Q1 2020 Clean Transportation Program Advisory Council Meeting

April 29, 2020

Together, Building a Better California

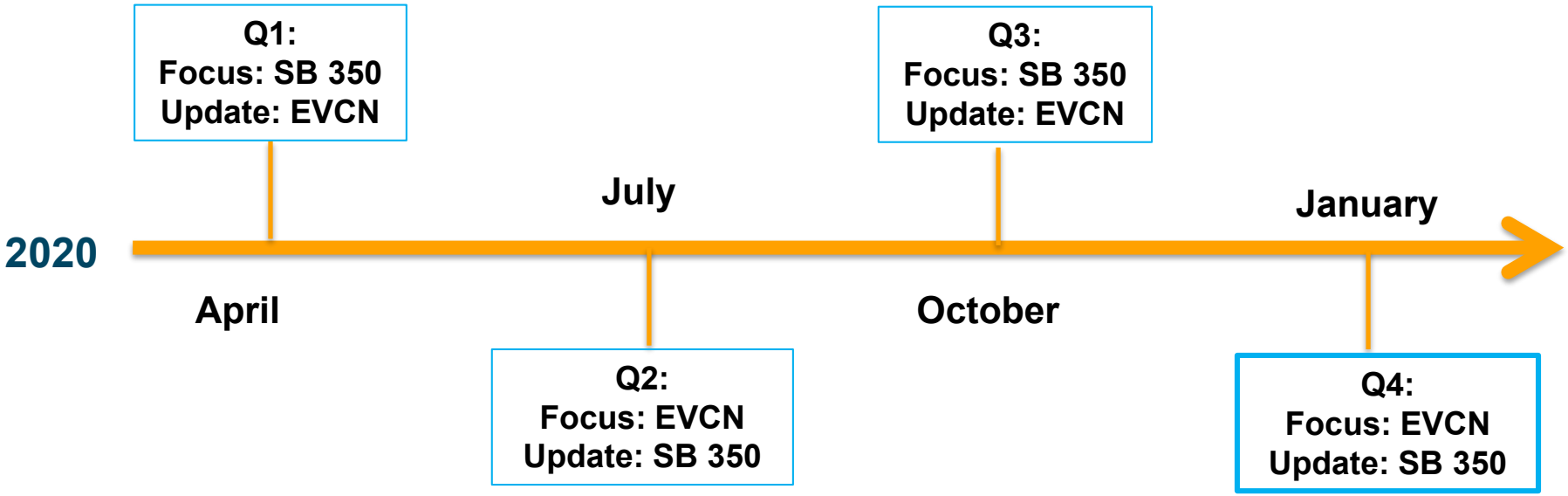
Agenda

Safety / Introductions	**9:00 – 9:05**
Program Status – COVID-19 and EVCN Update	**9:05 – 9:25**
SB 350: Standard Review Projects	**9:25 – 10:10**
BREAK	**10:10- 10:20**
SB 350: Priority Review Projects	**10:20 – 10:50**
Questions	**10:50 – 11:00**

Clean Transportation Program Advisory Council

Overview

- PG&E has expanded our efforts on transportation electrification, with a number of filings, pilots 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 on PG&E's proposals and ongoing programs



Programs Status: COVID-19 Update

- Through March 2020, PG&E has installed:
  - ~60% of its target EVCN ports (2,660 ports out of 4,500 port target)
  - First 5 projects under the Fleet program
- PG&E was on track to install target of 4,500 ports by December end of program, before COVID19-related halt to installation starting March 16
- Shelter-in-place impacts to programs, disproportionately affecting EVCN
  - Existing customer projects requiring field work on hold
  - Continuing to support customers' participating in EV infrastructure programs
- Timing of return to work is still uncertain, and a program timeline extension will likely be necessary. Factors impacting need include:
  - Shelter-in-place duration
  - Supply chain
  - Resource availability

EV Charge Network

Together, Building
a Better California

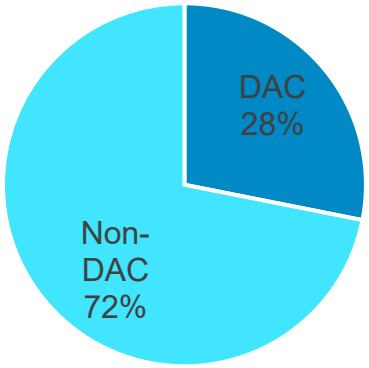
Overall Progress Update

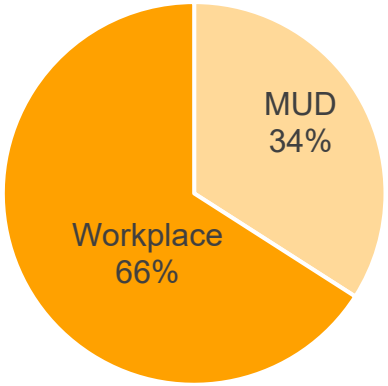
Status as of 3/31/2020

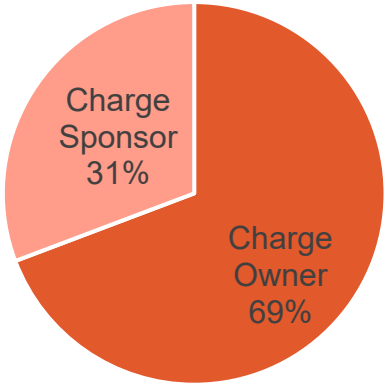
	Ports	Sites
Submitted	15,837	817
Viable	4,932	200
Final Design	4,060	188
Construction substantial complete	2,660	132
Activated	2,192	119

- **Customer acquisition** complete: application portal closed Q2 2019
- **Site eligibility** complete: all customer agreements in place*
- **Final design** at steady capacity, with aim of completing remaining final designs in Q2 2020
- **Construction** prior to COVID-19 at steady capacity, with aim of constructing 200-250 ports/month impacts**

Installed port portfolio





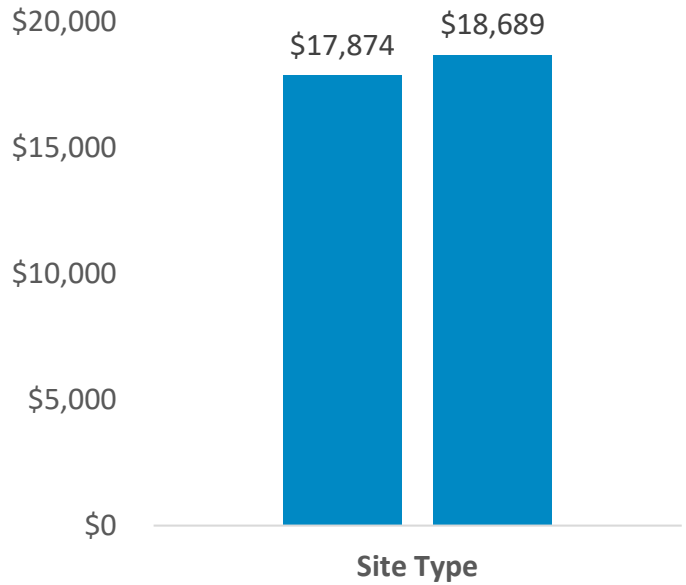


Notes: Data as of Mar. 31, 2020. *If projects are canceled in Final Design, additional projects may be selected from waitlist and result in customer agreements. **Depending on COVID-19 shelter-in-place duration and timing of construction restart for EV make-ready infrastructure, there is uncertainty regarding construction capacity and port completion pace for the 3-6 months after shelter-in-place.

Programs Status: EVCN Cost Analysis

- While the EVCN program is still underway, average cost for a subset of completed sites through 2019 is ~$18.4k per port
- Average cost per port for workplaces so far has been ~4-5% higher than MUDs. Factors may include:
  - Scope to tie in electrically at workplaces
  - ADA compliance costs at workplaces

Average cost per port, by project type (through 2019*)



	MUD	Workplace
Sites	24	39
Ports	373	677
Ports/site	16	17

*Note: Cost data include costs from only 63 of the EVCN projects completed through 2019; full actuals are available for these projects. Cost per port includes capital costs (excluding project manager labor) and includes cost of rebates

Small Businesses

Small business participation in existing PG&E programs:

- ~66% of viable EVCN projects serve workplaces
- ~30% of viable EVCN projects serve commercial workplaces (e.g. no govnt)
- ~20% of our signed EV Fleet contracts are with commercial customers

To attract small business customers:

- We provide an OEM a sales toolkit to support outreach to commercial customers.
- For EVCN, we created a sales toolkit that we shared with third parties and EVSPs.
- We also work with third parties (i.e. public agencies, associations, etc.) to get the word out to businesses, including small businesses. Specifically, we provide resource packets with email templates, call scripts, social media postings, newsletter clips, and more to engage their networks.

Business EV Rate Update

Together, Building
a Better California

Business EV Rate will be delivered in two phases to deliver bill savings five months earlier than full implementation

Business EV Rate Delivery Timeline 2020

Phase 1: Basic Billing
Launch Date: May 2020

Customers able to enroll in EV rate in May with basic functionality:

- SmartMeter Eligible
- CC&B Billing
- Non-NEM Rate
- Website for EV Rates

Customers enrolled in Phase 1 will automatically transition to Phase 2

Phase 2: Full Rate
Launch Date: October 2020

Customers able to enroll in EV rate in October with full functionality:

- SmartMeter and MV90 meters
- CC&B and ABS Billing
- NEM2 Options
- Subscription Overage Fees
    - Grace Period and Auto Adj.
    - Overage fee notifications
- BEV Rate Welcome Letter

Marketing, Education and Outreach Also Follows a Phased Approach

ME&O Plan 2020

May | Jun | Jul | Aug | Sep | Oct

Phase 1 Begin May 1, 2020

- Direct marketing and outreach to customers
- On demand Training and Webinars
- Supporting literature
  - Business EV Fact Sheet
  - Business EV FAQ Document
  - PG&E Website page for Business EV rate (basic)
  - Business EV webpage

Stop-Gap Support

- Additional FAQ
- Training/Webinars

Phase 2
Launch Date: October 2020

- Continued marketing and expanded outreach campaign to potential customers.
  - New customer tools
    - Business EV website full roll-out
    - Cost Comparison Tools for potential and existing customers

May 2020 Business EV Rate Eligibility

CUSTOMERS MUST MEET ALL OF THE FOLLOWING:

1. **Have a SmartMeter**
2. **Have an active Energy Alert email on file**
3. **Have individually metered charging stations***

*Multiple charging stations can be hooked up to a single meter, however charging stations can not share a meter with any other end use such as a building. Exception: AL 5793-E-A allows minimal environmental lighting.

