Bring EV Charging to your Workplace

Webinar for employers, property managers and EV drivers

April 16, 2019

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Plug-in SD

SANDAG

Center for Sustainable Energy®

Agenda

- Plug-in SD
- What is an electric vehicle?
- Benefits and incentives
- Charging equipment
- Workplace charging
- Resources

Plug-in San Diego

Ensure the San Diego region is ready for plug-in electric vehicles

- **Provide information and encouragement to adopt electric vehicles and infrastructure**

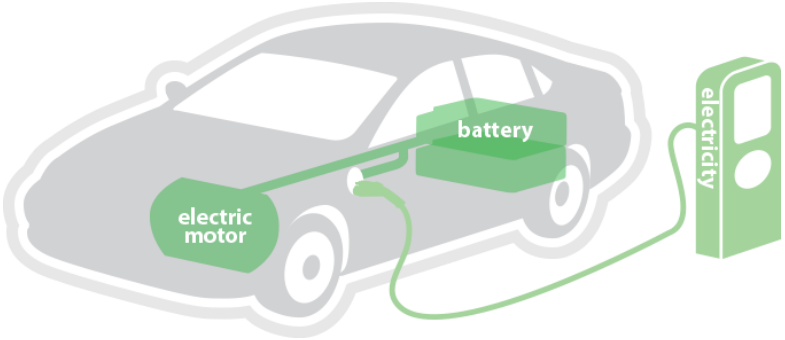
Why Workplace Charging?

- The San Diego Region's EV market is growing rapidly
- Workplaces represent the lengthiest parking location besides home
- Promotes EV adoption and increases electric miles traveled
- Daytime charging helps integrate renewables into the grid
- Resources and incentives are available

Plug-in Electric Vehicles (PEVs)

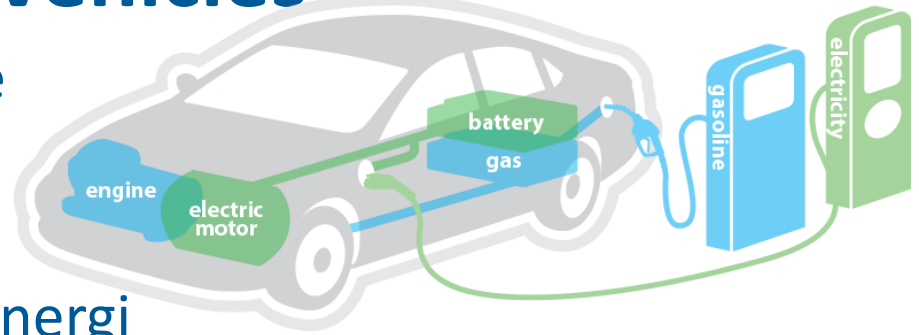
Battery Electric Vehicles

- All electric, zero-emissions
- 25 models available
- Examples: Nissan Leaf, Tesla Model 3, Chevy Bolt



Plug-in Hybrid Electric Vehicles

- Electric battery and gasoline
- 26 models available
- Examples: Chevrolet Volt, Honda Clarity, Ford Fusion Energi



Benefits of Electric Vehicles

- Improves local public health and air quality by reducing tailpipe emissions
- Lower fuel costs over vehicle lifetime
  - Electricity costs less than gasoline
- Lower lifetime maintenance costs
- Increases energy independence

Growing Number of Available Vehicles

Battery Electric Vehicles

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Growing Number of Available Vehicles

