Q1 2018 Clean Transportation Program Advisory Council Meeting

March 23, 2018

Together, Building a Better California

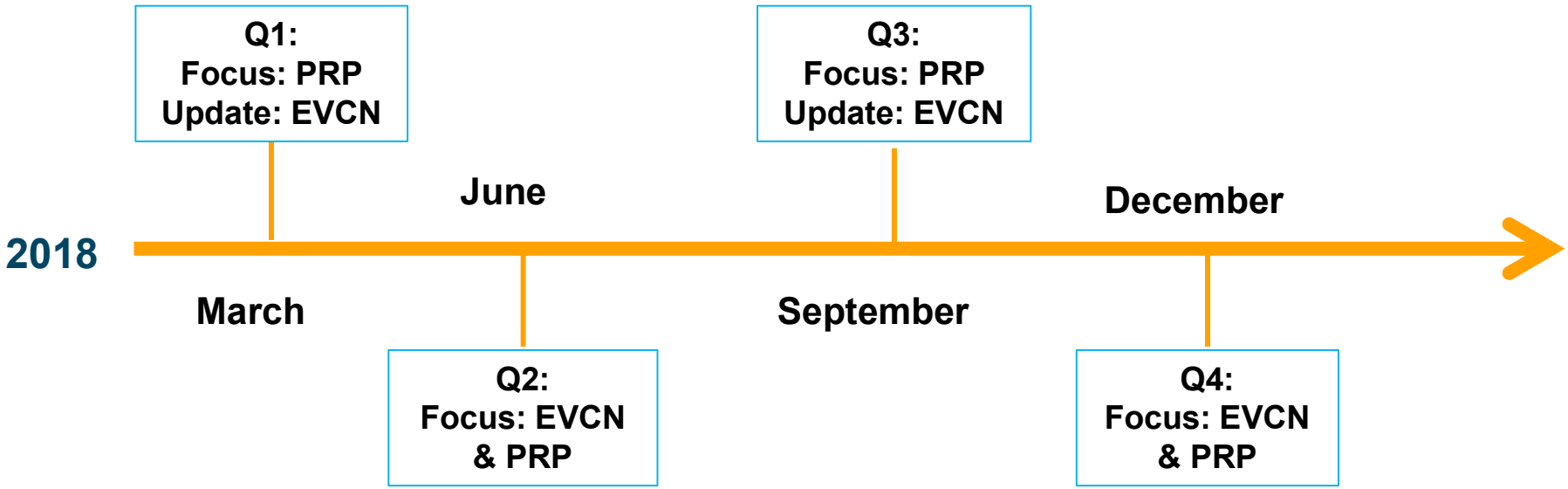
Agenda

Safety/ Introductions	9:00-9:15
Meeting Overview / EV Market Update	9:15-9:9:35
EV Charge Network Program Update	9:35-9:55
EV Cost of Ownership Tool	9:55-10:15
BREAK	10:15-10:25
SB 350 Priority Review Projects	10:25-11:00
AB1082 & AB1083	11:00-11:30
Proposed Priority Review Projects	11:30-12:00

Clean Transportation Program Advisory Council

Overview

- PG&E is expanding efforts on transportation electrification, with a number of filings and programs in development
- CPUC has directed PG&E to consult a Program Advisory Council in the development of these pilots and programs to gain feedback from industry stakeholders
- This platform will serve to gather insight and feedback to PG&E's proposals and on-going programs



EV Market Update

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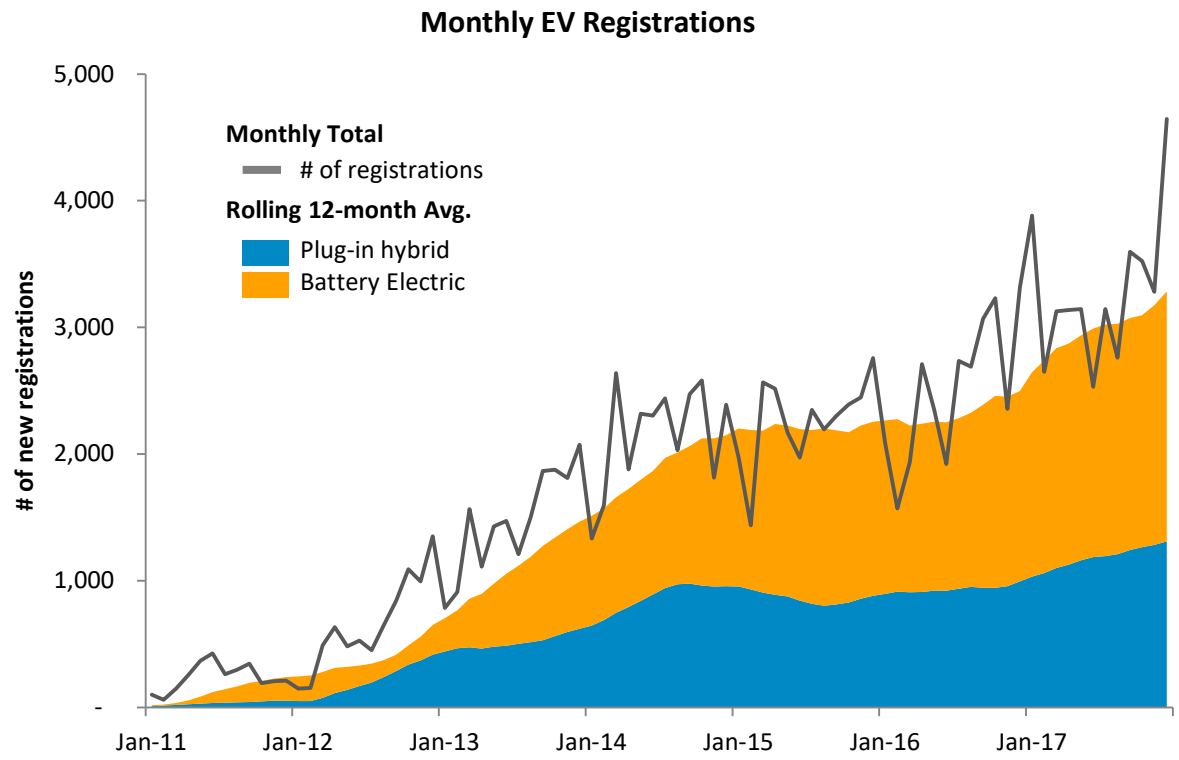
EV registration growth

150,659 **EVs registered** in PG&E service territory, through end of 2017



2017 EV registrations in PG&E service area increased 32% over 2016, after two years of marginal growth.

EV registrations were 20% higher than conventional hybrid registrations in PG&E service territory last year.

