Greening California’s State Fleet and Supporting Infrastructure

THE STATE-OF-THE-STATE SUSTAINABILITY EFFORTS

Evan Speer, Chief, Office of Fleet and Asset Management
Nancy Ander, Deputy Director, Office of Sustainability
May 16, 2019
The Transportation Opportunity

- Transportation represents the single largest opportunity area for us to aggressively reduce our carbon footprint in California

Source: California Air Resources Board
https://www.arb.ca.gov/cc/inventory/data/data.htm
Recent Drivers

**IPCC Report (2018)** - Prepared by over 90 authors from 40 countries
Climate change manifesting at much higher rates than previously assumed. At a target of 2 deg C (all coral reefs would be lost, sea ice levels plummet)
Evidence for need to reduce global temp rise to 1.5 deg C.

**EO B-48-18 (2018)** - 5 million ZEVs on CA roads by 2030

**EO B-55-18 (2018)** - Statewide carbon neutrality by 2045
CA Government Action Plan

- **2016 ZEV Action Plan**
  - Comprehensive action plan communicating what government will do to advance the ZEV industry and address barriers

- **2017/19 ZEV Roadmap**
  - Specific actions each department is taking to meet ZEV fleet and workplace targets

- **ZEV First Management Memo**

- **DGS 5 Year Operational Plan**
State’s ZEV Goal Timeline

- **2012**: EO B-16-12
  ZEV Goals Established (for State and Fleet)

- **2016**: 2016 ZEV Action Plan
  LD ZEV Goals Increased (Fleet)

- **2017**: SB 498
  LD ZEV Goals Codified (Fleet)
  AB 739
  Heavy Duty ZEV Goal Established (Fleet)

- **2018**: EO B-48-18
  State ZEV Goals Increased
  2018 ZEV Action Plan Update
  Medium and Heavy Duty ZEV Goals Established
Fleet Sustainability Policies

- Annual LD ZEV Purchasing Requirements
- ZEV/Hybrid First Policy
- EV Parking Policy
- Workplace Charging Policy
Education: through familiarization

Make state staff familiar with ZEVs
- **Multiple outreach** – showroom events for fleet managers
- **Annual AltCar event** on Capitol Steps

Stakeholder Outreach
- **Statewide policy workgroups** - forums to reinforce “green” direction
- **Drive Green California brochures** – share with state / locals
Results: EO B-16-12

- Executive Order
- Statewide Fleet Policy
- Actual Compliance
Results: ZEV/Hybrid First Policy

• Significant jump from 28% in FY 16/17 of all LD asset subject to 41% in FY 17/18.

• With addition of ZEV SUV and mini-van, this % is expected to increase in FY 18/19.
Results: Rapid ZEV/Hybrid Adoption

BRENDOWN OF ZEVs AND HYBRIDS (CUMULATIVE)

Number of Vehicles

Year

2012 2013 2014 2015 2016 2017

Traditional Hybrids
Plug-in Hybrid Electric Vehicle
Battery Electric Vehicle
Fuel Cell Vehicle
Results: EV Parking Policy

Registered EV Parkers

- 2014: 45
- 2015: 100
- 2016: 150
- 2017: 200
- 2018: 400
On the Horizon

• Medium and Heavy Duty ZEV Policy
• Telematics Policy for ZEVs
• ZEV Vehicle Home Storage Policy
Infrastructure Plan

• **DGS 5 Year Operational Plan**
  - Parking survey identified a phase one need of approximately 6500 charging ports
  - All fleet plus 5% of workplace parking
  - Funded for first two years
  - Leverage all possible external funding sources: EVGO, Electrify America, CEC, IOUs, POUs
Infrastructure – Results to Date

- **Infrastructure Support**
  - Assessments
  - Design
  - Regulatory reviews
  - Contracting
  - Construction management
  - Construction
  - Inspection
  - Closeout
Moving Forward in a Growing Industry

- **Some Questions/Decisions going forward:**
  - Scope of network services
  - Ownership options
  - Pricing options
  - Level of charging to meet user needs
  - Number of charging ports needed
  - Supporting leased facilities
  - Vehicle to grid opportunities
Thank You!

