

# Bring EV Charging to your Community

Webinar for Multi-Unit Dwelling Managers and Residents

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# Agenda

- **Plug-in SD**
- **What is an electric vehicle?**
- **Benefits and incentives**
- **Charging equipment**
- **MUD charging**
  - Process
  - Examples
- **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 Multi-Unit Dwellings

- MUDs represent around half of the San Diego Region's Housing stock
- Single-Family homeowners have more control of charging installation
- MUDs have unique challenges that can be overcome with creative solutions



# Benefits of Electric Vehicles

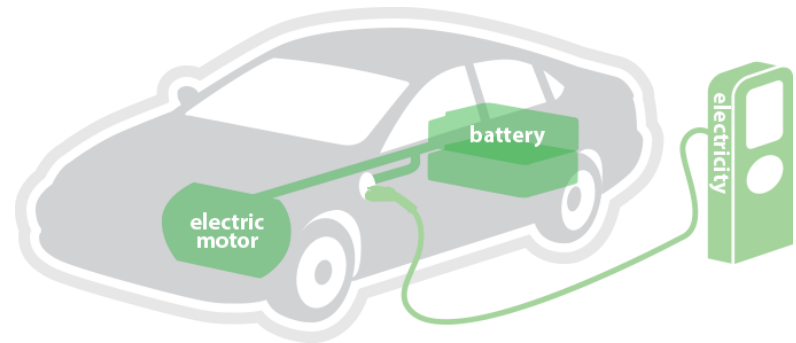
- Improves local public health and air quality by reducing tailpipe emissions
- Lower fuel costs over vehicle lifetime
  - Electricity costs less than gasoline
- Lower lifetime maintenance costs
- Increases energy independence



# Plug-in Electric Vehicles (PEVs)

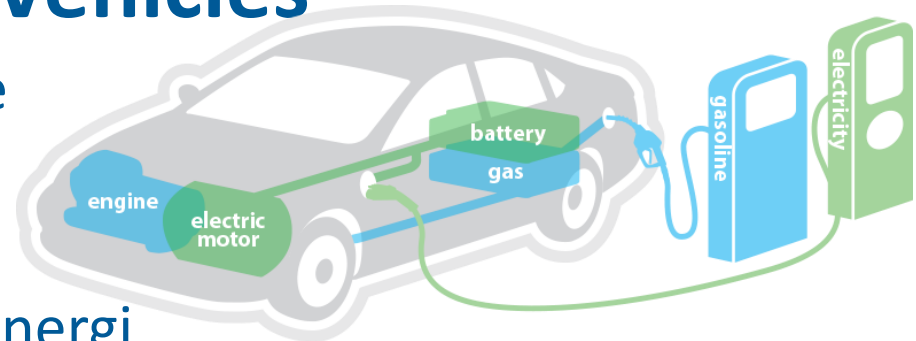
## Battery Electric Vehicles

- 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



# Growing Number of Available Vehicles



**114**  
mi/mi

**BMW i3** (including iRc / incluyendo iRc)

Fleet purchase only  
Solo para compra de flotas



**127**  
mi/mi

**BYD e6**



**238**  
mi/mi

**Chevrolet Bolt EV**




**82**  
mi/mi

**Chevrolet Spark EV**



**84**  
mi/mi

**Fiat 500e**




**115**  
mi/mi

**Ford Focus Electric**



**89**  
mi/mi

**Honda Clarity Electric**



**124**  
mi/mi

**Hyundai Ioniq Electric**



**111**  
mi/mi

**Kia Soul EV**



**87**  
mi/mi

**Mercedes-Benz B250e**



**59**  
mi/mi

**Mitsubishi i-MiEV**



**150**  
mi/mi

**Nissan LEAF** (all models)




**58**  
mi/mi

**Smart Fortwo**



**215**  
mi/mi

**Tesla Model 3**



**315**  
mi/mi

**Tesla Model S** (all models / todos modelos)



**289**  
mi/mi

**Tesla Model X** (all models / todos modelos)



**125**  
mi/mi

**Volkswagen e-Golf**

## Battery Electric Vehicles

# Growing Number of Available Vehicles



## Plug-in Hybrid Electric Vehicles



# 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

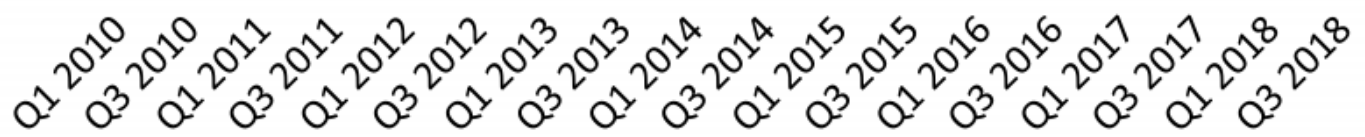
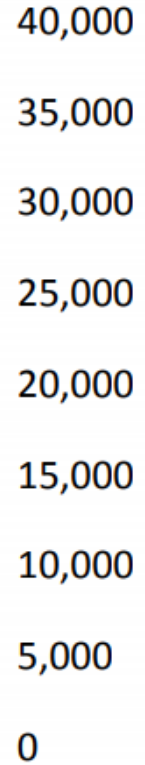
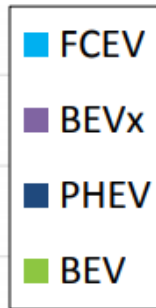
- Clean Vehicle Rebate Program (CVRP)
  - Provides rebates up to \$4,500 per purchase or lease of eligible light-duty plug-in vehicles
  - Rebate Now
- HOV Lane Access Sticker
- Federal Tax Credit (Up to \$7,500)