Plug-in Hybrid Electric Vehicles

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Vehicle Characteristics

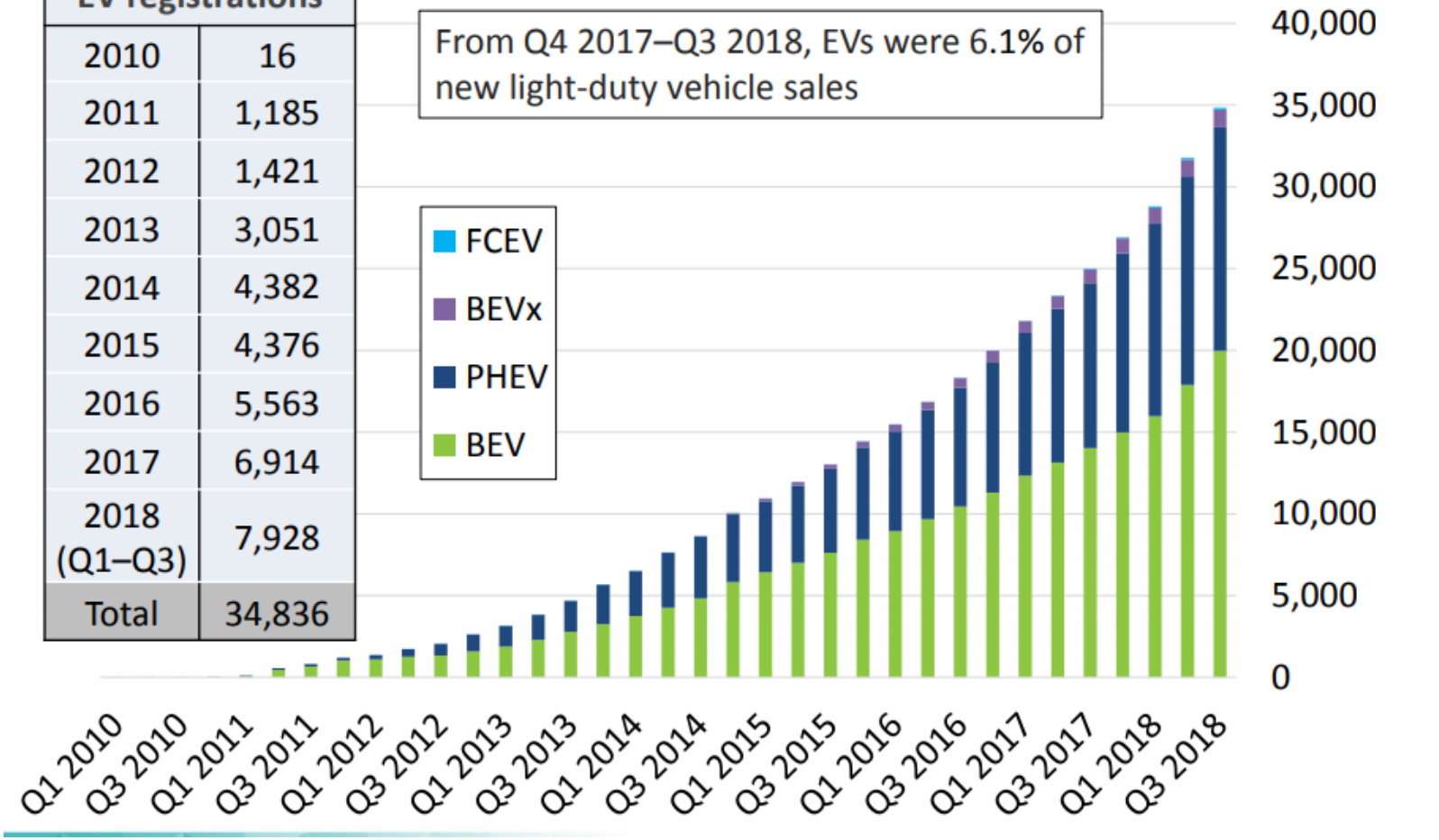
- 50+ models today, ~70 by 2020
- 2011-2016
  - ~70-90 mile range BEVs
  - Small cars/ hatchbacks
- 2017+
  - 100-200+ mile range BEVs
  - Bigger vehicles
  - Luxury vehicles
- Low lease costs
- More public fast charging

Electric Vehicle Incentives

- Clean Vehicle Rebate Program (CVRP)
  - Provides rebates up to $4,500 per purchase or lease of eligible light-duty plug-in vehicles
  - Rebate Now
- HOV Lane Access Sticker
- Federal Tax Credit (Up to $7,500)

Growth of the San Diego Market

EV registrations	
2010	16
2011	1,185
2012	1,421
2013	3,051
2014	4,382
2015	4,376
2016	5,563
2017	6,914
2018 (Q1–Q3)	7,928
Total	34,836



Source: Clean Vehicle Rebate Project, Includes content supplied by R.L. Polk & Co, © 2018