Approximately one in every 16 cars sold in PG&E's service territory was electric last year.

Source: EPRI, Based on external registration data

Governor Brown announces bold new ZEV goals for 2030

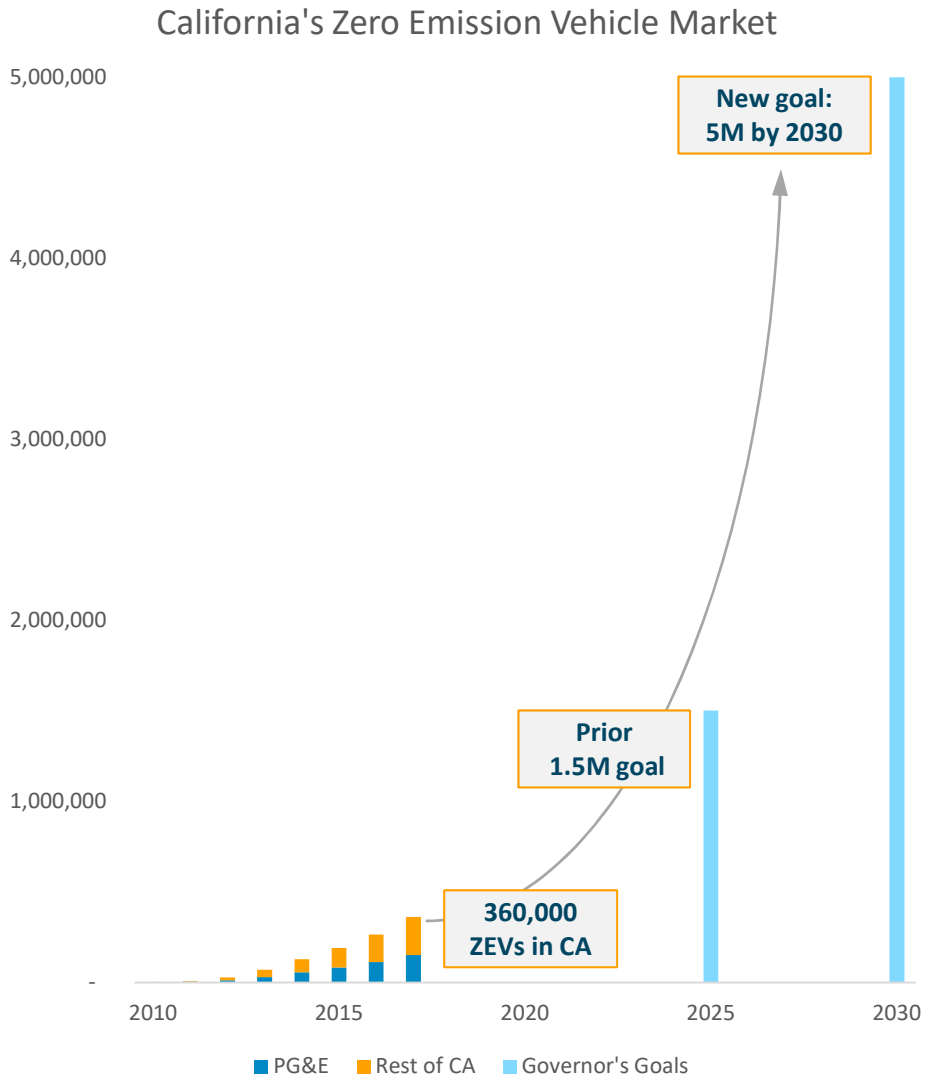
Through an Executive Order, Governor Brown announced a **2030 target of 5 million zero-emission vehicles**, significantly beyond the 1.5M vehicle target he previously set for 2025.

- This represents about 20% of all passenger vehicles

The Order also established concrete infrastructure targets for 2025

- 250,000 vehicle chargers, including 10,000 DC fast chargers
- 200 hydrogen refueling stations

Governor Brown also unveiled an eight-year, $2.5 billion funding plan for clean transportation, which featured $1.6B for vehicle incentives and $900M for infrastructure.



EV Charge Network Program Update

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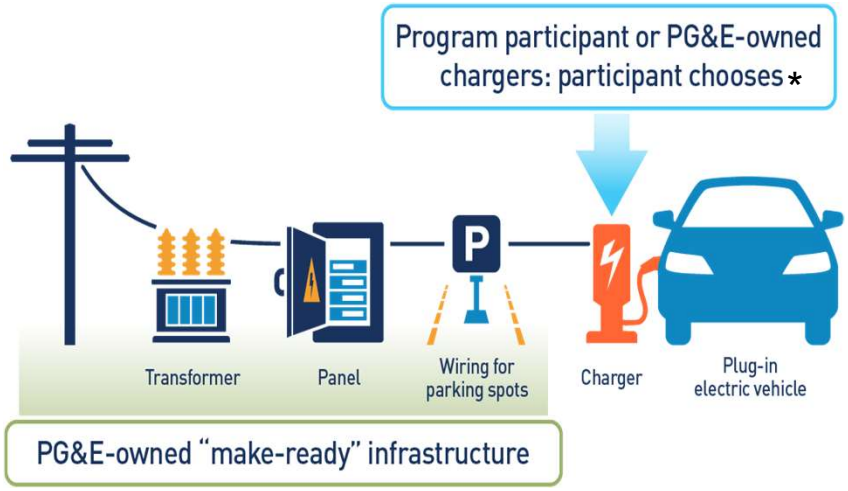
EV Charge Network Program Summary

Fast Facts:

- **Scope:** 3 years (2018-2020); $130M budget
- **Scale:** Up to 7,500 level 2 chargers (approx. 500-750 sites)
- **Sites:** Multi-unit dwellings (MUDs) and workplaces



Key Features:

In addition to the infrastructure, a portion of the charging equipment cost will be **paid for by PG&E**

Targeting 20% chargers at MUDs and 15% in DACs

Program requires a minimum of **10 EV parking spaces** per site

PG&E can own up to 35% of the chargers, at MUDs and in disadvantaged communities (DACs)