- **Evan Speer, Chief, Office of Fleet and Asset Management**  
evan.speer@dgs.ca.gov

- **Nancy Ander, Deputy Director, Office of Sustainability**  
nancy.ander@dgs.ca.gov

- **Mark Siroky, Transportation Manager, Office of Sustainability**  
mark.Siroky@dgs.ca.gov
PG&E Transportation Electrification Overview

May 2019
PG&E is focused on providing safe, reliable, affordable and clean energy to nearly 16 million Californians.

**Company overview**

PG&E customers lead the nation in clean technology adoption

- **>360,000 solar customers**
  - PG&E ranked #1 with 20% of all U.S. rooftop solar

- **>165,000 electric vehicles**
  - PG&E ranked #1 with 20% of all U.S. electric vehicles

- **>800 GWh of efficiency savings**
  - PG&E ranked #2 among U.S. utilities

- **>1,830 behind-the-meter battery customer sites**
  - CA ranked #1 for behind-the-meter storage deployments with 50% of all U.S. deployments

**Key Figures**

- **20,000+** employees
- **5.3 million** electric customers
- **~70%** GHG-free energy

- **70,000** square mile service area
- **4.4 million** gas distribution customers
- **7,700** MW of owned electric generation capacity

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Expanded EV offerings are driving sales

- 200,000 EV’s registered by PG&E customers; targeting 2M by 2030
- 40 EV models currently available in CA; likely doubling by 2021.

2018 EV Sales by County
PG&E Service Area

9 of the top 10 EV counties are in PG&E’s area

<table>
<thead>
<tr>
<th>County</th>
<th>2018 EVs as % of new vehicles</th>
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<tbody>
<tr>
<td>Santa Clara</td>
<td>17.2%</td>
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<tr>
<td>Alameda</td>
<td>13.6%</td>
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<tr>
<td>Marin</td>
<td>12.5%</td>
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<tr>
<td>San Francisco</td>
<td>9.4%</td>
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<tr>
<td>Contra Costa</td>
<td>9.3%</td>
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<tr>
<td>Santa Cruz</td>
<td>8.5%</td>
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<tr>
<td>Orange</td>
<td>8.0%</td>
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<tr>
<td>Mariposa</td>
<td>6.8%</td>
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<tr>
<td>Sonoma</td>
<td>6.8%</td>
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<tr>
<td>San Mateo</td>
<td>6.5%</td>
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</tbody>
</table>

In November 2018, EVs accounted for over 12.5% of all new car sales

Source: EPRI, Based on external registration data; County data as of Sept. 2018
PG&E’s transportation electrification portfolio targets the key enablers to electric vehicle (EV) adoption

<table>
<thead>
<tr>
<th>Programs / offerings</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
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<tr>
<td>Workplaces and multi-unit dwellings (light-duty)</td>
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<td><img src="image2" alt="image" /></td>
<td><img src="image3" alt="image" /></td>
<td><img src="image4" alt="image" /></td>
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<td>Public fast charging</td>
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<td><img src="image10" alt="image" /></td>
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<td>Fleet vehicles (medium- &amp; heavy-duty)</td>
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<td><img src="image15" alt="image" /></td>
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<td><img src="image17" alt="image" /></td>
<td><img src="image18" alt="image" /></td>
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<tr>
<td>Support for EV connections</td>
<td><img src="image19" alt="image" /></td>
<td><img src="image20" alt="image" /></td>
<td><img src="image21" alt="image" /></td>
<td><img src="image22" alt="image" /></td>
<td><img src="image23" alt="image" /></td>
<td><img src="image24" alt="image" /></td>
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<tr>
<td>Low- &amp; moderate-income residential</td>
<td><img src="image25" alt="image" /></td>
<td><img src="image26" alt="image" /></td>
<td><img src="image27" alt="image" /></td>
<td><img src="image28" alt="image" /></td>
<td><img src="image29" alt="image" /></td>
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<tr>
<td>Schools and state parks</td>
<td><img src="image31" alt="image" /></td>
<td><img src="image32" alt="image" /></td>
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<td><img src="image34" alt="image" /></td>
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### Enabler #1: Access to charging infrastructure
- Develop a charging infrastructure network that makes EV usage viable for all Californians
- See below timeline of PG&E’s investments and work to support charging infrastructure deployment
- All EV charging infrastructure programs have disadvantaged community deployment targets