Rate was designed for EV charging load only. Effectiveness of EV rate $ savings will be decreased if ineligible customers are enrolled on the rate.

If customer does not meet the eligibility requirements but would still like to enroll on the rate, customer will need to work with Service Planning to get the appropriate meter or meter set up installed.

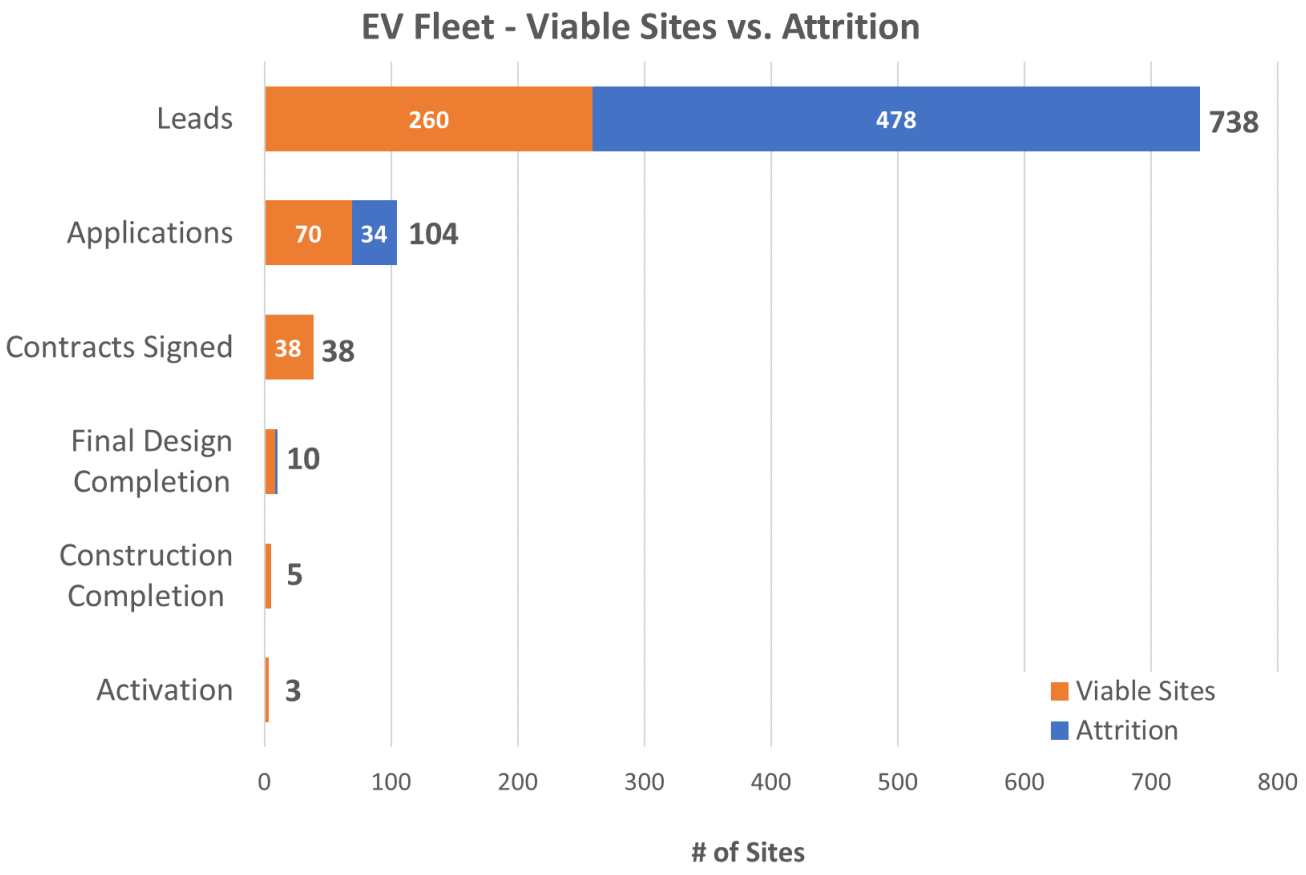
SB 350
Standard Review Projects

Together, Building
a Better California

EV Fleet

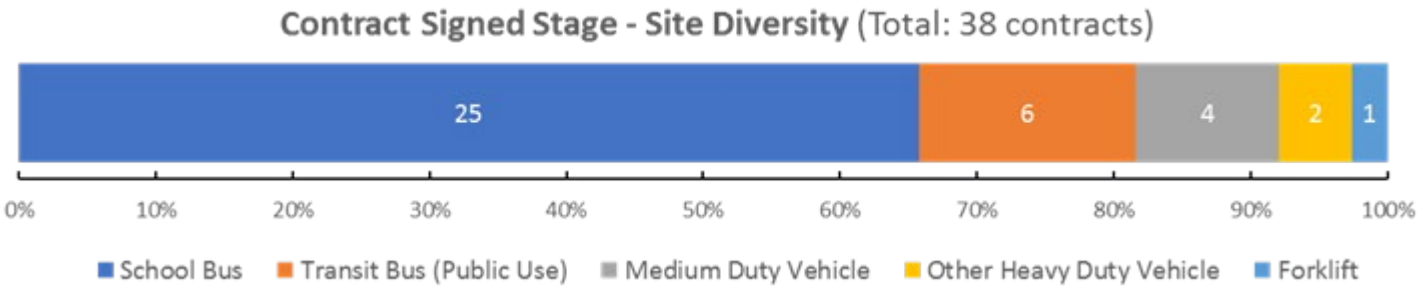
Together, Building
a Better California

EV Fleet – Program Overview

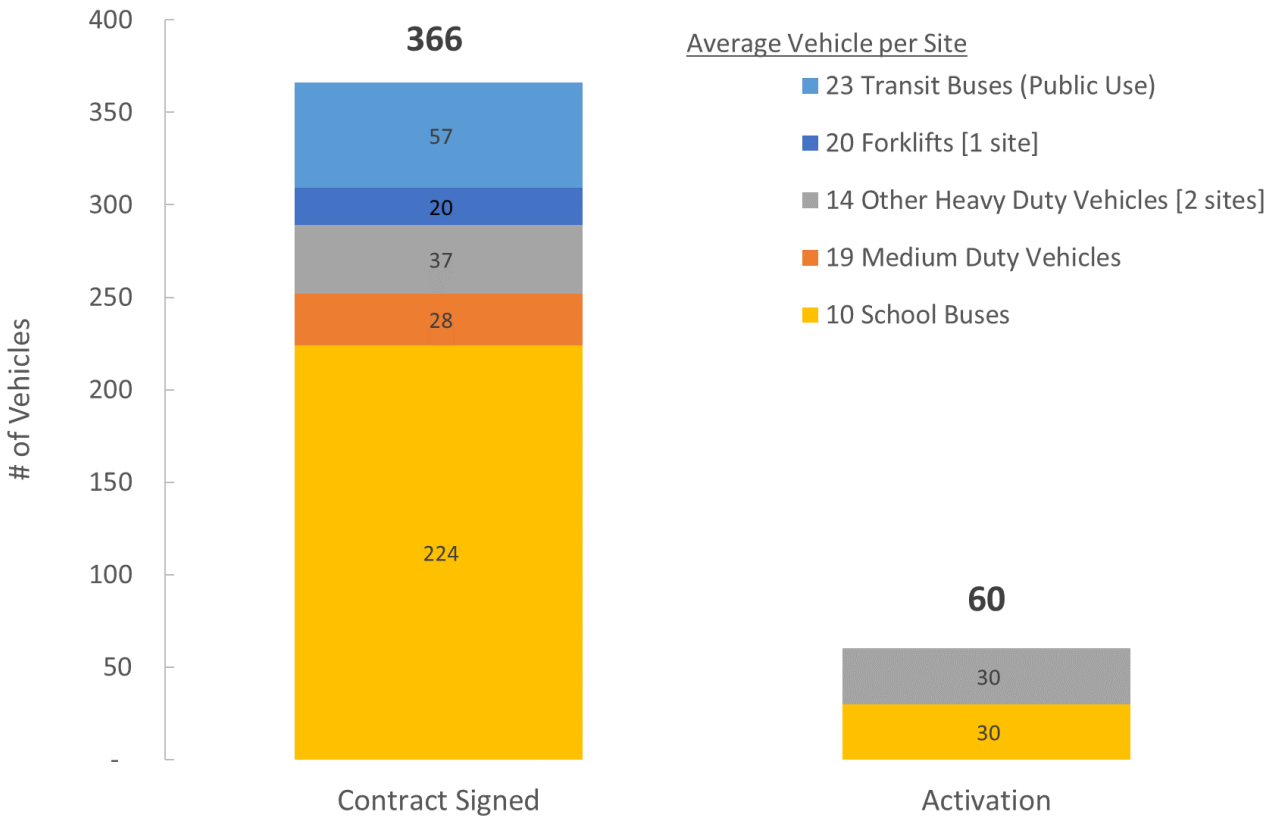


Highlights

- As of Q1 2020, PG&E has identified 738 leads for EV Fleet
- Of those, 104 have submitted applications, 38 have signed contracts (details below), and 5 have construction complete
- Q1 was strong on lead generation and new contracts. Team focused on conversion of Leads to Applications