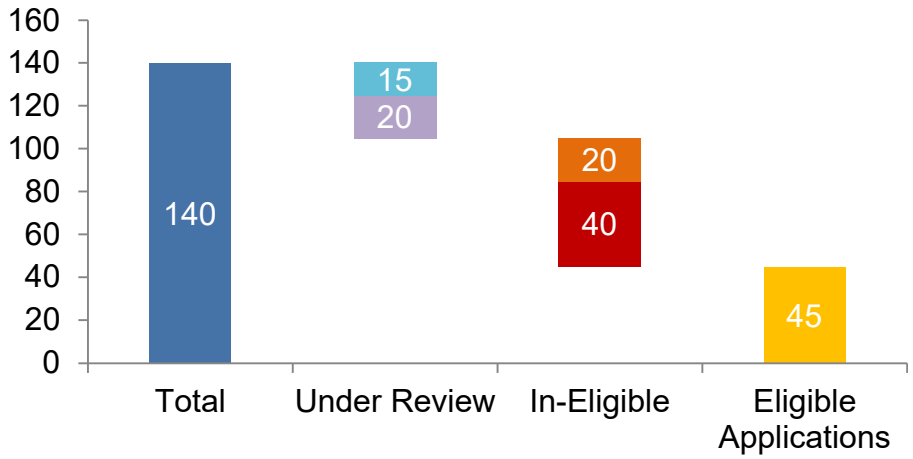
PG&E will **pay for, maintain and coordinate** construction of infrastructure from the pole to the parking space (often 60-80% of the total project cost)

Application and Participation Overview

Application Status Summary

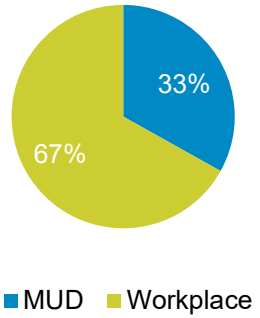
Application status as of March 21, 2018:

- Received: 140
- Under Review: 35
- Eligible Applications: 45
  - In construction: 3
  - Complete: 1
- Waitlist: 20
- Cancelled: 40

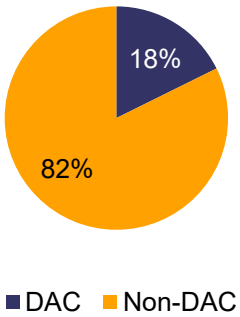


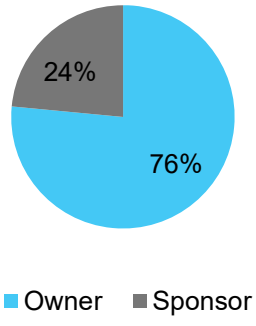
Customer Acquisition

- PG&E continues to work with **internal BES sales reps** as well as **external partners** including CCAs, vendors, and non-profit organizations
- Deploying **targeted marketing** strategy to fill up construction pipeline while working towards achieving portfolio of 20% MUD and 15% DAC
  - Press release: Jan 15, 2018
  - Email campaign: Jan 18, 2018
- Developing program materials including new EVSE **hardware filtering tool**



Customer Profile
(based on all applications received)





Procurement, Construction and Activation

Procurement

RFQ (EV Charge Owner):

- During PG&E's 3rd RFQ which concluded February 15th, 2018:
  - 17 vendors expressed interest in the RFQ
  - 3 new vendors were approved through the RFQ process
  - 1 existing vendor added approved hardware to sell to customers
- PG&E now has 18 approved vendor options for the EV Charge Owner option

RFP (EV Charge Sponsor):

- PG&E remains in negotiations with vendors for the Charge Sponsor option

Construction & Activation

- Started construction at first site in December 2017 at Merced Community College in Los Banos.
- The first chargers are expected to be activated by the end of March, at Travis Credit Union in Vacaville which will initiate program data collection.
- 3 projects are currently in construction, and we have a full construction schedule through May (~10 sites/month)

Completed striping and preparation for EV charger installation at first site, Merced Community College, Los Banos

Electric Vehicle (EV) Cost of Ownership Tool

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Background

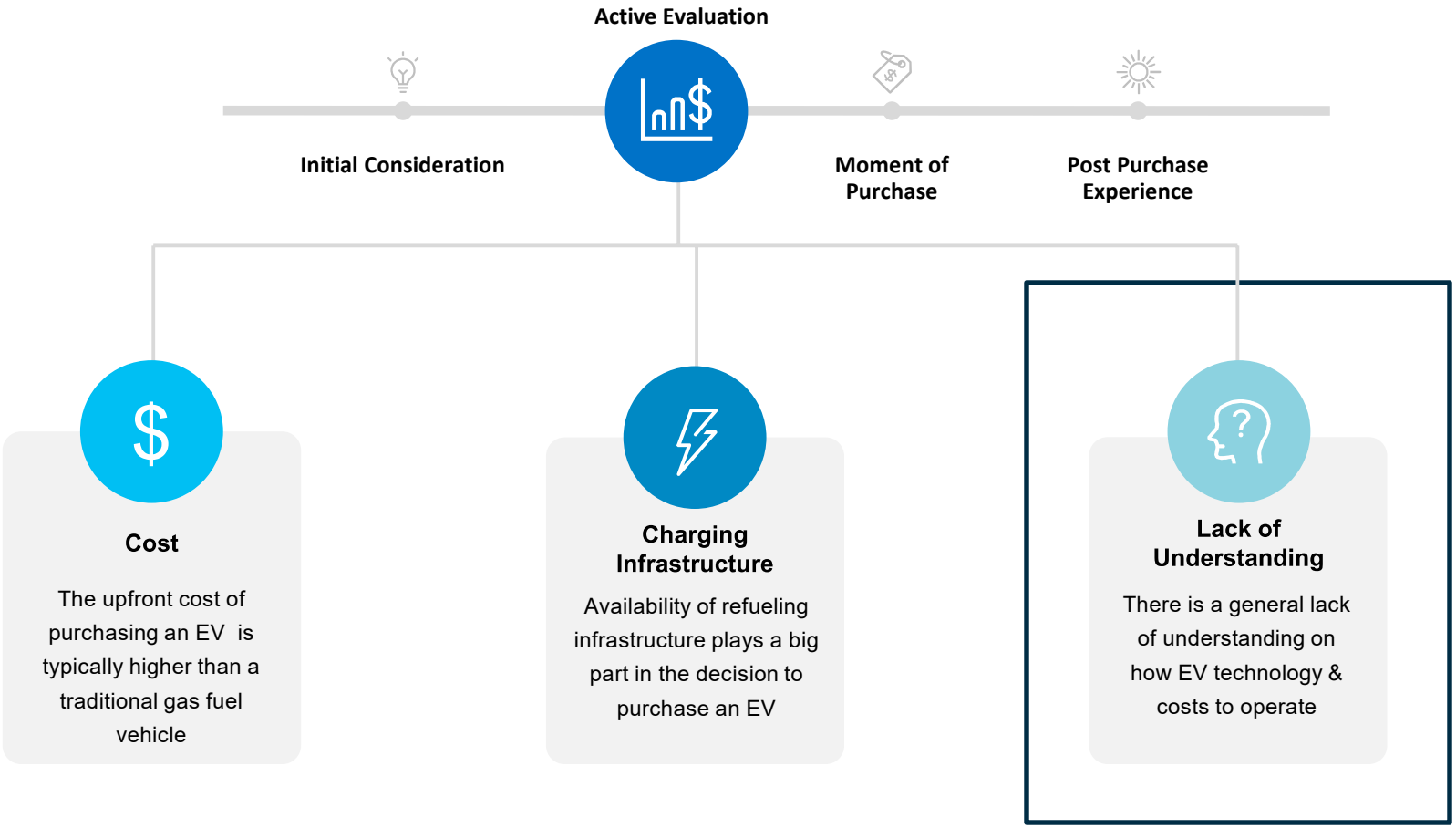
Advice Letter 5064-E and 5064-E-A established “EV Cost of Ownership Tool”

