upfront cost of EVs relative to conventional vehicle
- Range anxiety and lack of available charging infrastructure
- Charging availability for customers in multi-unit dwellings and workplaces
- Lack of easily-accessible customer information about EVs
- High infrastructure upgrade costs for commercial and fleet customers

Utility can play key role in addressing

1. EPRI, R.L. Polk Data, Dec. 2014
2. PlugShare © data, 2014



PG&E EV Infrastructure and Education Program Guiding Principles



Support California climate policy



Enable customer EV adoption



Make electricity widely available as a transportation fuel



Utilize EV load for system benefit



PG&E program designed to accelerate EV adoption through charging infrastructure and education

Proposal Overview

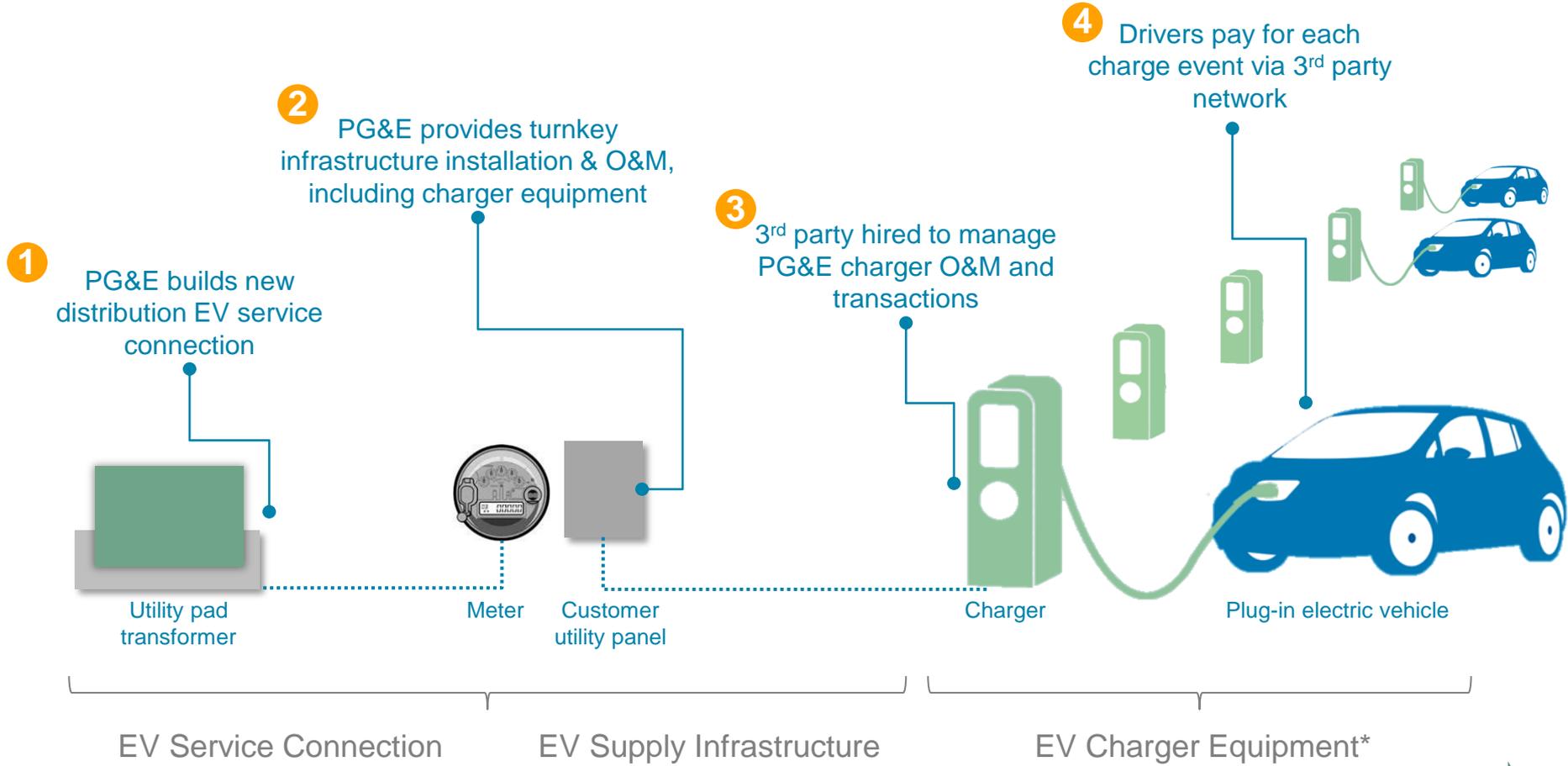
- Deploy 25,000 Level 2 chargers and 100 DC fast chargers
- 5 year program to build, own, and maintain 25% of the 2020 EV charging infrastructure need
- Deliver turnkey charging solutions with integrated education to accelerate EV adoption
- Target commercial and public locations, with approx. 10% of installations in disadvantaged communities
- Offer approved PG&E time-of-use rate to EV drivers