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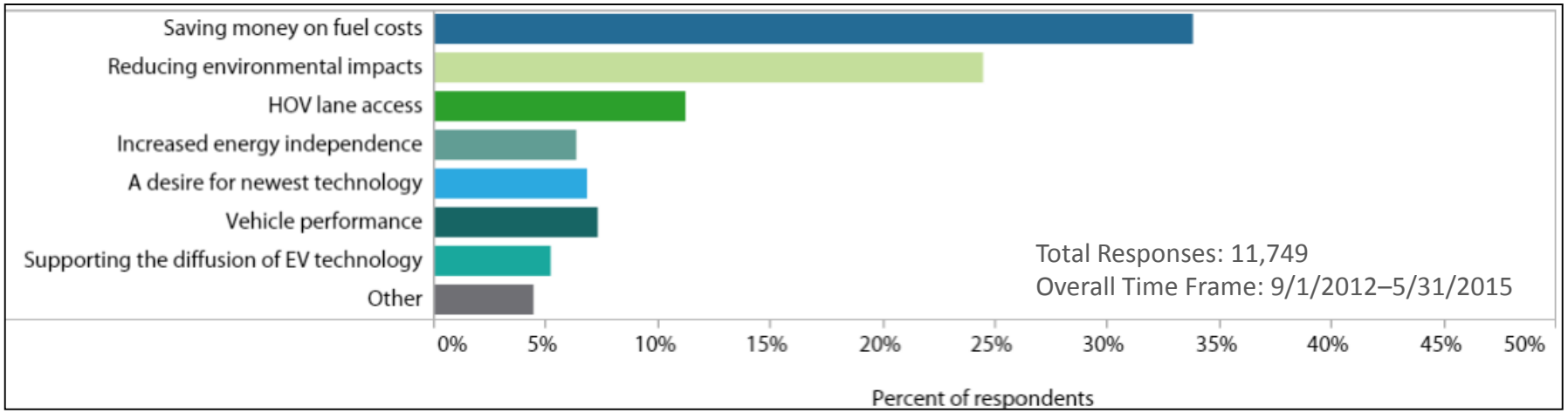
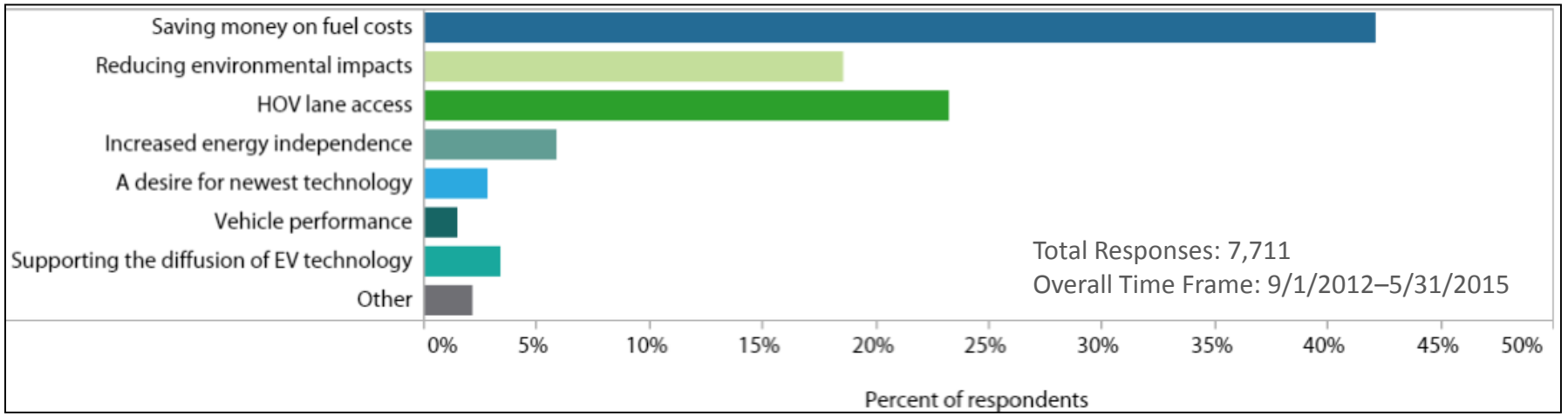
Purchase Motivations

BEV Respondents



PHEV Respondents



Source: Clean Vehicle Rebate Project Survey Overall Time Frame: 9/1/2012–11/15/2015
Total Responses: 25,217

Charging Equipment

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Charging: Level 1 vs. Level 2

AC Level 1

- Uses a standard 110/120-volt alternating current (VAC) three-pronged wall plug

AC Level 2

- Uses 208/240 VAC and can be hardwired or connected with a plug

Charging: DC Fast Charging

- Uses commercial-grade 440 /480 VAC – produces direct current (DC) to charge
- Commercial/Public – due to costs
- Provides fast charge for some BEVs

How Fast Can You Charge?

Type of Charging	Power Levels (installed circuit rating)	Miles of Range per Hour of Charging*
AC Level 1	110/120VAC at 15 or 20 Amps	~4-6 miles/hr.
AC Level 2		
3.3 kW (low)	208/240VAC at 30 Amps	8-12 miles/hr.
6.6 kW (medium)	208/240VAC at 40 Amps	16-24 miles/hr.
9.6 kW (high)	208/240VAC at 50 Amps	24-36 miles/hr.
19.2 kW (highest)	208/240VAC at 100 Amps	> 60 miles/hr.
DC Fast Charging	200-500VDC at up to 200 Amps	Generally up to 80% charge in less than 30 minutes

* Refer to vehicle specifications for exact ratings.