EV Fleet – Enabled Electric Vehicles by Project Stage

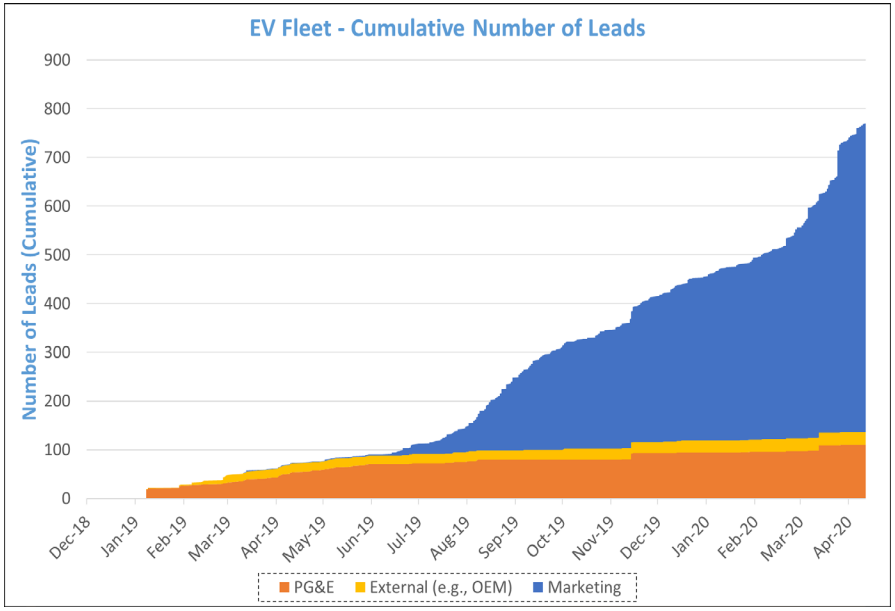


Highlights

- **As of Q1 2020, all contracts signed represented a total of 366 electric vehicles, across 5 categories**
- **The two activated sites represent a total of 60 electric vehicles**

EV Fleet: Lead Generation Updates

Lead Completes	2020 Lead Total	% of Program Total
Marketing Total (2020 Goal = 600)	303	95%
Teleservices	114	36%
Webinars	48	15%
Open Houses	66	21%
Paid Media	22	7%
Other Marketing	53	17%
Non-Marketing Total	17	5%
Total Program Leads 2020	320	100%



Efforts thus far:

- We successfully completed 4 webinars (focused on the Distribution & Delivery sector, and the Shuttle Buses sector) and 2 virtual open houses focused on the Distribution & Delivery sector
- In total, we had 1,600+ sign ups, 700+ attendees, and 114 leads from these webinars and events

Plans for Q2-Q3:

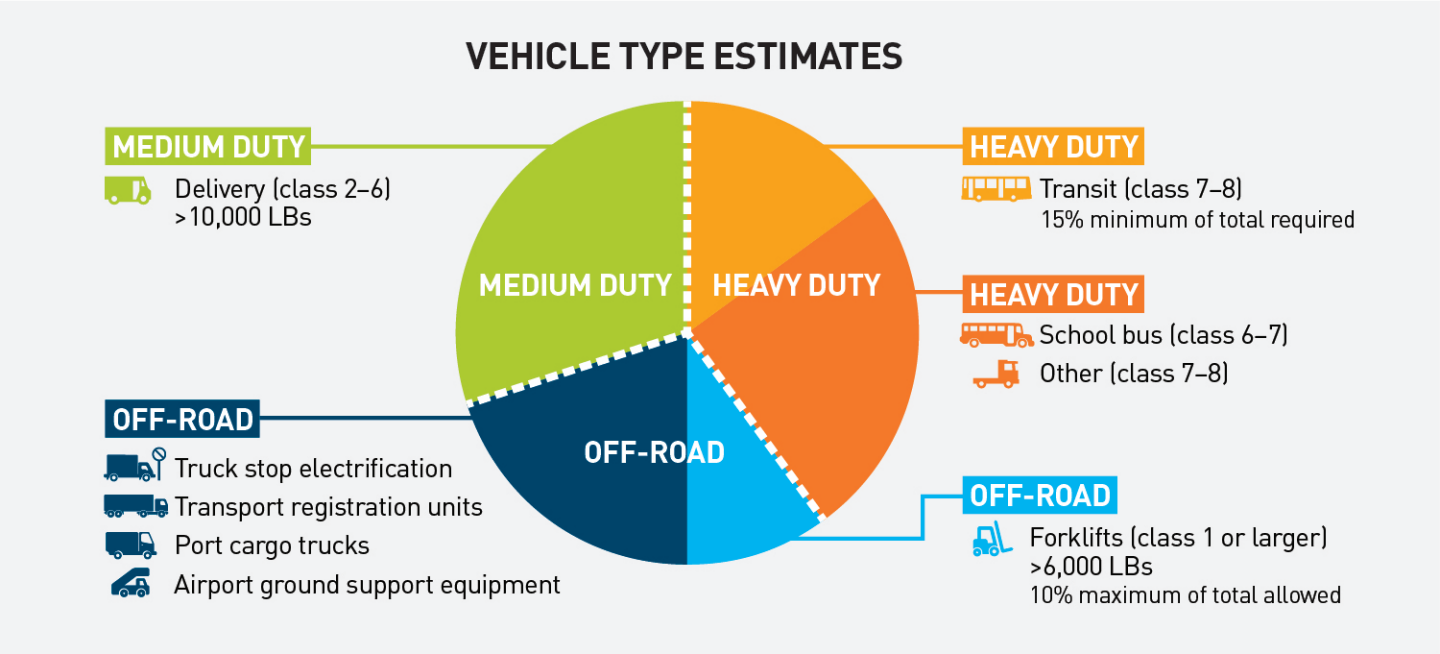
- Continue to host webinars on varied topics to educate customers and provide key insights and resources
- Enhance OEM relationships to better collaborate on projects and offer integrated solutions to customers
- Build and provide online tools to support customers in their decision towards electrification

Medium & Heavy Duty EV Examples

Customer Onboarding Team

Together, Building
a Better California

Fleet Program Medium & Heavy Duty EVs



*Actual representation of vehicle types subject to vary based on program implementation, project costs, and market readiness

Electric School Buses

THE LION ELECTRIC CO.

BLUE BIRD

Thomas BUILT BUSES

Application: School bus

Electric School Buses

Blue Bird - Micro Bird

Up to 30 passengers
100 mile range typically

Heavy-Duty

OEM: BYD

Application: Garbage Collection

Fork Lift

OEM: Wiggins / Dannar / XL Lifts

Application: Off Road

Medium-Duty

OEM: Chanje & Ford

Application: Package Delivery

Medium-Duty

OEM: Motive / Phoenix Motor Cars / Zenith

Application: Construction

Heavy Duty - Class 8 Semi

OEM: Freightliner / Tesla / Lion

Application: Food Delivery

Transport Refrigeration Unit (TRU)

THERMO KING

Carrier
TRANSICOLD

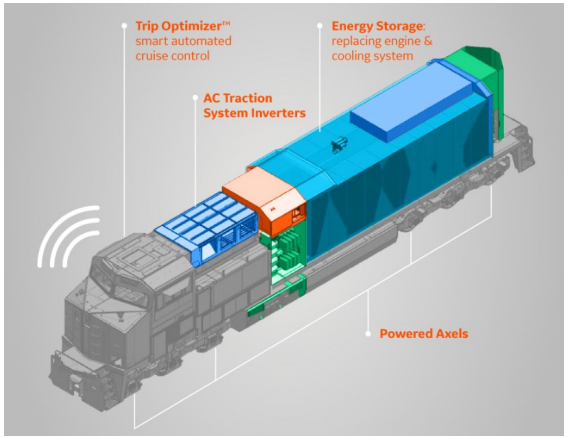
Transit Bus

OEM: Proterra / Gillig / New Flyer

Application: Public Transportation

Hostler / Rubber Tire Gantry Crane

OEM: Orange EV / General Electric / Taylor



Application: Off Road

Motorcoach

OEM: BYD

Application: Private Shuttle

Tractor

OEM: Hummingbird

Application: Farming

https://youtu.be/eQ-UldFaGVQ

EV Fast Charge

Together, Building
a Better California

Recent Milestones

Pipeline

- Executed first two customer agreements
- Represents: 1 customer; 2 Sites; 8 Chargers
- Completed 2nd site solicitation (Beta 2)

Vendors

- Qualified 4 new vendors into the program –> brings total to 12
- Launched 3rd vendor RFQ (currently in progress)

Marketing & Outreach

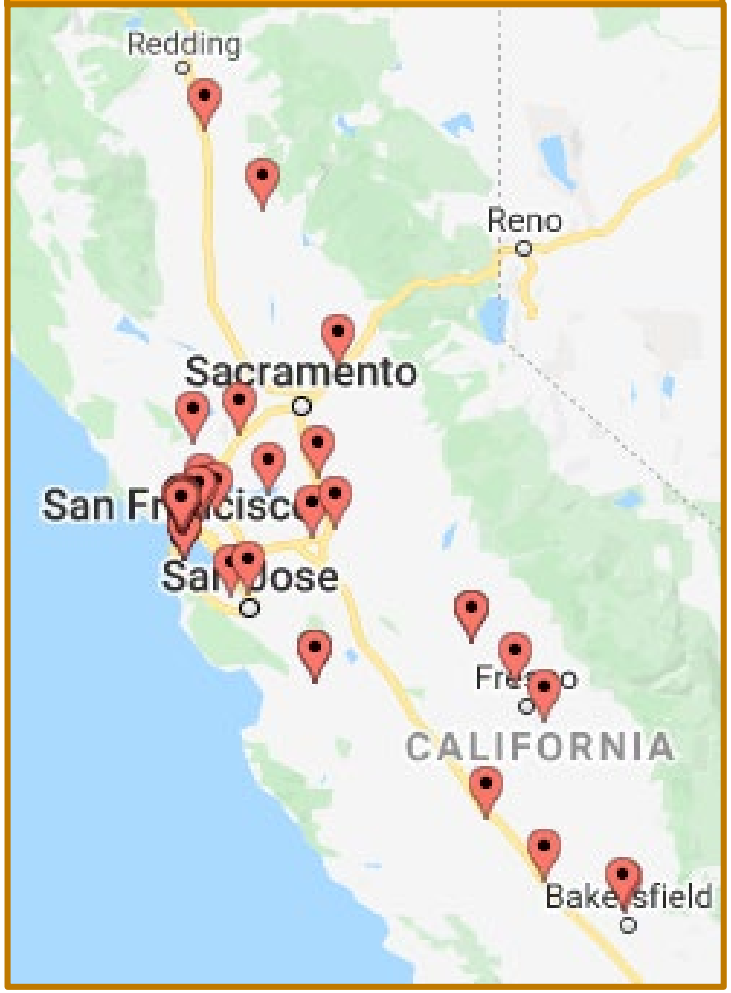
- Launched official program website: pge.com/evfastcharge