### Enabler #2: Total cost of ownership
- Ensure that owning and operating an EV is cheaper than the gasoline-fueled alternative
  1. **Electric vehicle rates:**
     - Residential EV rate
     - Commercial EV rate
  2. **Upfront vehicle cost:**
     - Point of purchase rebate (replaces PG&E Clean Fuel Rebate)
     - OEM rebates for customers
  3. **Equity & adoption in DACs:**
     - Used EV rebate low-income

### Enabler #3: Education and buying experience
- Make Californians’ awareness of EVs as common as conventional vehicles
  1. **PG&E website resources and customer tools**
     - Home charger resource
  2. **Marketing, education, and outreach programs (Veloz, Ride and Drives)**

### Innovation, R&D & vehicle-grid integration
- Optimize charging infrastructure siting and usage to maximize utilization and minimize grid impacts
  1. **Charger siting / load management:**
     - BMW iCharge Forward pilot
     - I-5 corridor study
  2. **Distributed generation and renewable integration:**
     - Transit and idle-reduction customer demonstrations
     - School bus + renewables
  3. **EV submetering**

**Note:** Initiatives in purple text are pending approval or under development.
Support for EV growth by addressing market barriers and leveraging PG&E’s core competencies

1. Infrastructure and access to charging
2. Rate design & rebates
3. Grid modernization and R&D
4. Education and outreach
Access to charging infrastructure is closely correlated to EV adoption

Source: International Council on Clean Transportation (2018), *California's continued electric vehicle market development.*
Utility EV infrastructure investment models

1) Duty-to-Serve

*Obligated* investments 
*triggered by EV Adoption*

- Transformer
- Distribution grid upgrades

2) Programs

*Optional* investments behind the customer meter 
*to accelerate adoption*

- **a** Make-Ready
- **b** Charger Ownership

- Panel
- Make-ready
- Charger
$380M of investments in EV infrastructure

**EVcharge network**
- 7,500 Level 2 chargers (10-20 chargers per site)
- Installations began in January 2018
- $130 million; 3 years
- Targeting Workplaces, multi-unit dwellings
- Turnkey installation from utility covers most costs; rebate/participation payment for site hosts

**EVfast charge**
- 50+ plazas for DC Fast Charging; utility provides make-ready infrastructure
- Final CPUC approval received 05/31/18
- $22 million; 5 years
- Corridor and urban sites
- Plan for variety of power requirements (50 – 350 kW)

**EVfleet**
- Infrastructure for non-light-duty fleets (e.g. delivery vans, transit buses, forklifts, truck refrigeration units) - addressing the primary source of air pollution
- Final CPUC approval received 05/31/18
- $236 million; 5 years
- Program sized to meet forecast adoption – 6,500 vehicles at 700 sites

All programs include additional incentives for and deployment targets in disadvantaged communities
Pilots to test new approaches to EV adoption

Empower EV  
(pending approval)

- Support EV adoption by low-moderate income customers by reducing 3 key barriers:
  1. Vehicle cost: education on and coordination of available incentives
  2. Lack of knowledge of EVs and benefits: targeted outreach by community-based organizations
  3. Access to charging infrastructure:
     - $500 point-of-sale rebate for a residential level 2 charger for low & moderate income residents
     - Additional $2,000 rebate for panel upgrade for low-income customers
- $4 million pilot targeting adoption of 2,000 EVs

EV Parks and Schools  
(pending approval)

- Test investments in hard-to-reach, highly visible locations to increase awareness of EV charging infrastructure and support EV adoption
- **Schools:**
  - Level 2 charging for staff, parents, students, etc.
  - An EV-related curriculum will be offered at the 20-30 participating schools in disadvantaged communities
- **Parks:**
  - Level 2 and DC fast charging installed at 10-20 parks for use by visitors and park fleet vehicles
  - Educational displays to inform visitors about the benefits of EVs
  - Given the remoteness of some parks, off-grid charging will be explored
- $6 million budget for each pilot
Support for EV growth by addressing market barriers and leveraging PG&E’s core competencies