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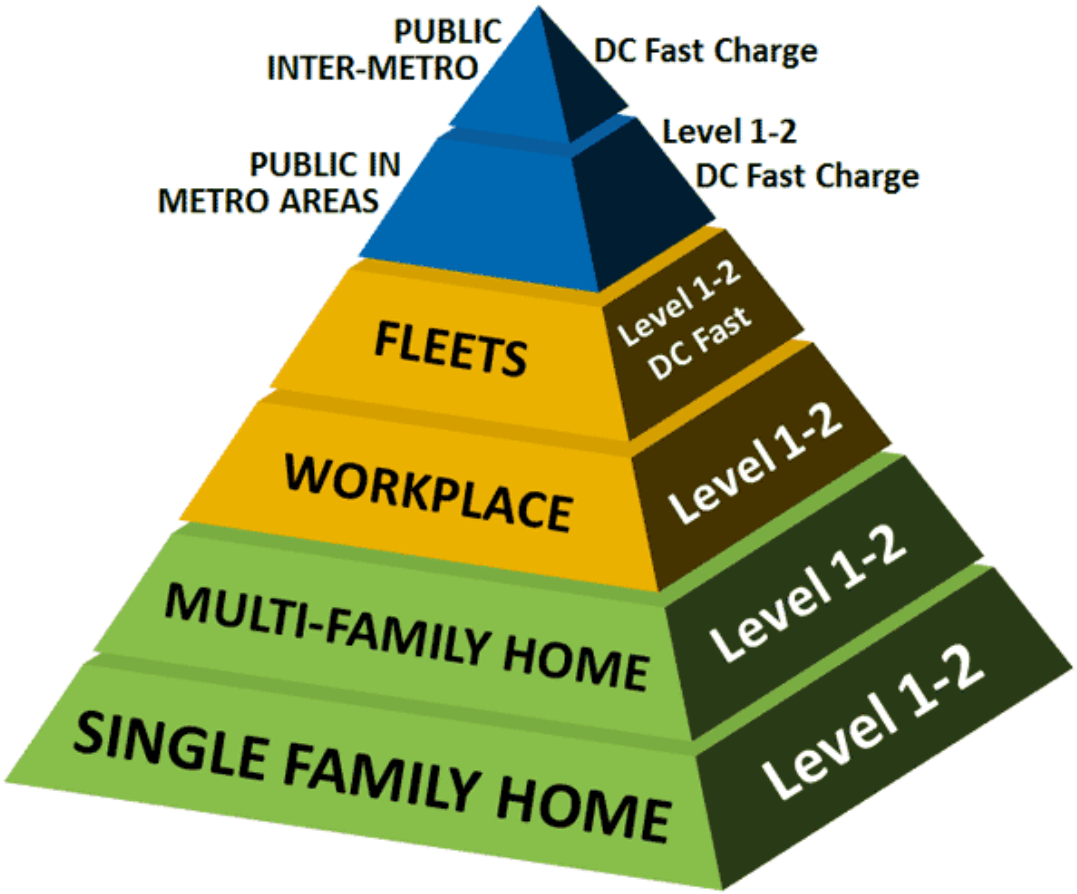
Where do EV drivers plug-in?