Beta 2 Solicitation

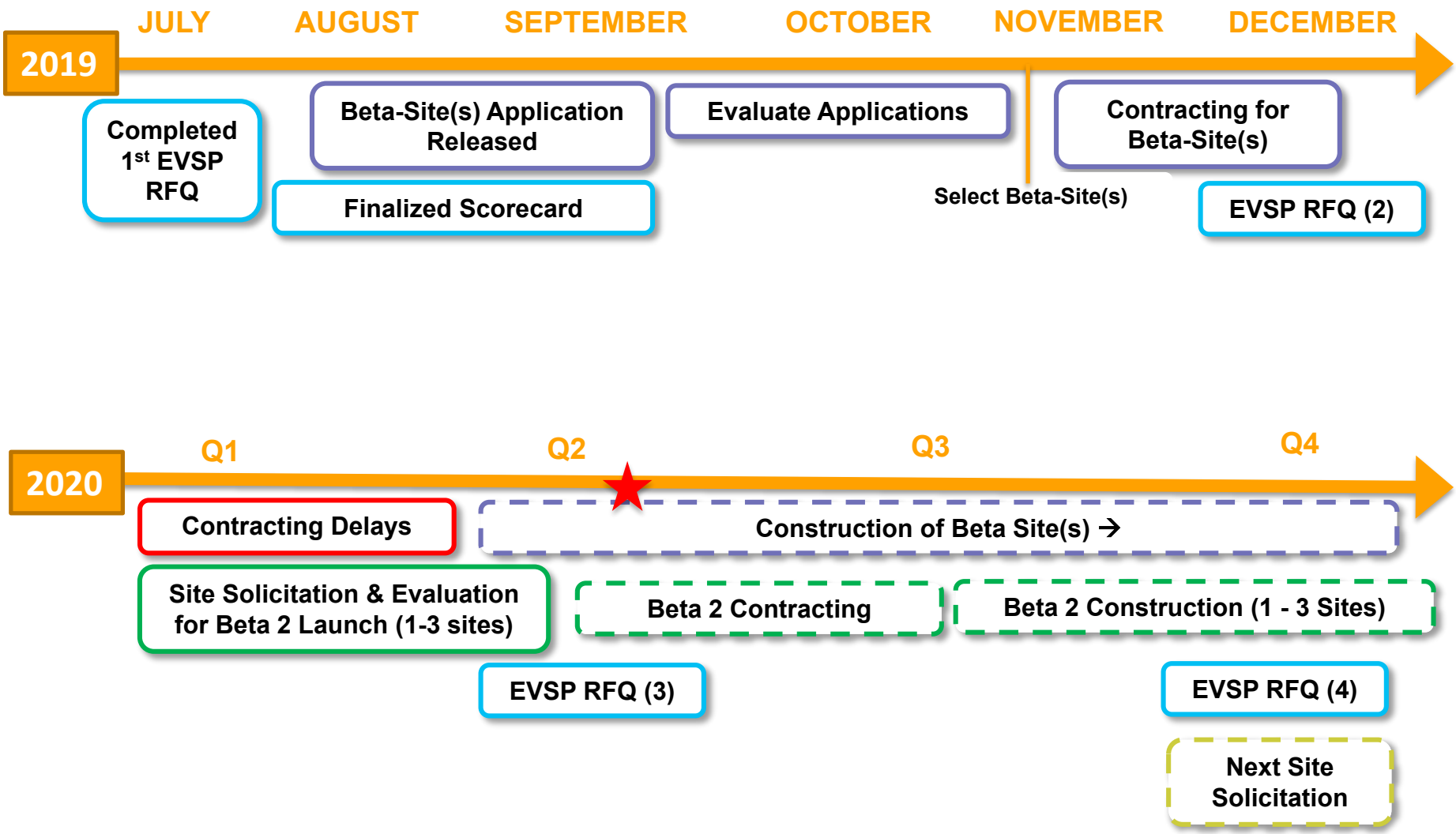
Beta 2 Solicitation Statistics

- 7 Different EVSP submitted
- 61 Total applications received
- 24 different customers
  - Parking garages
  - Gas station/C-stores
- >65% sites located in DACs
- 8 different hardware models represented, ranging from 50kW to 175kW

Represented Areas



Timeline


JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
2019
Completed 1st EVSP RFQ
Beta-Site(s) Application Released
Finalized Scorecard
Evaluate Applications
Select Beta-Site(s)
Contracting for Beta-Site(s)
EVSP RFQ (2)
Q1
Q2
Q3
Q4
2020
Contracting Delays
Construction of Beta Site(s) →
Site Solicitation & Evaluation for Beta 2 Launch (1-3 sites)
Beta 2 Contracting
Beta 2 Construction (1 - 3 Sites)
EVSP RFQ (3)
EVSP RFQ (4)
Next Site Solicitation
Dashed line indicates delay due to COVID-19

SB350
Priority Review Projects

Together, Building
a Better California

PG&E SB350 Priority Review Projects

High-level Project Status:

1. Home Charger Information Resource Pilot

   Platform launched on PG&E website

2. Electric School Bus Renewables Integration

   Project Phases 3 and 4 Modeling in progress

3. Medium/Heavy Duty Fleet Customer Demonstration

   Testing and Data Collection in progress, Battery Installation in progress

4. Idle Reduction Technology

   25 eTRU Ports Energized, Data Access and Collection underway

---

Statewide Evaluation

Home Charger Information Resource Pilot

Together, Building a Better California

Home Charger Information Resource Pilot

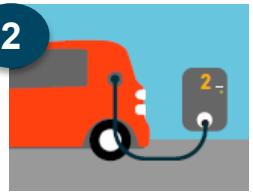
High Level Pilot Goals

Engage disadvantaged and minority communities

1

Education on home charger installation

2



Make installation process convenient

3

Customer Journey

1 Research

Customer reviews installation checklist and purchasing considerations for a Level 2 residential charger

2 Home Services Website Review

Customer compares home services websites to find best match for installation needs

3 Customer Selection & Install

Customer selects best fit website and connect with contractors to complete installation

Conducted Survey with Residential Panel for Feedback on Home Charger Installation Materials

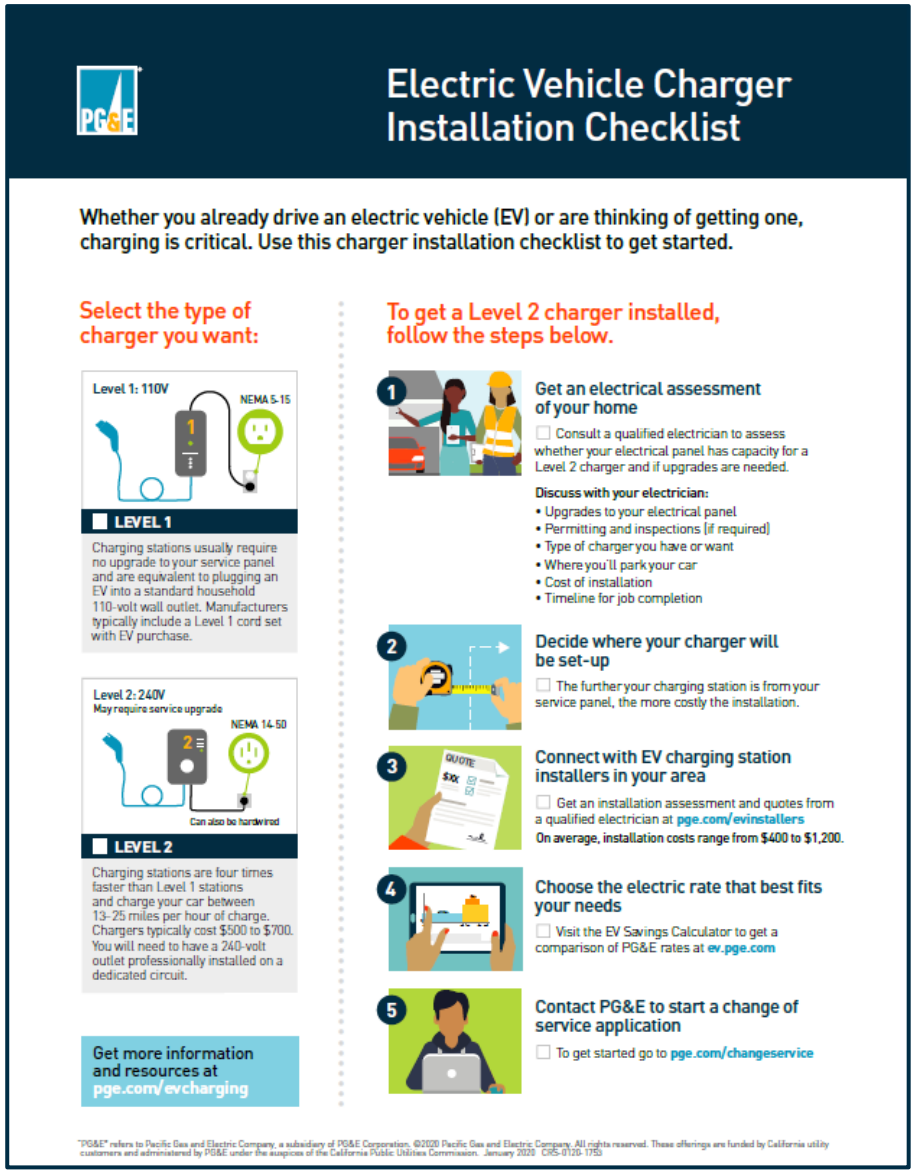
Summary

- Engaged **230** total residential customers
- Customers provided feedback through two surveys on **web content** and **EV checklists**
- Determine **effectiveness** and **helpfulness** of:
  - Information
  - Visual images
  - Layouts

Key Insights

1. Website designs and materials tested offer **clear**, **easy to read** information
2. Designs utilizing **graphics** and linear layouts **performed best**
3. Information offered in **tabular view** feels more engaging, interesting, and organized
4. **More details** are still desired throughout the materials

Incorporating Feedback into Finalized Materials



Electric Vehicle Charger Installation Checklist

Whether you already drive an electric vehicle (EV) or are thinking of getting one, charging is critical. Use this charger installation checklist to get started.