<table>
<thead>
<tr>
<th></th>
<th>Infrastructure and access to charging</th>
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<tbody>
<tr>
<td>2</td>
<td>Rate design &amp; rebates</td>
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<tr>
<td>3</td>
<td>Grid modernization and R&amp;D</td>
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<td>4</td>
<td>Education and outreach</td>
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</tbody>
</table>
Rates and rebates for EVs

Residential EV Rate
• Time of use rate offering customer $1.20 per gallon equivalent when charging overnight

Commercial EV Rate
Aims to encourage investments in public charging and fleet electrification.
• Creates a new EV customer class
• Simplifies rate structure based on a subscription model
• Filed with the CPUC in November 2018

Low Carbon Fuel Standard rebates
Rebates for the upfront cost of an EV
• PG&E provides a one-time $800 vehicle rebate for EVs (“Clean Fuel Rebate”)
• This will be replaced by a statewide point-of-purchase rebate

Automaker rebates
Discount at the dealership
• $3,000 off the MSRP of a Nissan Leaf
• Previous offering of $10,000 off the BMW i3
For modeled customer sites, new EV rates can enable significant savings compared to existing commercial rate plans. Actual bill impacts will vary for each customer depending on charging usage patterns.

Rate and billing estimates are preliminary and only reflect the sample site modeled. Actual costs will vary based on approved rate values, as well as individual site energy usage.
Support for EV growth by addressing market barriers and leveraging PG&E’s core competencies

1. Infrastructure and access to charging
2. Rate design & rebates
3. Grid modernization and R&D
4. Education and outreach
Vehicle Grid Integration (VGI) optimizes EV charging for grid & customer

What is VGI?

VGI covers both managed charging (one-directional), as well as vehicle-to-grid (bi-directional).

VGI is a concept, not a product. It spans several players, assets, technologies, and applications.

VGI Value/Asset Chain

| Electric grid | Electric vehicle service provider (EVSP) | Electric vehicle service equipment (EVSE) | Electric vehicle (EV) |

Why is VGI important?

VGI optimizes EV charging: changes charging patterns, to maximize value for grid & customers.

If properly leveraged, VGI can help enable the acceleration of EV adoption.

VGI Goals

Grid
- Ensure reliability
- Provide services

Customer
- Ensure satisfaction
- Unlock more value
Optimizing EV charging with grid capacity and renewables

**BMW i ChargeForward**

- Partnership with BMW: technology demonstration pilot for managed charging using car telematics
- Participants received incentive for allowing BMW to optimize charging
- Tested stationary storage using 2nd-life EV batteries to complement EV smart charging in demand-response.

Charging profiles can be optimized for overnight and mid-day hours to reduce grid costs and use excess renewable generation.
Support for EV growth by addressing market barriers and leveraging PG&E’s core competencies

1. Infrastructure and access to charging
2. Rate design & rebates
3. Grid modernization and R&D
4. Education and outreach
Assisting customers purchase EVs

https://ev.pge.com/
Thank you!

Contact information:

David Sawaya – DUST@pge.com
Southern California Edison
Charge Ready Programs

Ken Reichley, Marketing Communications Advisor
May 16, 2019
California’s GHG Emissions Goals

If we want to get to zero emissions, eventually we have to replace many of the things we rely on today that require combustion.
Emissions contributors

- Transportation: 39%
- Electric Power: 19%
- Industrial: 17%
- Transportation-Related Industrial: 6%
- Residential & Commercial: 11%
- Agriculture: 8%
A Transportation Electrification Pathway to 2030

- 24% of cars and light trucks (7 Million total)
- 15% of medium-duty trucks and vans (180,000 total)
- 6% of heavy-duty trucks and buses (22,000 total)

= Removing 17,000 tons of NOx and 58 million metric tons of greenhouse gas emissions from California's Neighborhoods by 2030
The need for SCE to accelerate transportation electrification (TE)

- California’s GHG and environmental goals are some of the most ambitious in the world and will take significant deliberate action to meet.

- Achieving California’s carbon reduction and air quality goals cost-effectively requires a broad set of actions across every part of the economy (see SCE’s Clean Power and Electrification Pathway recommendations).