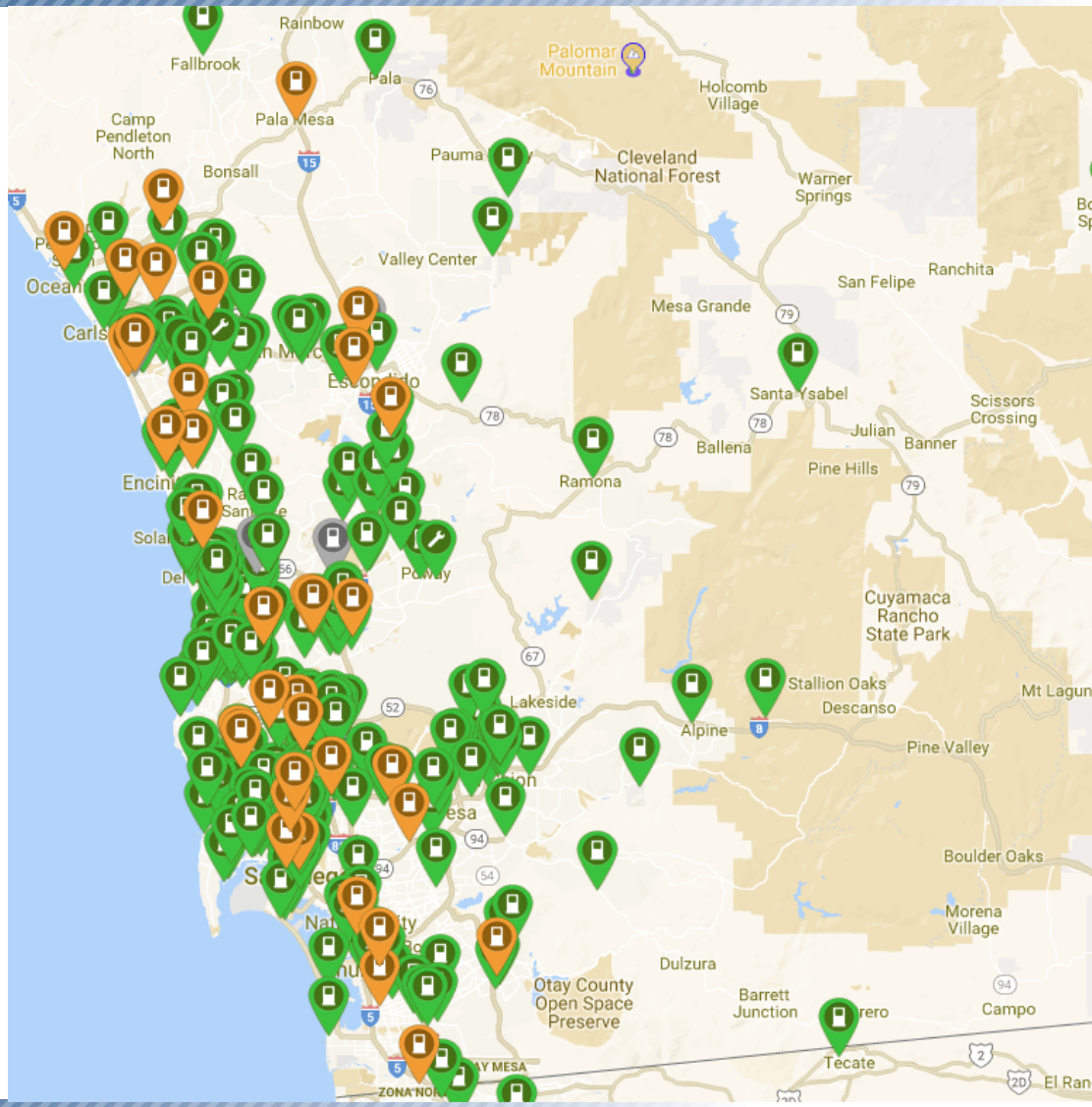


The majority of charging occurs at home, next workplace, lastly public charging

Source: New York State Energy Research and Development Authority

Public Charging in San Diego

- 400 public charging locations in the SD region (with a total of about 1,400 plug-in points)
- 42 DCFC locations, 185 ports
- Many private Workplace locations



Source: Plugshare (December 2018), AFDC, March 2019

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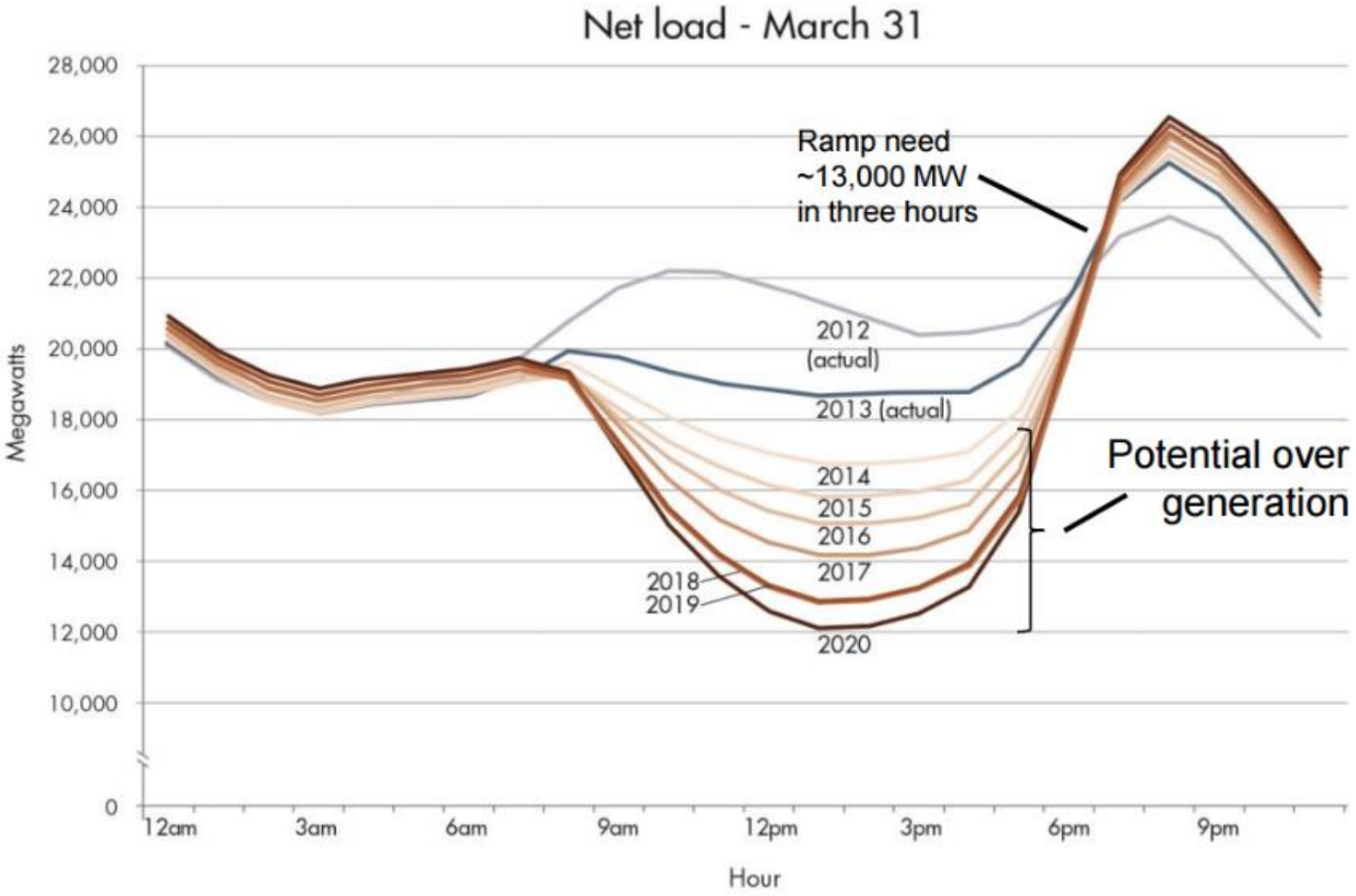
Grid Impacts



Workplace Charging

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Benefits for Employees

- **Improve daily commutes**
  - Access to the carpool lane reduces driving time and stress

- **Save money on fueling costs**
  - Electricity is less expensive than gasoline