Select the type of charger you want:

Level 1: 110V

NEMA 5-15

LEVEL 1

Charging stations usually require no upgrade to your service panel and are equivalent to plugging an EV into a standard household 110-volt wall outlet. Manufacturers typically include a Level 1 cord set with EV purchase.

Level 2: 240V

May require service upgrade

NEMA 14-50

Can also be hardwired

LEVEL 2

Charging stations are four times faster than Level 1 stations and charge your car between 13-25 miles per hour of charge. Chargers typically cost $500 to $700. You will need to have a 240-volt outlet professionally installed on a dedicated circuit.

Get more information and resources at pge.com/evcharging

To get a Level 2 charger installed, follow the steps below.

1 Get an electrical assessment of your home

☐ Consult a qualified electrician to assess whether your electrical panel has capacity for a Level 2 charger and if upgrades are needed.

Discuss with your electrician:

- Upgrades to your electrical panel
- Permitting and inspections (if required)
- Type of charger you have or want
- Where you'll park your car
- Cost of installation
- Timeline for job completion

2 Decide where your charger will be set-up

☐ The further your charging station is from your service panel, the more costly the installation.

3 Connect with EV charging station installers in your area

☐ Get an installation assessment and quotes from a qualified electrician at pge.com/evinstallers

On average, installation costs range from $400 to $1,200.

4 Choose the electric rate that best fits your needs

☐ Visit the EV Savings Calculator to get a comparison of PG&E rates at ev.pge.com

5 Contact PG&E to start a change of service application

☐ To get started go to pge.com/changeservice

"PG&E" refers to Pacific Gas and Electric Company, a subsidiary of PG&E Corporation. ©2020 Pacific Gas and Electric Company. All rights reserved. These offerings are funded by California utility customers and administered by PG&E under the auspices of the California Public Utilities Commission. January 2020 CHS-0120-1750

Survey Findings

- ✓The inclusion of images is preferred and quickly portrays the information
- ✓Information presented is useful and addresses a broad audience
- ✓Information provided to customers is new
- ✓Customers desired more information on costs

**Additional content on charging station amperage and kilowatts is needed*

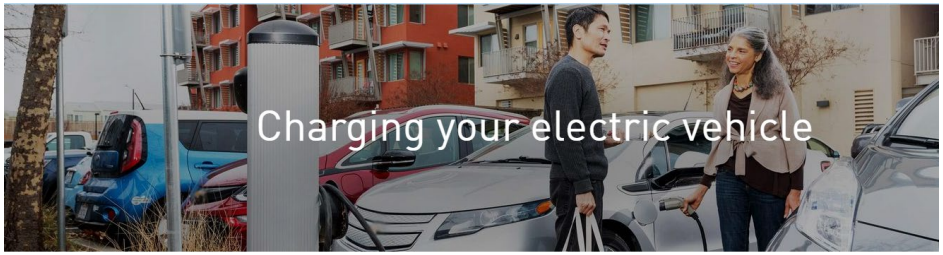
Home Charger Information Resource Pilot

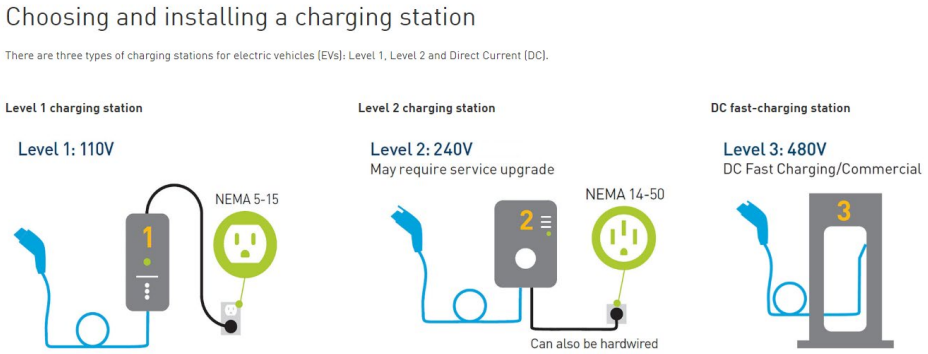
Key Milestones

- Finalized home charger installation checklist – 01/27/2020
- Platform launched on PG&E website - 04/29/2020
- Visit page at pge.com/evcharging

Next Steps

- Platform will be offered in Spanish and Chinese - 05/29/2020
- Collect customer feedback to identify enhancements for future iterations - Q2





Electric School Bus Renewables Integration

Together, Building a Better California

Electric School Bus Renewables Integration

Developing model for Phases 3 and 4 to illustrate data results.

Phase 3: Renewable Self-Consumption

Goals:

- Demonstrate the system's ability to dynamically maximize local renewable powering of e-school bus fleet.
- Minimize PUSD bill while maximize onsite renewable consumption.

Dec 2019 – Jan 2020

Phase 4: Renewable Optimization

Goals:

- Demonstrate the system's ability to combine wholesale and local renewable generation to maximize green energy for the e-school bus fleet.

Feb 2020 – Apr 2020

Impacts to Phase 3 and 4 Evaluation

- Low utilization of eLions due to passenger size
- Inability to control Bluebird bus charging
- Malware attack on school district systems
- COVID-19 school closures

Model Parameters

- December 2019 – April 2020
- 4 eLion buses
- Charge commands utilizing real time monitoring of renewable export
- Outputs: 15 min interval data, monthly bill and GHG emissions reduction

Electric School Bus Managed Charging

Customer demo vision: Allow an automated system to manage charging

eLion Bus Behavior with Managed Charging

- If charging cable is plugged in without receiving power, there is a “high voltage backfeed” warning.
- Vehicle disables the charging system after 15 minutes.
- The charging cable requires a reconnection to allow for charging again.

Clipper Creek Maintenance Mode Workaround

- Clipper Creek CS-100 charger’s maintenance mode firmware provides 6 amps trickle charge during “off” mode, preventing “high voltage backfeed” warning.
- Replaced two charger circuit boards.

eLion Bus Specs

- Type C all-electric
- 100 Mile Nominal Range
- 132 kWh Battery
- 72 passengers
- AC 19.2kW - J1772 Charging Protocol

Electric School Bus Managed Charging

Customer demo vision: Allow an automated system to manage charging

Blue Bird Bus Behavior with Managed Charging

- If charging cable is plugged in without receiving power, the battery charging system will go to sleep and no longer accept charge after 2 minutes.
- The charging cable requires a reconnection to allow for charging again. Proximity signal reconnected to wake bus up.
- No vehicle warning during occurrence.

Learnings from Cummins Electric

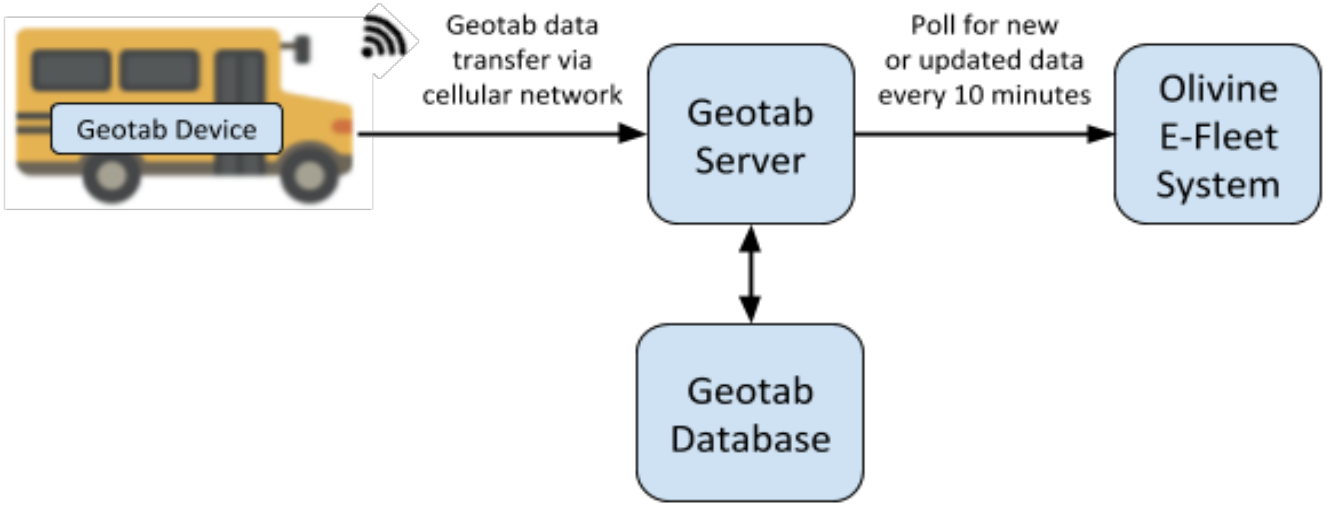
- System is not designed for managed charging nor time charging.
- Vehicle goes to sleep to prevent charge depletion . Minimum of 12-26 amps to prevent shut down.
- Vendors are considering time charging for future improvements. Cummins working on solution.