A tool to help customers understand the full cost and benefits of owning an electric vehicle, while addressing:

- Vehicle range anxiety
- Electricity costs / rates
- Available incentives
- Overall cost of ownership

Tool's Objective

McKinsey & Company found that **30 percent** of US car buyers have **considered buying electric cars**—but **only 3 percent** actually **bought one**



Source: ARS Technica

Request for Solution (RFS)

Support EV adoption by providing customers with a tool that is quick, easy to use and provides an accurate/personalized **cost breakdown for owning an EV**

Quick

- Data from external sources loads instantly & and is up to date
- Results should be displayed instantly after user submits data

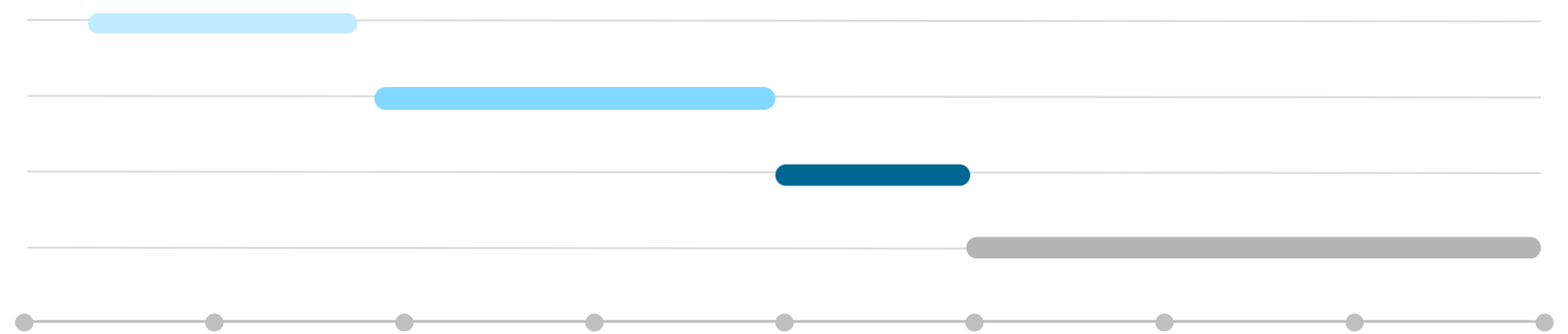
Easy

- Minimize user input
- Auto fill data that is publicly available
- Allow user to modify inputs
- Benefits of owning an EV are tangible
- Results are easy on the eyes

Accurate/ Personalized

- Use user's interval data to project Electric Bill with addition of EV
- Show estimated cost for recommended electric rate plan
- Results provide High Decision Quality

High Level Timeline



01 RFS Development

02 RFS

03 Contracting

04 Development and Implementation

SB350 Approved Priority Review Projects

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PG&E SB350 Priority Review Projects

		Status
1	Medium/Heavy Duty Fleet Customer Demonstration	Approved
2	Electric School Bus Renewables Integration	Approved
3	Idle Reduction Technology	Pending Tier 2 Advice Letter Filing
4	Home Charger Information Resource Pilot	Pending Tier 2 Advice Letter Filing (reduced funding)
5	Open Request for Proposals (RFP) for Third-Party EV Innovators	Not Approved

Medium/Heavy Duty Fleet Customer Demo

Pilot Goals

1. **Further EV adoption by demonstrating lower Total Cost of Ownership (TCO) for electric transit buses vis-à-vis fossil fuel vehicles through:**
   a) **Minimizing infrastructure costs:** Working closely with transit agencies to find efficiencies in infrastructure installation
   b) **Minimizing fuel costs:** Managing charging to minimize peak demand potentially using tools such as energy storage and/or charge management software
2. **Reduce Greenhouse Gas Emissions (GHG) and other criteria air pollutants**

Quick Facts

Market Segment
Transit Agencies

Cost
$3.35 million

Implementation
Constructed by January 2019
One year of monitored EV operations

Business Model
Customer owned chargers
PG&E owned make ready

Project Partner(s)
TBD – in discussion with 1 agency

Vehicle Goals
2-10 electric buses

Electric School Bus Renewables Integration

Pilot Goals

1. **Reduce the Total Cost of Ownership (TCO) of electric buses for school districts by:**
   a) **Minimizing infrastructure costs:** Working closely with school partners to find efficiencies in infrastructure installation
   b) **Minimizing fuel costs:** Managing charging to reduce electric usage during expensive, peak times
2. **Inform how fleet MD/HD vehicles can act as distributed energy resources during periods of high renewable penetration by testing incentive mechanisms for compensating fleet operators to adapt charging schedules**

Quick Facts

Market Segment
School Buses

Cost
$3.35 million

Implementation
Constructed by January 2019
One year of monitored EV operations

Business Model
Customer owned chargers
PG&E owned make ready

Project Partner(s)
TBD Bay Area School District(s)

Vehicle Goals
2-5 electric buses

Idle Reduction Technology

Pilot Goals

1. **Further adoption of idle reduction technology by demonstrating lower Total Cost of Ownership (TCO) through:**
   a) **Minimizing infrastructure costs:** Working closely with customers to find efficiencies in infrastructure installation
   b) **Minimizing fuel costs:** Testing the hypothesis that "electric fuel" costs compare favorably to the cost of diesel fuel spent while idling; assessing viability of tools such as storage and/or charge management software
2. **Reduce emissions of air pollutants from diesel engines**

Quick Facts

Market Segments
eTRU: Grocery & Food Service

Cost
$1.72 million

Implementation
Constructed by January 2019 *
One year of monitored EV operations

Business Model
Customer owned chargers
PG&E owned make ready

Project Partner(s)
TBD – in discussion with 1-3 interested parties

Vehicle Goals
N/A: at least 15 electrified spaces

** Pending approval of Tier 2 Advice Letter*

Evaluation Criteria for PRP Sites/Customers

	Disadvantaged Community (DAC) Status	Geographic Diversity	Cost, Ability, Timing to Build	Procurement Timeline
Best fit	Sited in a PG&E Disadvantaged Community *	Dispersed throughout PG&E service territory	Can be built by end of year 2018 AND Costs in line with initial estimates from SB350 filing	Owns its own fleet AND Electric vehicles already ordered OR Grant funding requested OR Electric fleet procurement plan developed
Minimally acceptable				