- EV drivers without access to home charging can have a **reliable place to charge** at work

Benefits for Employers

- **Improve employee retention**
  - Access to the carpool lane reduces driving time and stress
  - Free charging is low cost benefit
  - Competitors may have it
- Meet sustainability goals
  - LEED Certification
- Incentives to help offset capital cost and operating cost(LCFS)
- Provides range assurance and increases eVMT for PHEVs

Companies with Workplace Charging

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Step 1: Research Options and Develop a Plan

- Review key resources
- Survey employees to determine current and future interest in PEV charging
- If you lease, talk to landlord or facility managers to obtain permission to install charging
- Evaluate electrical connections
- Create a budget
- Contact local utility for available rate options
- Explore any available incentives or tax credits
- Plan for future growth

Step 2: Choose a System

PEV charger options

- Level 1? Level 2?
- How many?
- What capabilities?
- Where will it be installed?

What are the hardware costs?

- Level 1: $0 to $500 (for refurbishing an outlet)
- Level 2: $500 - $6,000
- Networked vs Non-Networked

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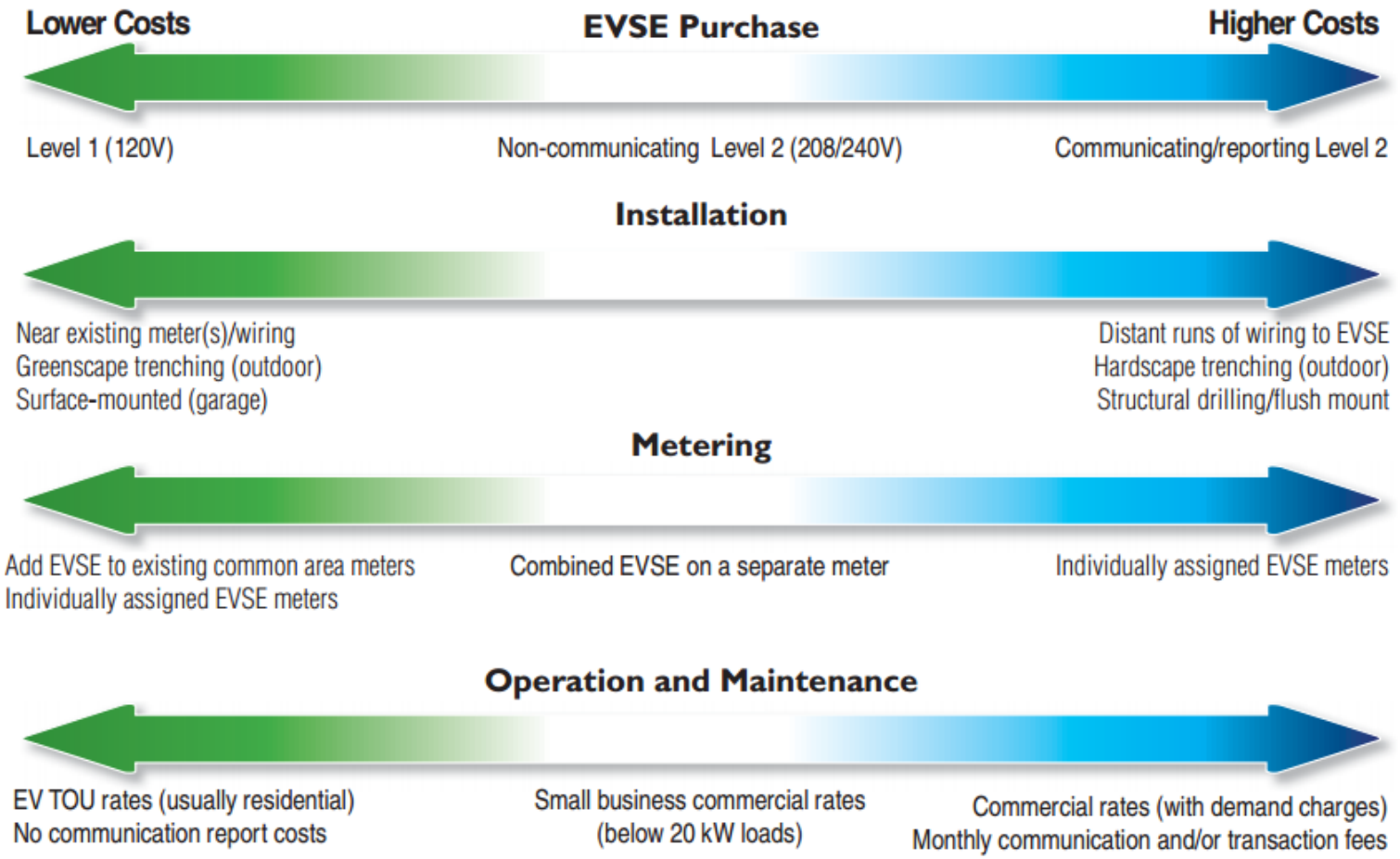
Costs