Operational details

- No out of pocket cost to site host – requires in-kind land easement contribution
- 3rd parties service providers contracted for charger installation, O&M, & billing
- Site hosts receive outreach tools to drive awareness & help accelerate adoption
- EV charging platform enables future smart charging to support renewables integration and drive grid benefits



PG&E's turnkey program integrates EV education with charging infrastructure for participants



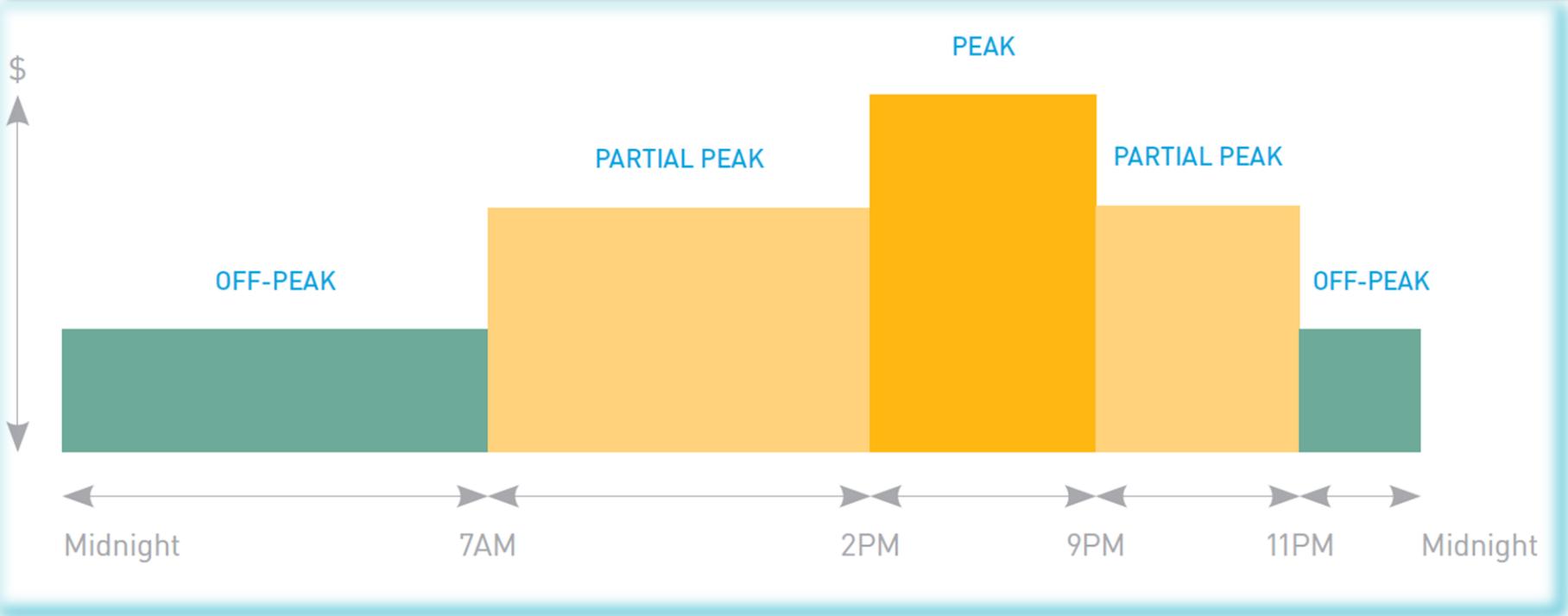
Site hosts receive outreach tools to drive awareness & help accelerate adoption

*PG&E's EV Program platform enables future smart charging to support renewables integration and drive grid benefits



Redesigned EV Rates Help Customers Lower Fuel Costs

Simplified time-of-use rates allow EV customers to charge off-peak at the equivalent of \$1/gallon, providing a benefit to customers and the utility



Thank you!