Blue Bird Bus Specs

- Type D all-electric
- 120 Mile Nominal Range
- 150 kWh Battery
- 78 passengers
- AC 19.2kW - J1772 Charging Protocol

Electric School Bus Telematics

Customer demo vision: Utilize real-time electric bus operational data for charging optimizations



Geotab Data

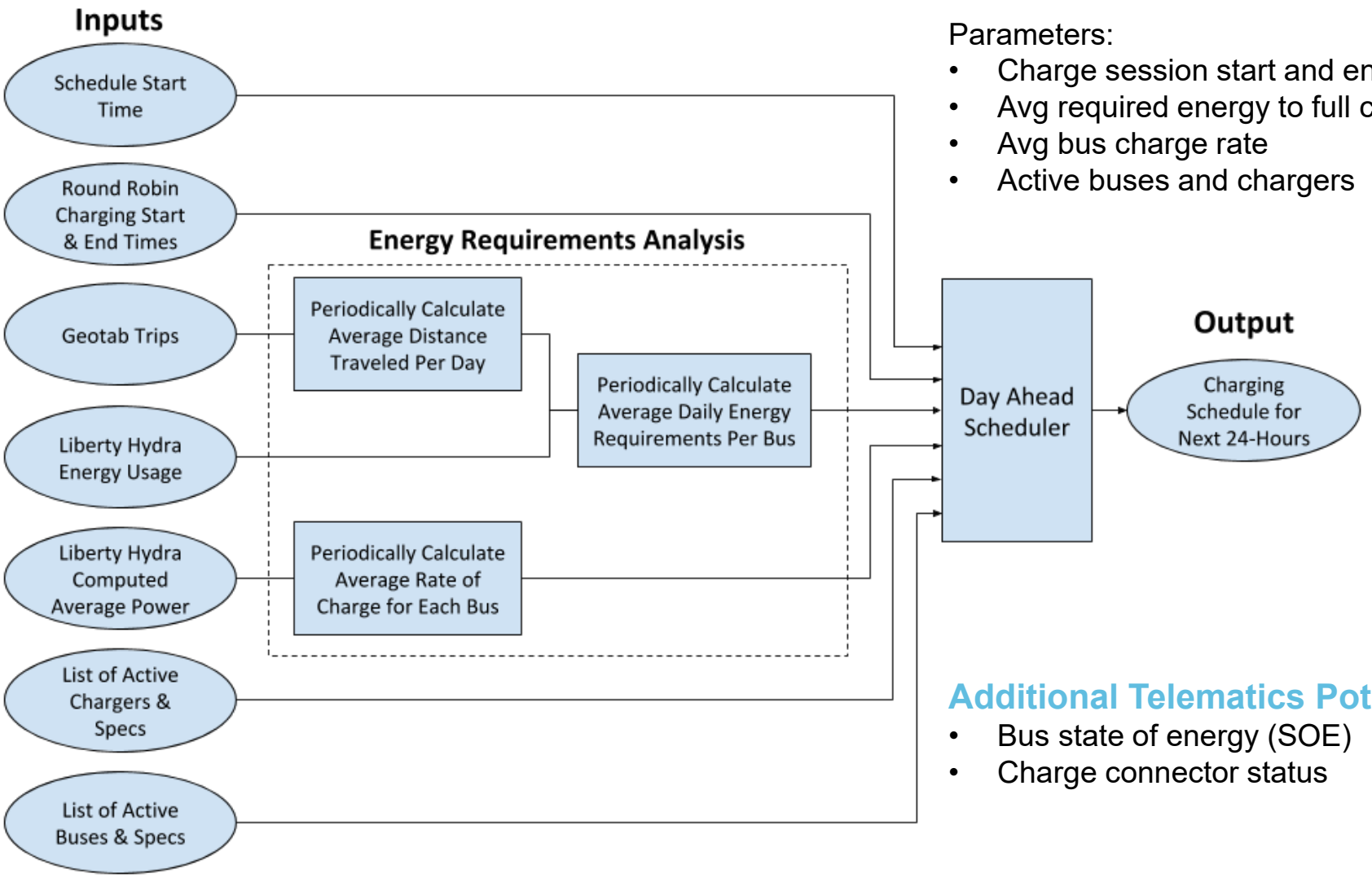
Trip

Start datetime
End datetime
Distance
Average speed
Maximum speed
Driving duration
Idling duration

LogRecord

Datetime
Latitude
Longitude
Speed

Electric School Bus Telematics



Day Ahead Scheduler

Parameters:

- Charge session start and end times
- Avg required energy to full charge
- Avg bus charge rate
- Active buses and chargers

Additional Telematics Potential

- Bus state of energy (SOE)
- Charge connector status

Medium/Heavy Duty Fleet Customer Demo

Together, Building a Better California

Medium/Heavy Duty Fleet Customer Demo

Charge Configuration Testing and Analysis

1. Overnight Depot Charging Only

Cold season – Dec 2019

- $1.46 per mile (blended electric and diesel-hybrid spare)
- $0.52 per mile (diesel hybrid baseline)
- $0.58 per mile (projected electric on EV rate)

2. Overnight Depot + On Route Charging

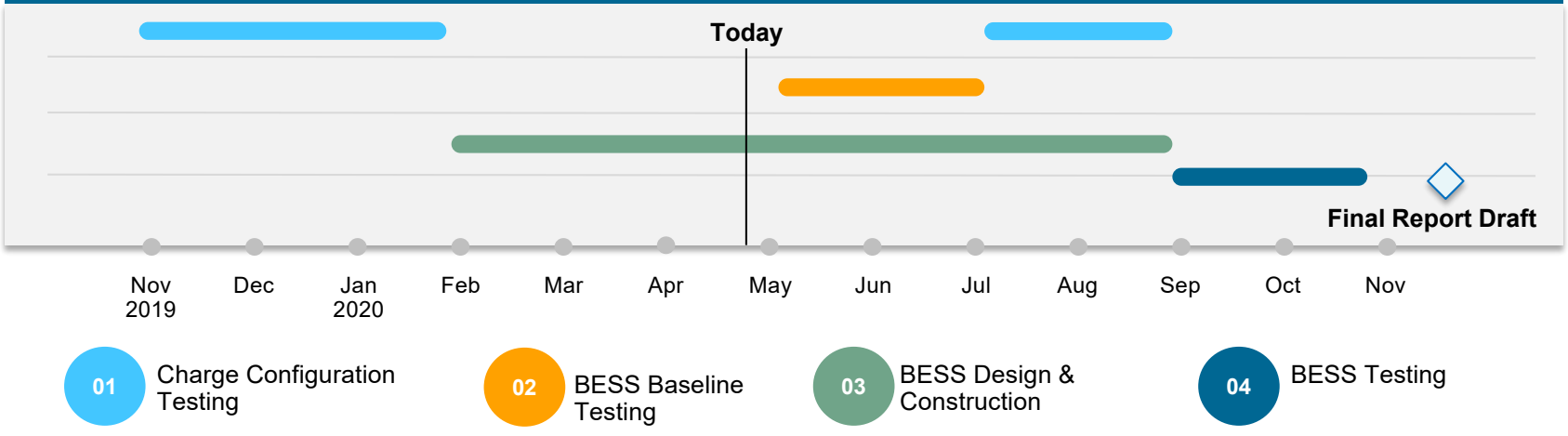
Cold season – Jan 2020

- $1.56 per mile (electric)
- $0.50 per mile (diesel hybrid baseline)
- $0.53 per mile (projected electric on EV rate)

Mild season – Nov 2019

- $1.27 per mile (electric)
- $0.65 per mile (diesel hybrid baseline)
- $0.53 per mile (projected electric on EV rate)

Project Timeline of Key Activities



Idle Reduction Technology

Together, Building
a Better California

Idle Reduction Technology Customer Demo

Project Update

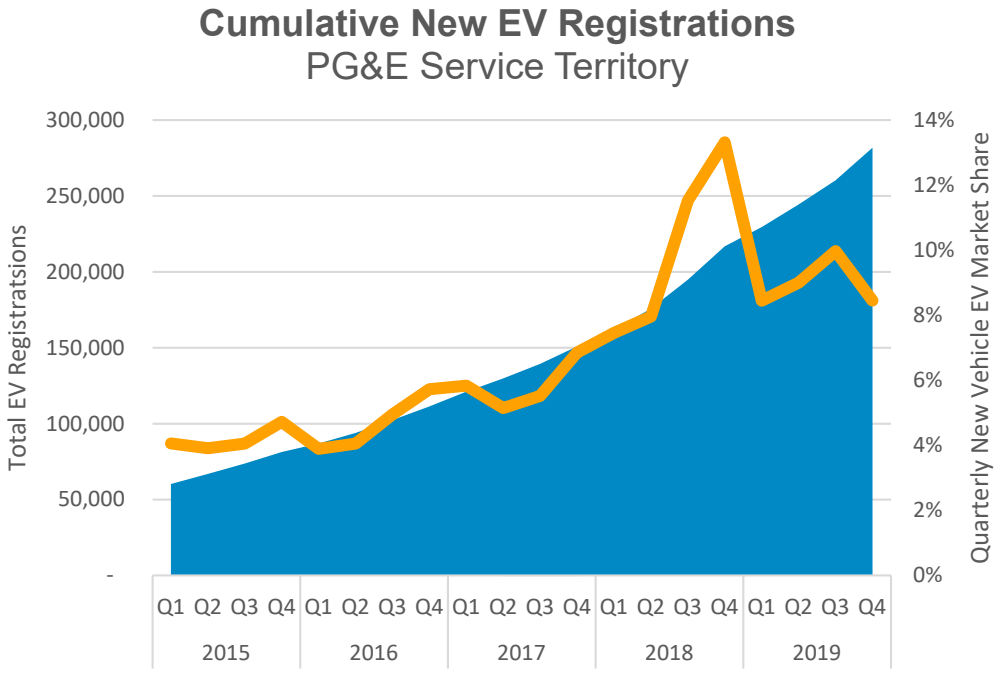
1. **25 eTRU ports energized in Nov 2019**
   - 232 eTRU units (out of 664 fleet) retrofitted.
2. **Data Collection**
   - Eaton power meter installed for tracking of eTRU power consumption.
   - Submetering reporting implementation delayed due to COVID-19 priorities; originally scheduled to be available March 2020.