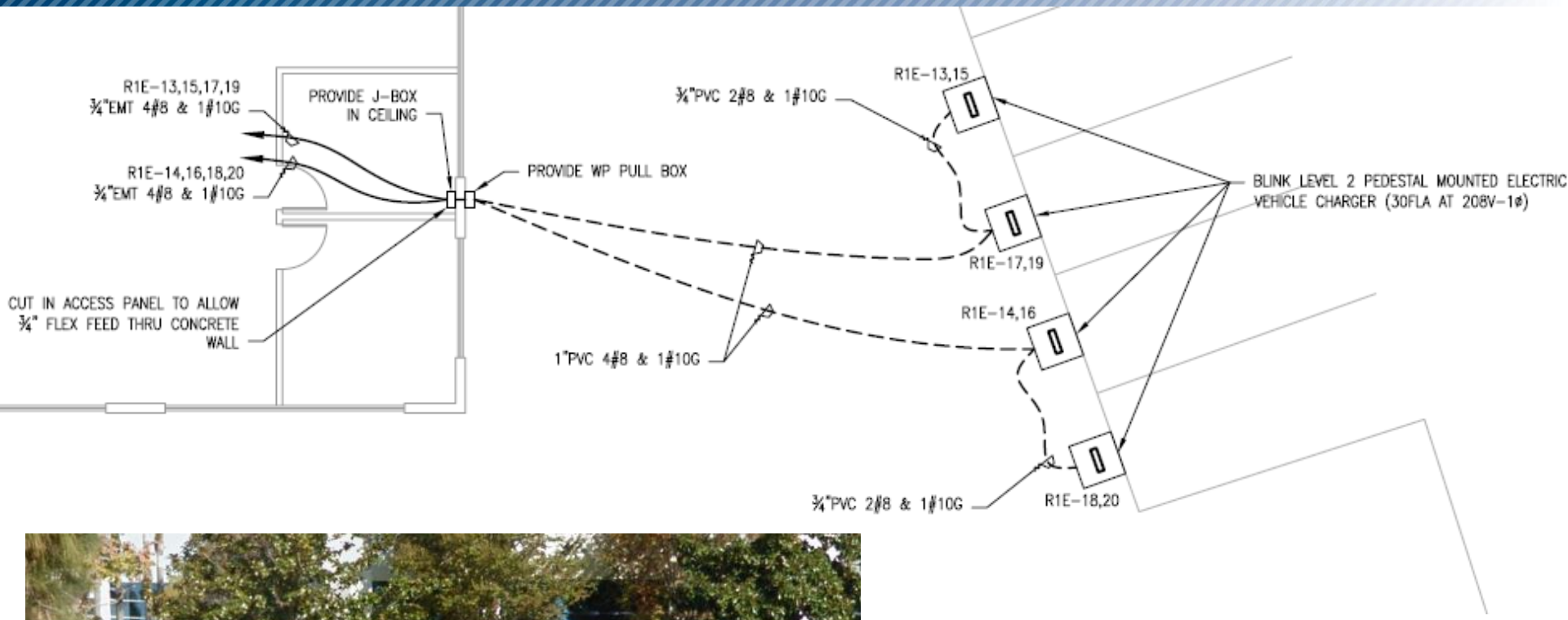
Source: California PEV Collaborative

Step 3: Create and Follow an Installation Checklist

- Conduct a site assessment
- Check compliance with ADA
- Estimate electrical load
- Coordinate with local utility
- Contact equipment suppliers
- Hire contractor(s)
- Pull all necessary permits
- Install charging equipment