** Received percentile rating greater than or equal to 64.63% per Cal Enviro Screen 3.0*

Progress Updates

	STATUS	Q2 MILESTONES
1 **Medium/ Heavy Duty Fleet Customer Demonstration**	• Preliminary design in progress with 1 transit agency • Have received interest from 1-2 additional agencies (several of which are not in DACs)	• Customer contract signed • Detailed project scope complete • Equipment procurement process begun
2 **Electric School Bus Renewables Integration**	• Preliminary design and contracting in progress with 1 school district for 2 chargers • Initial discussions with other school districts for 1-2 chargers	• Easement(s) completed • Project design complete and signed off by customer(s), PG&E • Charging equipment procured
3 **Idle Reduction Technology**	• Soliciting customer commitments • Preparing Tier 2 Advice Letter filing and presentation for the California Freight Advisory Committee (CFAC)	• Feedback from CFAC on implementation plan • Tier 2 Advice Letter filed
4 **Home Charger Information Resource Pilot**	• Work to commence after Tier 2 Advice Letter is approved by Energy Division	• Tier 2 Advice Letter filed proposing how the budget will be spent

Proposed Filings: AB 1082 & 1083 Schools and Parks

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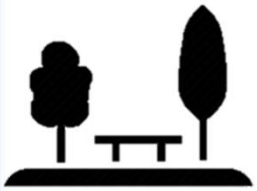
AB1082 and AB1083 Overview

AB1082 / AB1083 AB1082/AB1083 authorize the IOUs to file proposals to pilot charging infrastructure in schools and state parks and beaches

AB 1082: Schools / Educational Institutions

- School can establish guidelines for use of the charging stations
- School authorized to require users to pay electricity costs
- Proposal may include parameters for installation of charging structures for school buses

AB 1083: State Parks and Beaches



- California State Department of Parks and Recreation shall determine which parks and beaches are suitable for charging
- Parks shall not be required to incur any costs or liability related to the charging stations for the pilot's duration

- Prioritize disadvantaged communities
- Propose reasonable mechanism for cost recovery
- Each pilot budget not to exceed $10M
- Pilot duration not to exceed 2 years

Public School Landscape in PG&E Territory

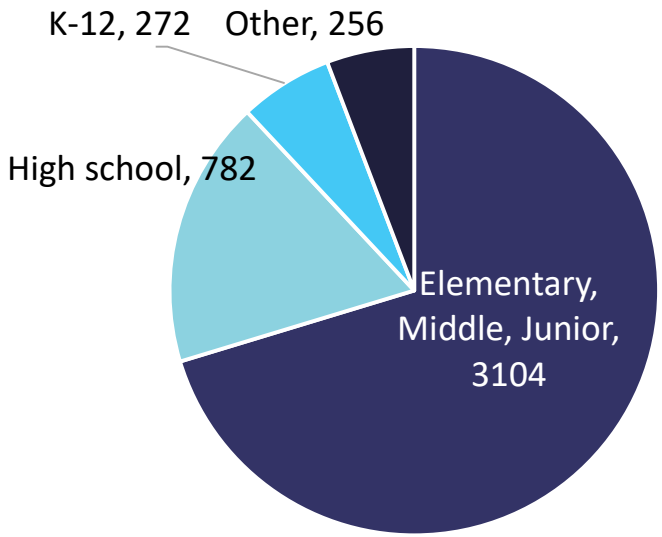
K-12 Schools: Key Inputs

- Schools have few resources available for program design, planning, maintenance, etc.
- Schools are concerned about:
  - Limited number of parking spaces
  - Allowing the public access to chargers on school campus
  - Vandalism
- Schools are interested in incorporating EV charging into the curriculum, and/or integrating with past investments in solar and energy efficiency

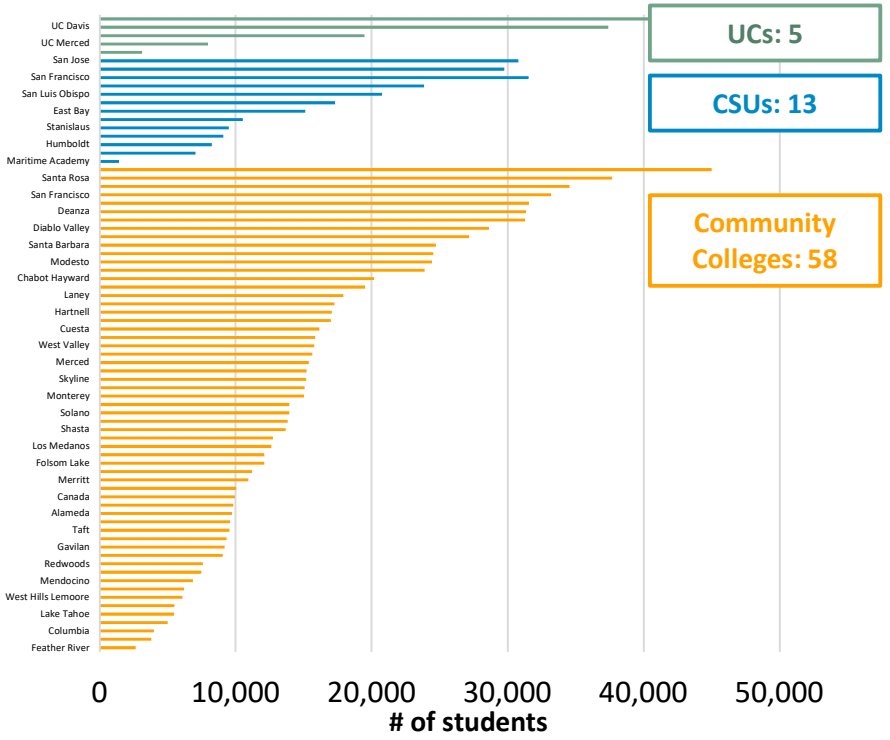
Higher Education Campuses: Key Inputs

- Campuses are seeking ways to meet sustainability goals, including fleet electrification
- Many larger campuses have already installed some EV chargers
- Many higher ed campuses own their own distribution systems

>4,000 Public K-12 Schools in PG&E territory



75 Public Higher Ed campuses in PG&E territory



Work in progress: Program design for AB1082

ELEMENTARY, HIGH SCHOOLS and SMALL HIGHER ED CAMPUSES

Vision

Meet the needs of small campuses through a installation of 2-4 Level 2 charging ports