- Substantial transportation sector electrification is needed to meet the State’s environmental goals
  - The Governor has set a target of 5 million zero-emission vehicles in California by 2030
  - SCE’s analysis finds that nearly 7 million light-duty EVs will be needed statewide, in combination with other measures, by 2030

- Barriers continue to impede EV adoption (range anxiety and lack of awareness).

- Accelerating and sustaining EV adoption requires market transformation; using the success and learnings from the Charge Ready Pilot, SCE’s TE portfolio is intended to help spur this transformation.
# SCE TE Portfolio Overview

<table>
<thead>
<tr>
<th>Program</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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<tbody>
<tr>
<td>Charge Ready Pilot $46.6M*</td>
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<td>Charge Ready Transport $356M</td>
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<td>Charge Ready 2 $760M</td>
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<td>AB 1082 Schools $9.9M</td>
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<tr>
<td>AB 1083 Parks and Beaches $9.9M</td>
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* 2018 Dollars in Millions

**PRP (Priority Review Pilots) consist of:**
1) Charge Ready Home Installation Rebate
2) Charge Ready | Transit Bus
3) Port of Long Beach Projects
   1) Gantry Port of Long Beach
   2) Container Movers Port of Long Beach
4) Charge Ready DC Fast Charge

Items in these swim lanes are filed but not approved and could be substantially altered or not offered
Current Programs
Business Programs

**Charge Ready Pilot**
*No-cost infrastructure* to serve level 1 or level 2 EV charging
Available to *business customers* and *multi-unit dwelling* site owners
*One-time rebate* to offset the costs of charging stations
*New Multi-Unit Dwelling* minimum of five ports

**Charge Ready DC Fast Charge**
*No-cost infrastructure* to serve DCFC or level 3 EV charging
Available to *business customers*
*One-time rebate* to offset the costs of DCFC stations
Launched *June 29, 2018*
Business Programs

**Charge Ready | Transit Bus**

- **No-cost infrastructure** to serve electric bus charging
- Available to government **transit agency** customers
- **One-time rebate** to offset the costs of charging equipment
- Launched **June 4, 2018**

**Port of Long Beach Projects**

- Convert **nine out of 24** rubber tire gantry cranes from diesel to electric power
- Deploy infrastructure to serve up to **20 yard tractor charging stations**
- Complete by **end of 2019**
Residential Programs

**Clean Fuel Reward Program**
Available to SCE residential customers who drive electric vehicles (EV)
Offers a one-time $450 or $1K rebate
Up to three different owners of the same EV can qualify
Launched May 2017

**Charge Ready Home Installation Rebate**
Available to SCE residential customers with dedicated parking spaces and own/lease EVs
Rebate aims to offset electrician and permitting costs
3,350 applications received, 1,309 rebates paid
Launched May 30, 2018, closing soon
Future Programs
Business Programs

**AB1082 Schools**

- **No-cost** or **utility owned infrastructure** to serve level 1 or level 2 EV charging
- Available to **K 1-12 Schools**
- **One-time rebate** (with the no-cost option) to offset the costs of charging stations

**AB1083 Parks**

- **Utility owned** infrastructure (for existing or new construction) to serve level 2 or DCFC EV charging
- Available to **California State parks and beaches**
No-cost infrastructure or rebated infrastructure (for existing or new construction) or utility owned (for government or multi-unit dwellings) to serve level 1, level 2 or DCFC EV charging
Available to business customers and multi-unit dwelling site owners
One-time rebate to offset the costs of charging stations for no cost infrastructure
Decision Summary
Approved total program budget of $356.4M
Achieve minimum 870 sites with 8,490 electric vehicles procured or converted
Charging station rebates available for transit/school buses and sites in DACs
Launching May 20, 2019

Budget Allocation
Minimum 15% infrastructure budget should serve transit agencies
Maximum 10% infrastructure budget should serve forklifts
Minimum 25% of infrastructure budget should serve ports and warehouses
Minimum 40% infrastructure budget should serve sites in DACs
Charge Ready Transport Kickoff
May 20, 2019
SCE Energy Education Center, Irwindale
Thank you!
Kendall Reichley
Marketing Communications Advisor
Kendall.Reichley@sce.com