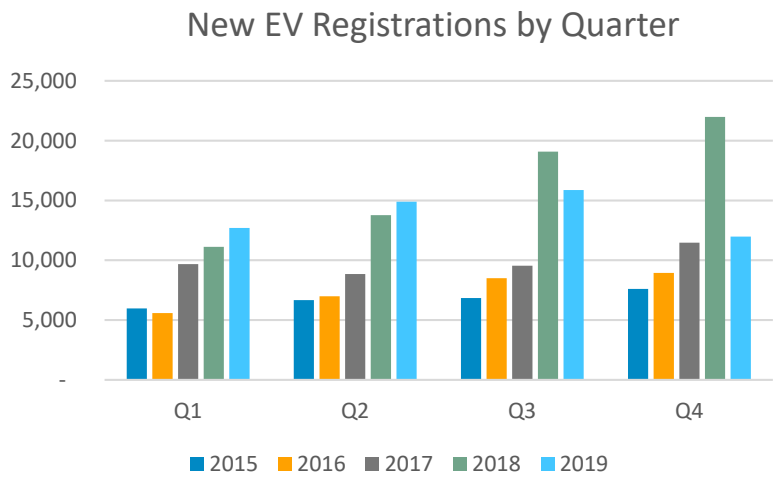
Appendix

Together, Building
a Better California

Q1 2020 EV Market Update

285,708 **EVs registered** in PG&E service territory, through February of 2020

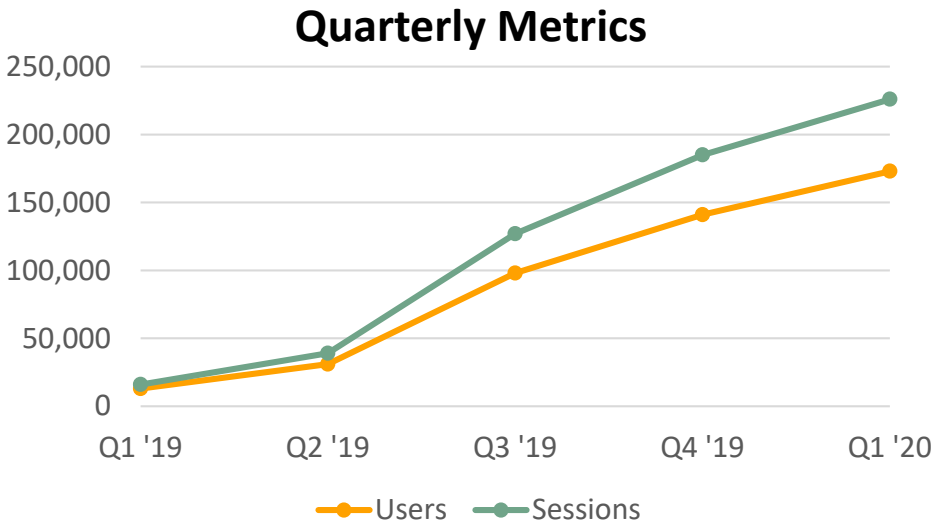


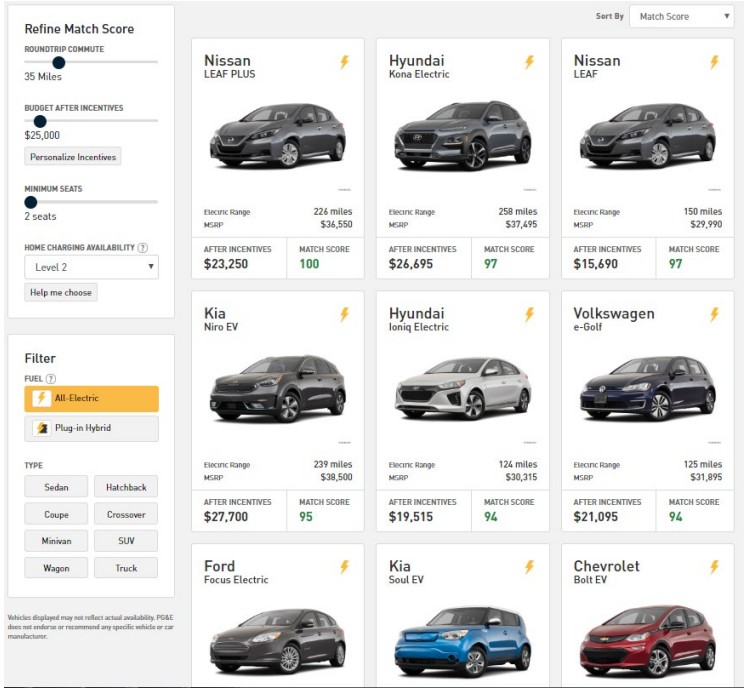


Source: EPRI, Based on external registration data through Feb 2020

EV Savings Calculator ev.pge.com

PG&E tool	ITD unique users	ITD total sessions
EV Savings Calculator	173,000	226,000





- >7,200 total hours of engagement ITD

*There is no active marketing campaign for the solar calculator

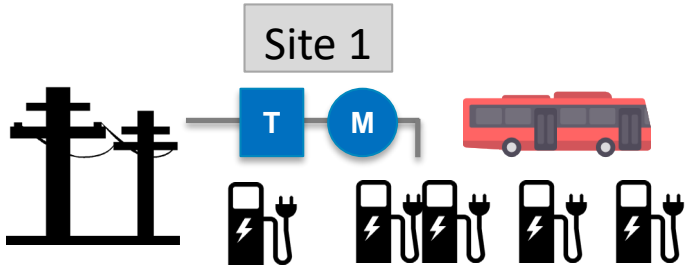
Medium/Heavy Duty Fleet Customer Demo

Project Partner

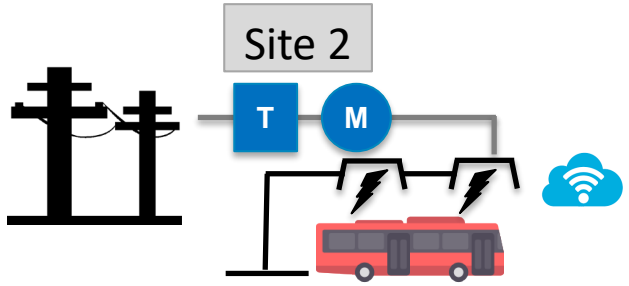
San Joaquin Regional Transit District (SJRTD)

- SJRTD is located in and serves a **Disadvantaged Community**
- Existing fleet of **17 electric buses**
  - 12 legacy electric buses (49-62 mi range) using **three overhead extreme fast chargers (XFC) on-route**. Each charger rated for up to 500 kW.
  - 5 new electric buses (251 mi range) joined the fleet in 2018
- Plan for **all-electric bus fleet** (~100 buses) by 2025

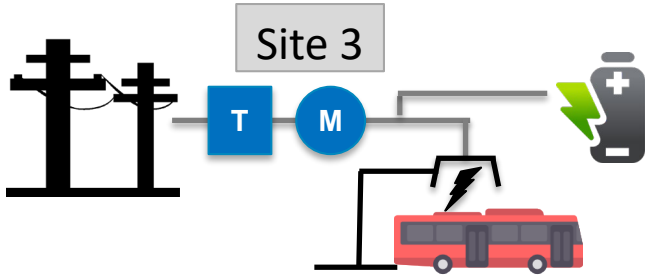
Project Scope



- **Five 60 kW overnight depot chargers**



- **Demand Management Software** with XFC



- **500 kWh* battery storage** with XFC

**capacity in AC at full nameplate power*

Electric School Bus Renewables Integration

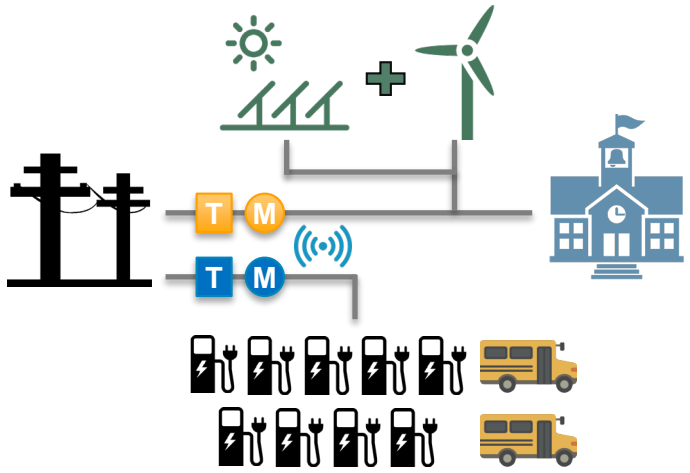
Project Partner

Pittsburg Unified School District

- K-12 school district, serving 13 school sites, including 8 elementary schools
- Pittsburg is located in and serves a **Disadvantaged Community**
- Current fleet of **2 electric buses**
  - Adding 7 electric buses to bring electric fleet to 9 buses
- Installing **~200KW onsite wind and solar renewable generation**
- Built **Learning Center** for students