Program Details: Work in Progress

Number of sites: 10-20

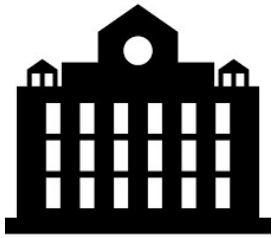
Equipment: 2-4 Level 2 charging ports per site

Vehicle type: Personal vehicle: staff, possibly students and parents

Rates: Customers to stay on existing rates

Ownership model: Option to schools of site host ownership or PG&E ownership

Participation payment: None



LARGE HIGHER EDUCATION CAMPUSES

Vision

Meet multiple campus transportation needs and support nearby transit corridors with multiple different charging technologies

Program Details: Work in Progress

Number of sites: 2 or 3

Equipment: 10-20 Level 2 charging ports; 1-2 DC Fast Chargers

Vehicle type: Personal vehicles, commuter vehicles; passenger shuttles and other fleet vehicles

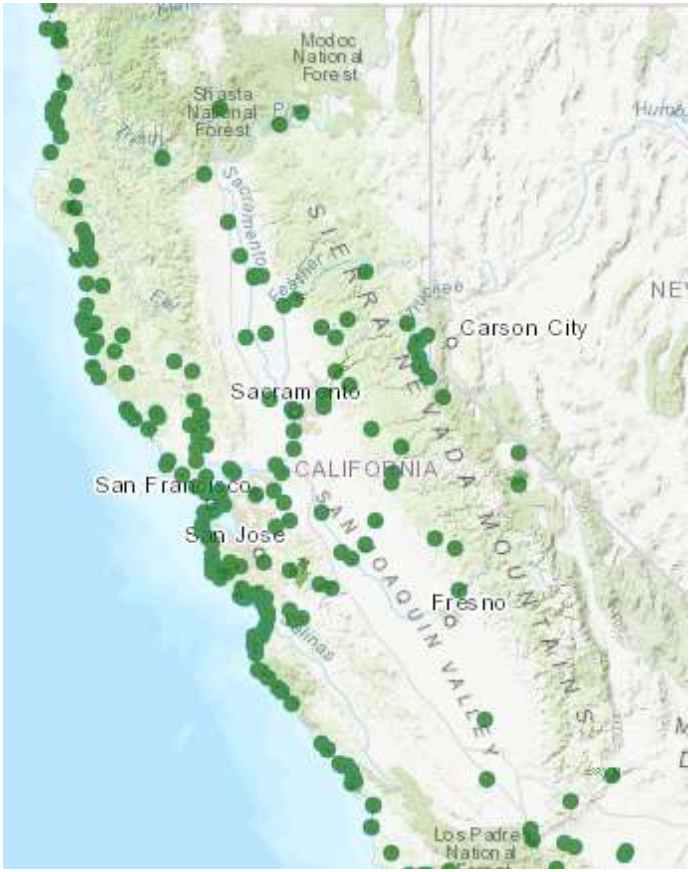
Rates: Customers to stay on existing rates

Ownership model: Option to schools of site host ownership or PG&E ownership*

Participation payment: TBD

*Will vary for higher ed campuses that own their own distribution systems

California State Parks in PG&E Territory



California State Park considerations:

- **Minimize cost and risks** associated with chargers in parks
- Minimize impact to **availability of visitor parking**
- Facilitate **fleet electrification** in accordance with Governor's Executive Order
- Increase **park revenue and visitor-ship**
- **Increase access** to parks for disadvantaged communities

2016 ZEV Action Plan

50% of all state agency light-duty vehicle procurements be ZEV by 2025

5% of all workplace parking spaces at state-owned facilities to have EV charging

Proposed Program design for AB1083

DC FAST CHARGING TO CONNECT REMOTE PARKS AND BEACHES

Vision

Electrify scenic routes across the state, enabling EV access to California Parks and Beaches

Program Details: Work in Progress

Number of sites: 6-8

Equipment: 1 DC Fast Charger per site

Vehicle type: Personal vehicles (visitors)

Rates: Customers to stay on existing rates

Ownership model: PG&E owns

Participation payment: None

FLEET AND EMPLOYEE VEHICLE CHARGING

Vision

Facilitate State Park adoption of electric fleet vehicles to meet the Governor's mandates

Program Details: Work in Progress

Number of sites: 10-20

Equipment: 2 Level 2 charging ports with infrastructure for future installation

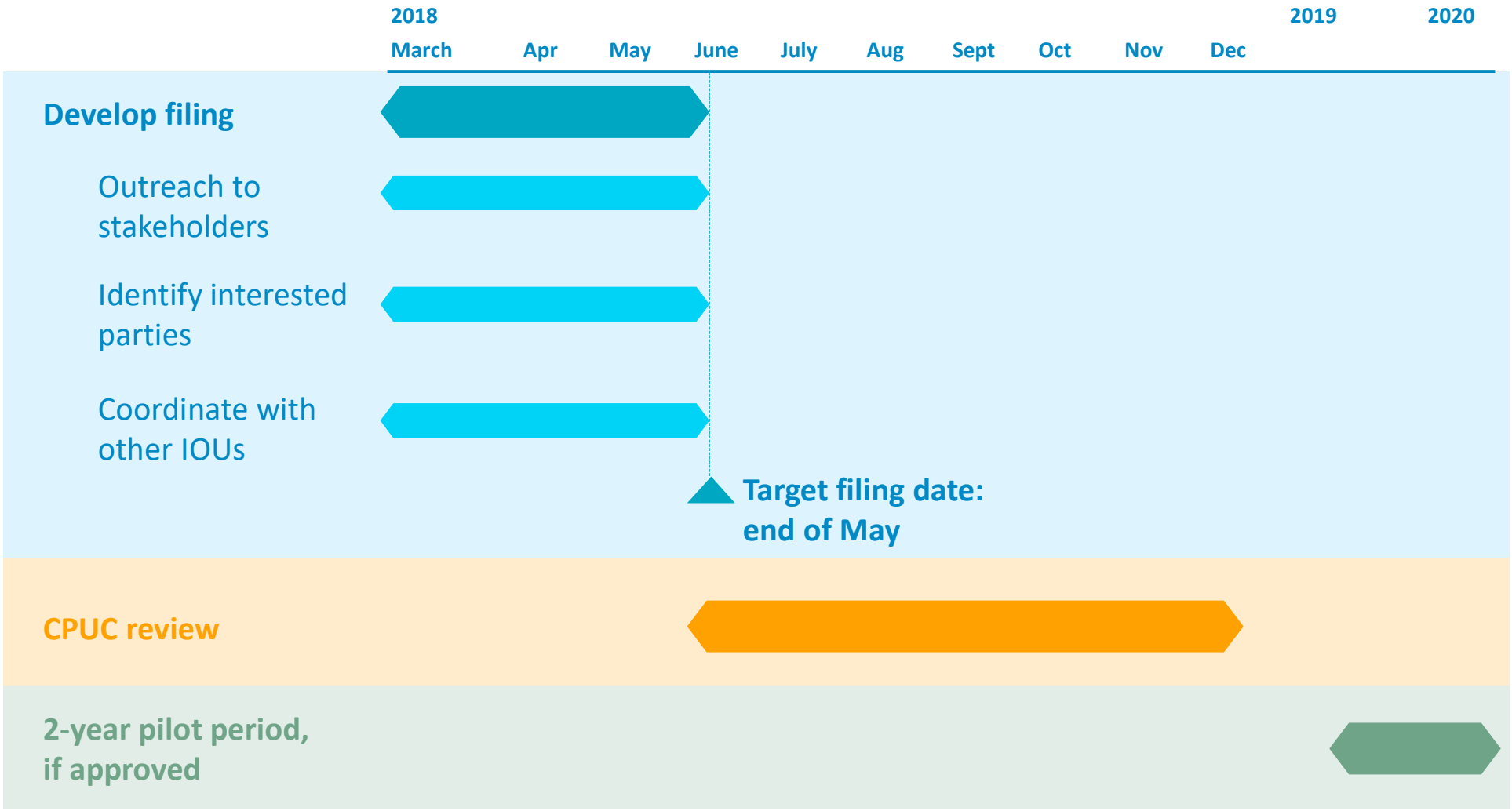
Vehicle type: Fleet vehicles (with potential for employee charging during the day)