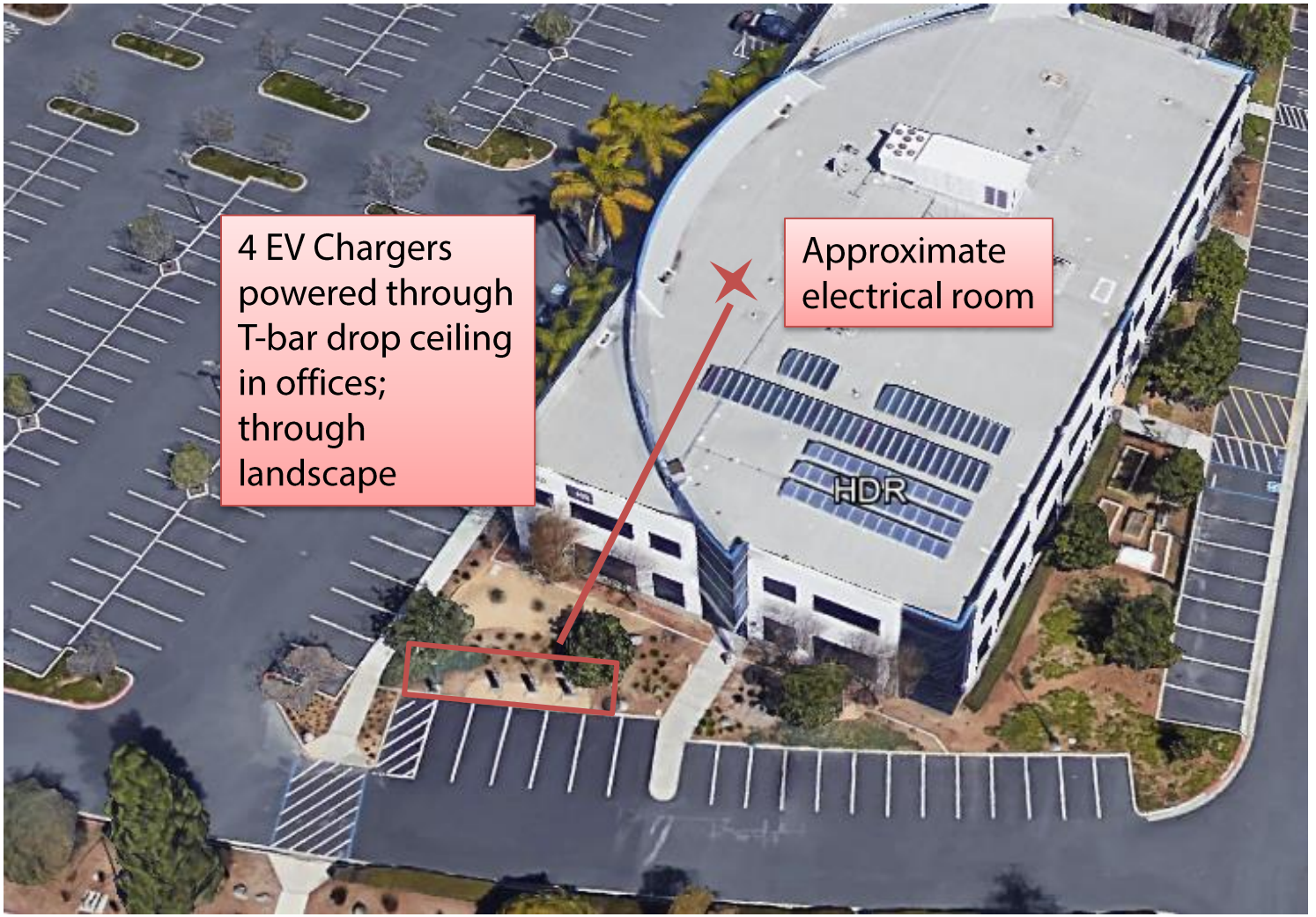
Start charging!

Site Plan- Workplace Installation



ADA striping of accessible EVCS space connects to existing path of travel

Workplace Installation



Step 4: Establish and Follow Workplace Charging Policies and Procedures

- Payment options
  - Determining Fee vs. Free
  - Flat fee ($/hr) or electricity usage ($/kWh)
  - Monthly fee?
- Access priorities
  - Accessible to the public
  - Prioritize charging for fleet vs. employee vs. public
- System optimization
  - Manage usage among employees
  - Establishing timing schedules to avoid demand charges
  - Consider possibilities with clean distributed generation (i.e., solar or wind)
  - Low carbon Fuel Standard Credit

SANDAG EV Charging Program

2015 Regional Plan Measure

- Establish regional incentive program to launch in 2020
- Initial SANDAG focus on Level 2 public & workplace chargers

Program Design Phases

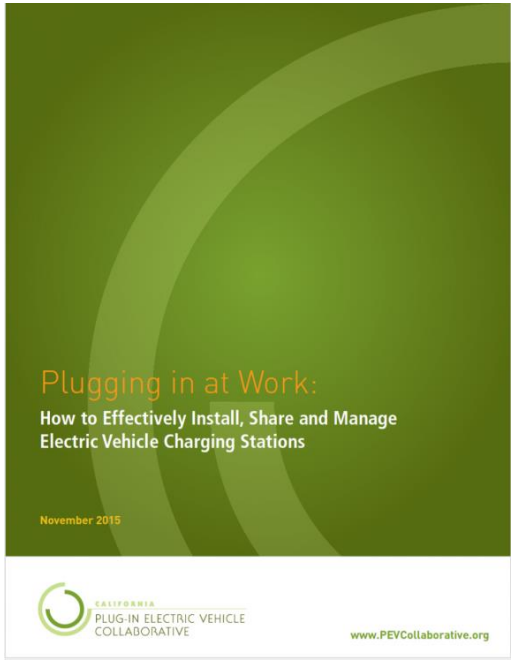
1. Best practices review & stakeholder engagement (2018)
2. Develop program framework: collaborate with APCD & CEC CALeVIP on possible larger joint program (2019)
3. Build out program (with partners) & conduct outreach (Mid-2019 to Early-2020)
4. Launch program mid-2020

www.sandag.org/EVChargingProgram

Charging Resources

Guidance Documents
- Where to start
- Assessing demand
- Selecting a solution

https://energycenter.org/pluginsd



Find Vendors and Installers
https://calevip.org/calevip-connects

http://www.veloz.org/pevc-resources/

Other Resources

San Diego Gas & Electric Power Your Drive
https://www.sdge.com/poweryourdrive

CALIFORNIA CLEAN VEHICLE REBATE PROJECT℠

Clean Vehicle Incentive Program
https://cleanvehiclerebate.org

Electric Vehicle Cost Comparison & Planning Tool
http://gis.its.ucdavis.edu/evexplorer/

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Thank you!

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