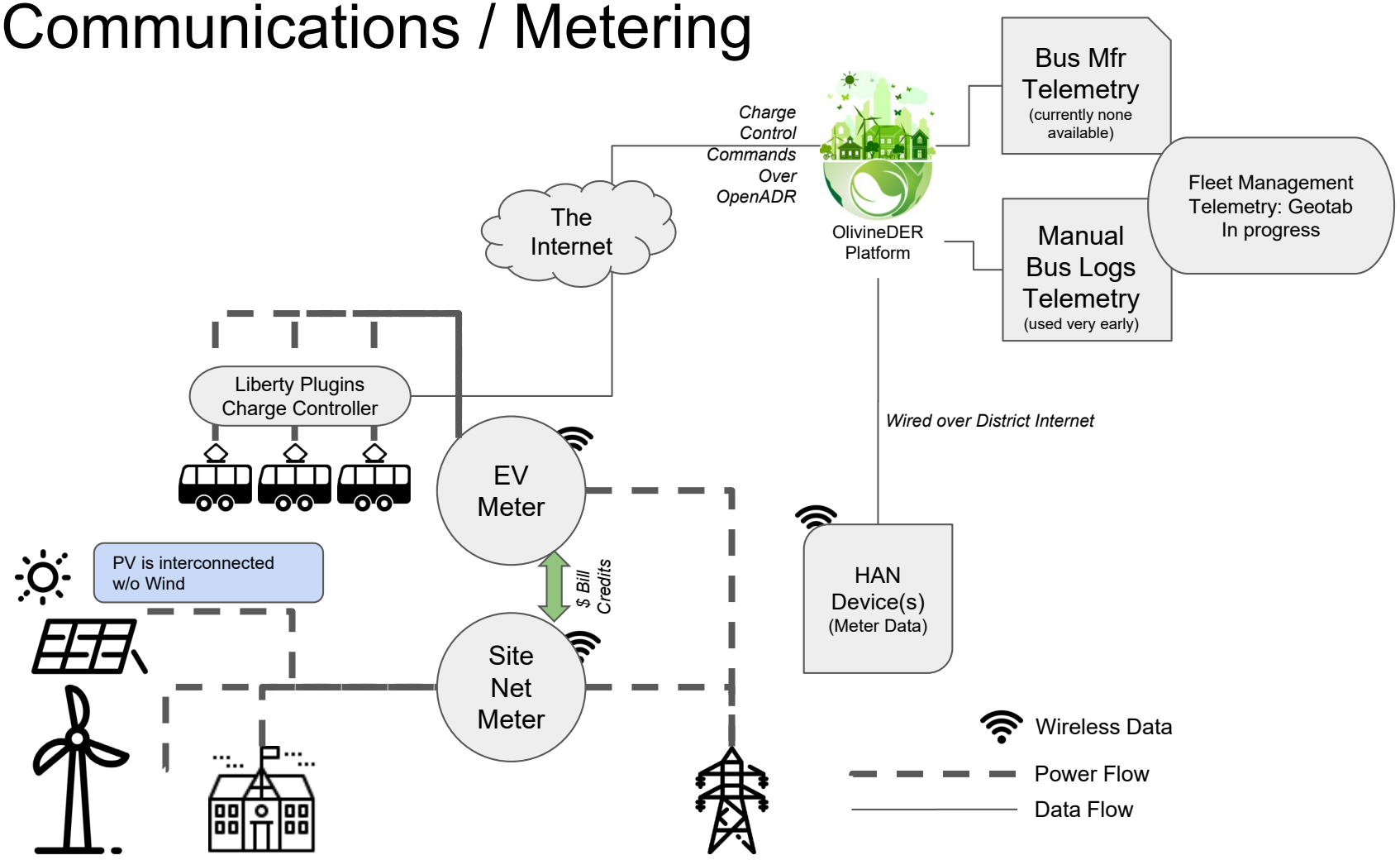
Project Scope

- Installed **9 Level 2 Chargers**
  - At 19kW each, about ~180kW total load
- Charge management software and platform to **optimize charging** for economics and GHG reductions
- Architecting **novel communications design** to integrate onsite renewables



Electric School Bus Renewables Integration

Communications / Metering



Idle Reduction Technology Customer Demo

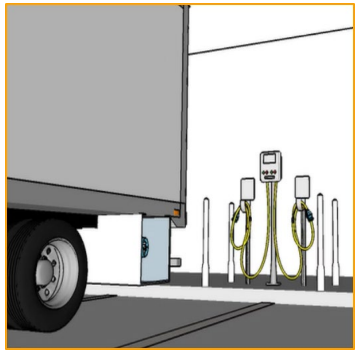
Project Partner

Safeway Albertson's Food Distribution Service Center Facility

- Facility is located in and serves a **Disadvantaged Community**
- Facility is **2.2 million square feet**
- Facility has roughly **313 dock spaces**
- Current fleet
  - Consists of **664 trucks**
  - 232 trucks with eTRU units capable of running on diesel or electricity
- Plan of **360 eTRU ports** now, with total of 550 – 600 eTRU ports if pilot is success

Project Scope

- **Deployment** of 25 electrified receptacles for eTRU connection (each 15-17 kW, adding a total load up to 425 kW)
- Demonstrate building off of customer owned infrastructure
- Demonstrate minimizing fuel costs by reducing diesel idling
- Understand deployment of eTRU technology and impact of site operations



Fast Charge: Program Overview

Key Program Features

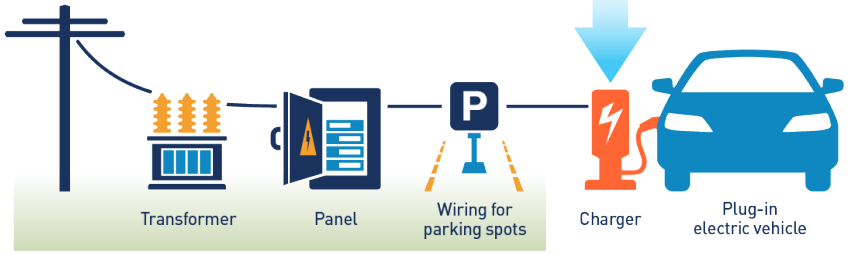
- **Light-duty vehicles**
- **Publicly available chargers**
- **PG&E pays for and owns make-ready infrastructure**
- **EVSE owned by site-host, EVSP or 3rd Party**
- **Participation limited to top-ranking sites**

Fast Charge Highlights by the Numbers

$22.4 M	Total program budget
25%	Minimum sites & budget for DAC+ adjacent
50kW+	Hardware requirement
150kW+	Make-ready infrastructure capacity per port
52	Targeted sites
234	Targeted ports

Fast Charge: How it Works

PG&E pays for a significant portion of total costs



Program participant pays for DC fast charging equipment*

PG&E pays for and owns "make-ready" infrastructure

Disadvantaged Communities**

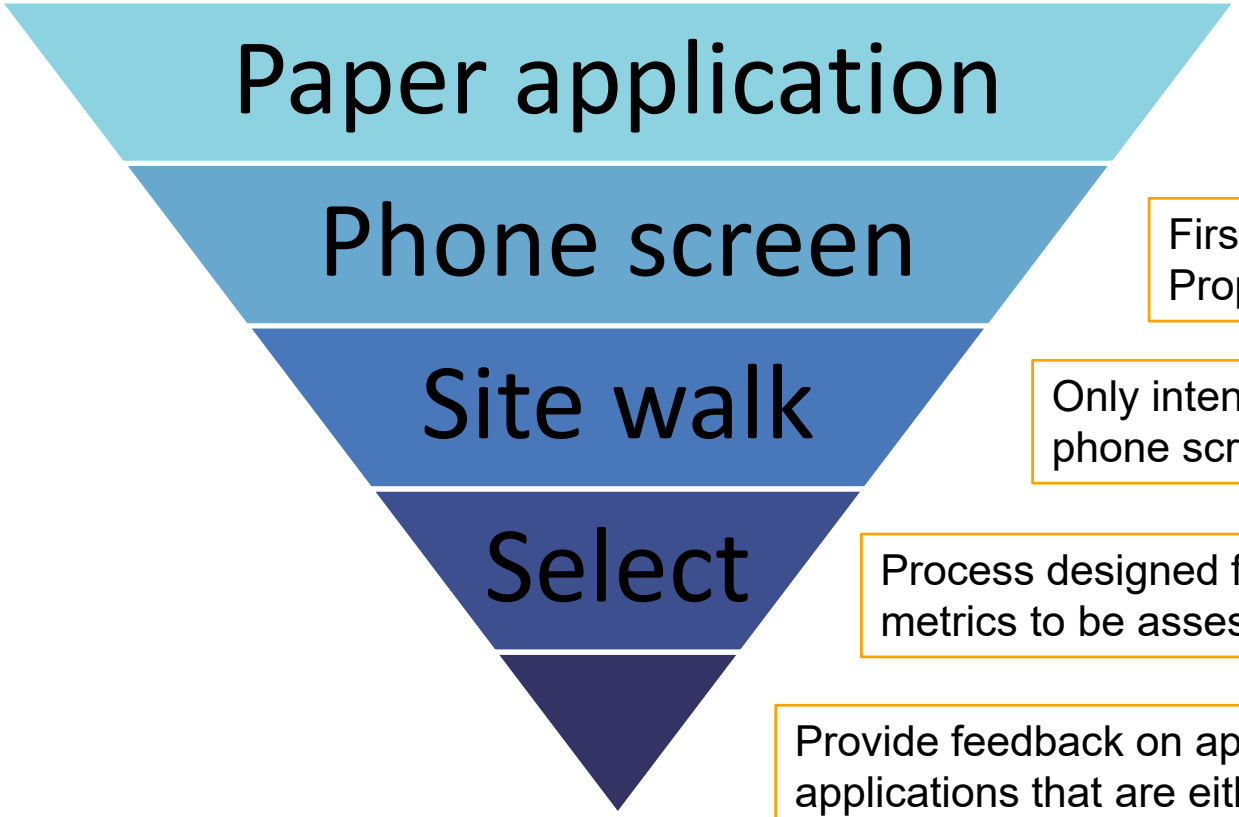
- $25,000 rebate per charger***
- PG&E pays for make-ready infrastructure as well

Everywhere else

- No rebate for chargers
- PG&E pays for make-ready infrastructure ONLY

* DC fast charger can be owned by customer, charging equipment vendor, or other third-party. PG&E can not own chargers.
** Includes census tracts adjacent to disadvantaged communities
*** Rebate amount not to exceed full cost of charger equipment and installation costs

Fast Charge: Summary of Application Process



Evaluation Criteria

All sites evaluated on objective scorecard

First direct contact with Site Host & Property Owner

Only intended for top-scoring sites after phone screen

Process designed for qualitative and quantitative metrics to be assessed.

Provide feedback on application to all EVSPs with applications that are either not selected or waitlisted.