Rates: Customers to stay on existing rates

Ownership model: PG&E owns

Participation payment: None

Next steps


2018
2019
2020
March
Apr
May
June
July
Aug
Sept
Oct
Nov
Dec
Develop filing
Outreach to stakeholders
Identify interested parties
Coordinate with other IOUs
Target filing date: end of May
CPUC review
2-year pilot period, if approved

Discussion & Feedback

Proposed Filings: SB 350 Priority Review Projects

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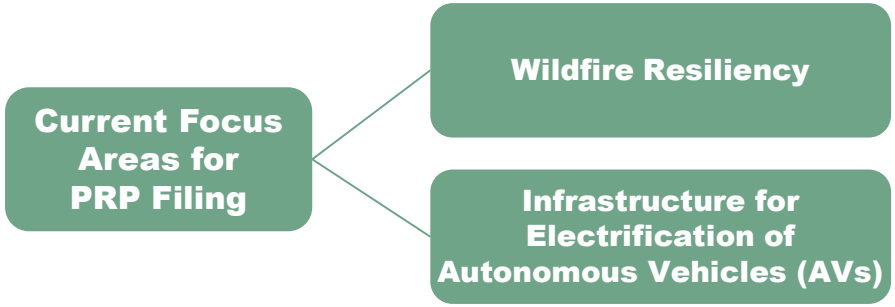
Supplemental SB350 Priority Review Projects

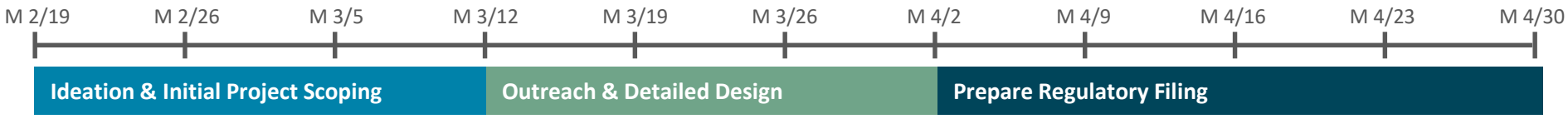
PG&E is developing a new filing of Priority Review Projects

- Under SB350 each utility can include up to $20M of Priority Review Projects (PRPs):
  - Jan 2018 CPUC approved 4 PRPs with total $8M budget, denied 1
  - PRPs must be “non-controversial”, short term (i.e. one year), up to $4M per project
  - Complementary to existing efforts – not duplicative

“...welcome projects that leverage ongoing rebuilding efforts in disaster-affected areas within PG&E service territory”

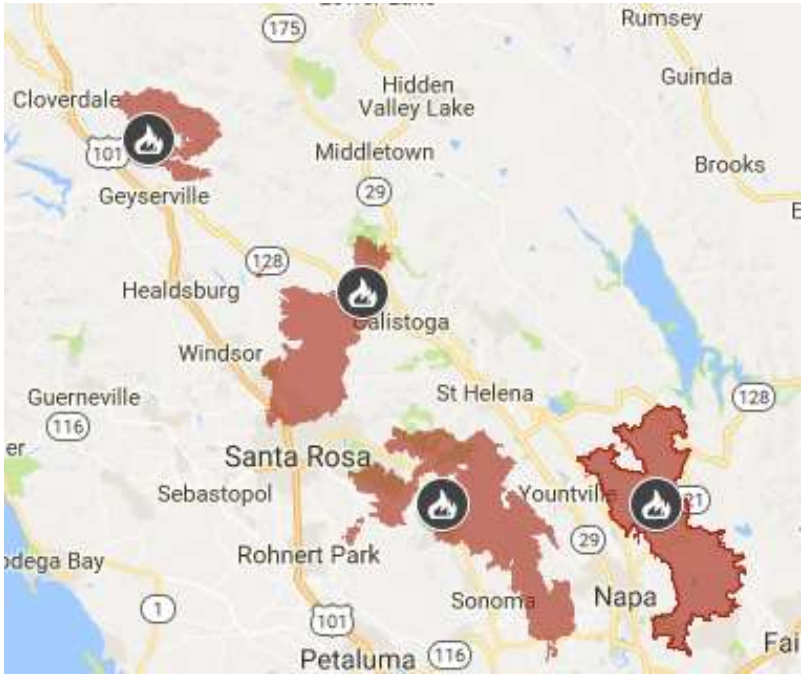


Target Timeline



Wildfire PRP: Affected area Background

- Majority of impacted customers are Residential and in Sonoma County
- Existing Adoption in Sonoma
  - 4,000 BEV + PHEV
  - 1% New EV Adoption (↔)
- EV Infrastructure in Sonoma
  - 66 DC Fast Chargers (↓)
  - 457 L2 Chargers (↔)



"new developments…that focus on ensuring…include TE"

"ensure the redevelopment or new development is climate-resilient"

"leverage ongoing rebuilding efforts in disaster-affected areas"

BEV – Battery Electric Vehicle
PHEV – Plugin Hybrid Electric Vehicle

Current Program design for Wildfire PRP

Project Structure:
Offer EV charging infrastructure in Wildfire affected areas that is:

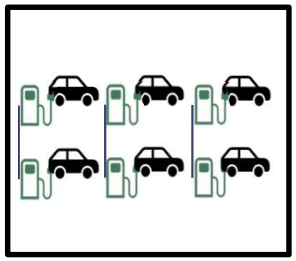
- Resilient and widespread to support residents
- In critical areas to support emergency and evacuation operations

5-7 projects, sited with input from city planners and local community groups

Portfolio of charging for resiliency applications

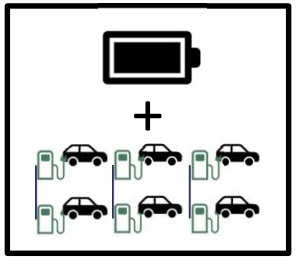
Level 2 Chargers

- "priority restoration" central sites across the county



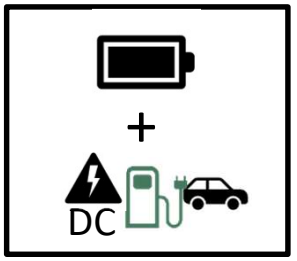
Battery + Level 2 Chargers

- used in emergency operations during outages



Battery + DC Fast Chargers

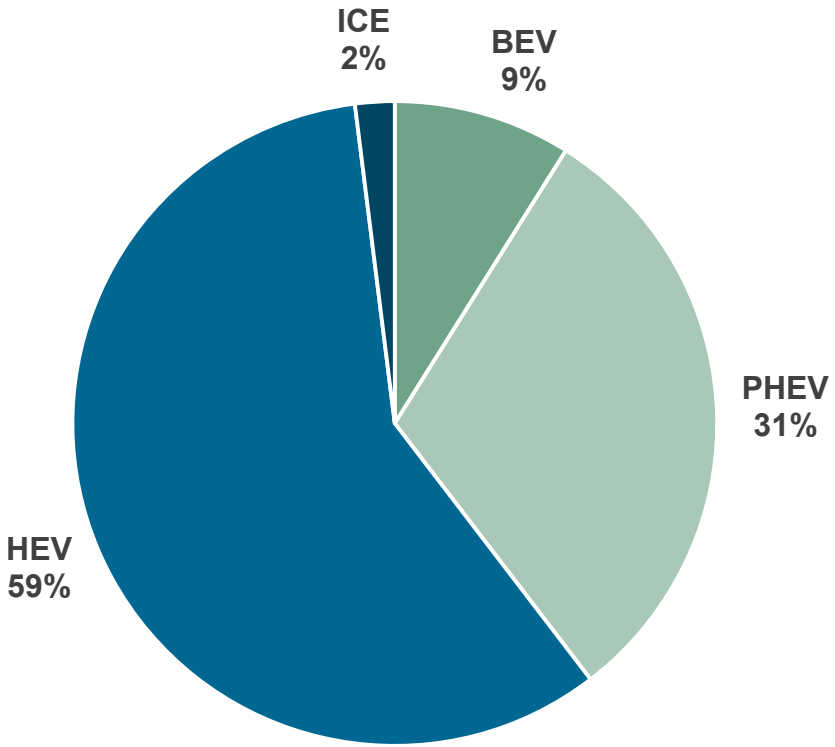
- provide quick charging in evacuation corridors



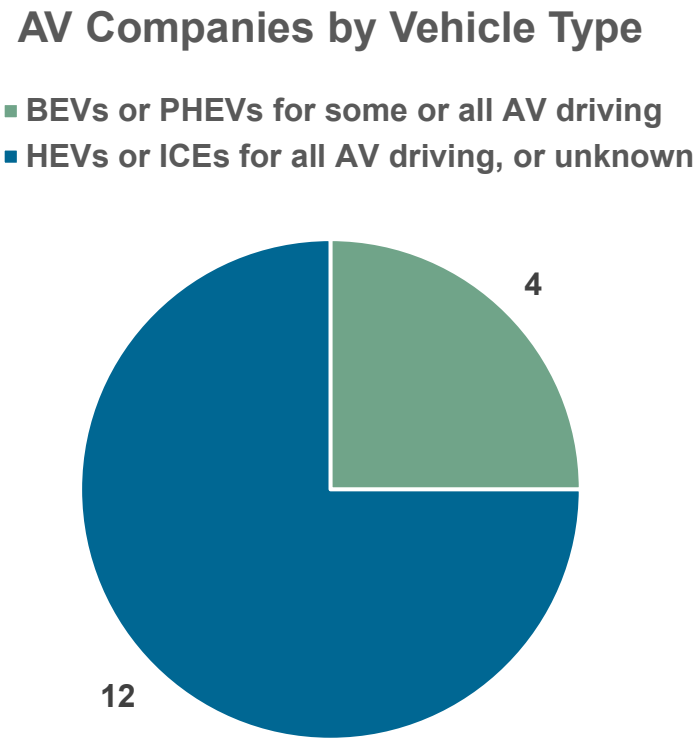
AV Infrastructure Project: So far, Autonomous ≠ Electric

Over the last 3 years, a majority of Autonomous Vehicle (AV) testing in California has been fueled by gasoline.

AV Miles by Vehicle Type



AV Companies by Vehicle Type



BEV – Battery Electric Vehicle
PHEV – Plugin Hybrid Electric Vehicle
HEV – Hybrid Electric Vehicle
ICE – Internal Combustion Engine
Percentages may not add to 100 due to rounding

Data from:
California Department of Motor Vehicles and Bloomberg New Energy Finance

AV Infrastructure Project: Accelerate Merging of AV and EV Technology

Gap and Customer Needs

AV Companies need easy access to fast fueling to enable high-mileage testing of autonomous technology.

Autonomous EV Use Case	PG&E's Existing & Proposed Programs		
	EVCN	Fast Charge	Fleet Ready
Light Duty Vehicles	Light Duty Vehicles	Light Duty Vehicles	Medium/Heavy Duty Vehicles
Private Access	Public Access	Public Access	Private Access
DCFC	Level 2	DCFC	Level 2/DCFC

Objective

Accelerate electrification of AVs into the current early testing phase

Program Details: *Work in Progress*

Number of sites: 2-5

Eligibility: partner companies must meet certain criteria aimed at:

- fast deployment
- increasing electric proportion of AV miles drive
- high utilization during off-peak hours
- safety

Equipment: DCFC depending on size of charging needs

Vehicle type: light duty AV fleet vehicles

Ownership model: make-ready infrastructure owned by PG&E, DCFCs owned by partner company

Participation payment: partner company buys DCFC, 25% rebate payment

Discussion & Feedback