# Growth of the San Diego Market

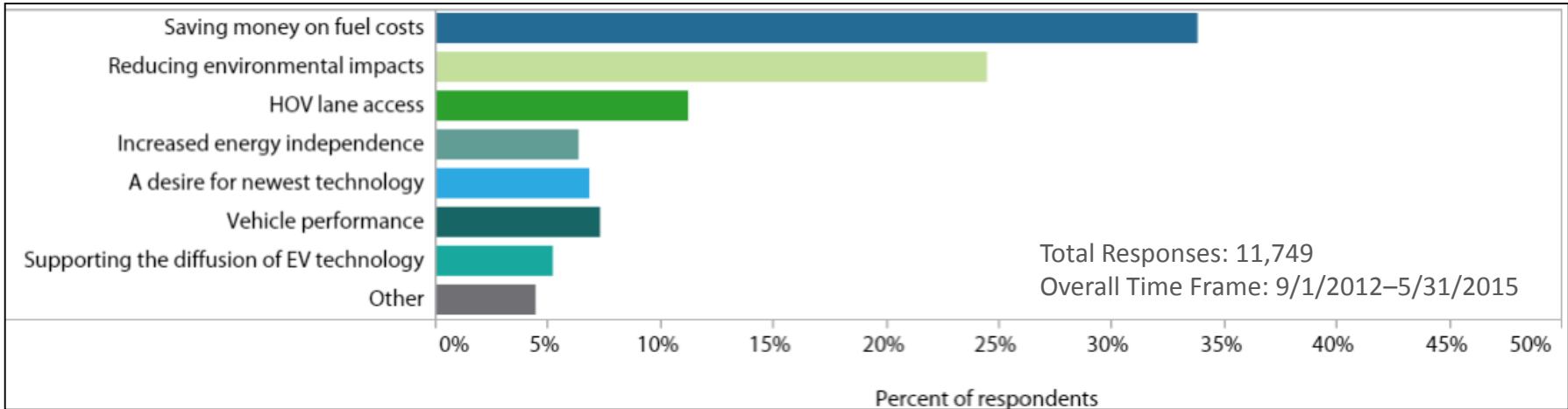
EV registrations	
2010	16
2011	1,185
2012	1,421
2013	3,051
2014	4,382
2015	4,376
2016	5,563
2017	6,914
2018 (Q1-Q3)	7,928
<b>Total</b>	<b>34,836</b>

From Q4 2017–Q3 2018, EVs were 6.1% of new light-duty vehicle sales

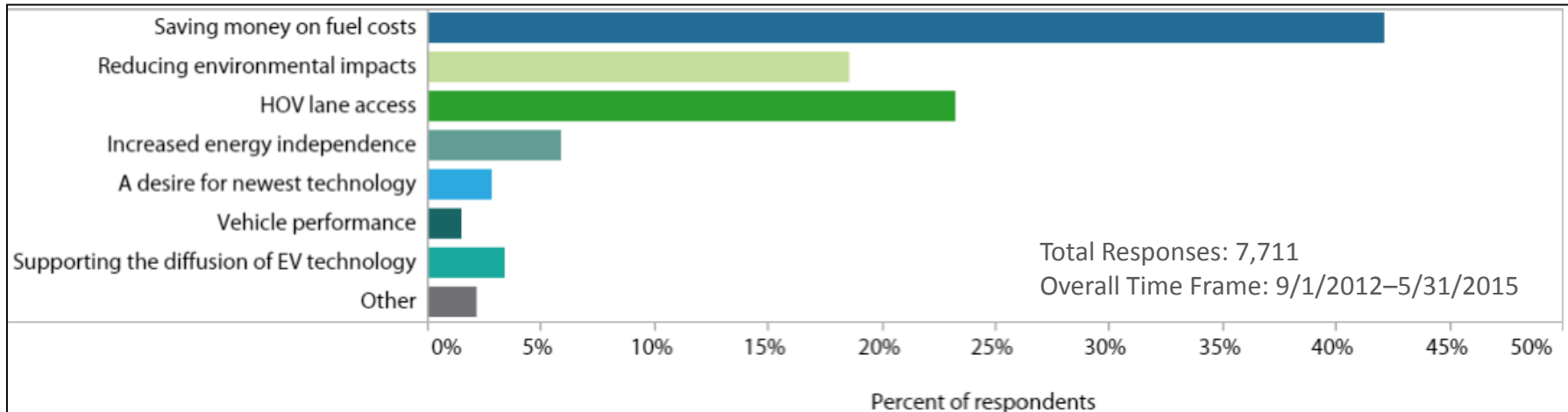


# Purchase Motivations

BEV Respondents



PHEV Respondents



# Charging Equipment

# Charging: Level 1 vs. Level 2

## AC Level 1

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



Not exactly as shown

## 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
  - Can be used by MUD residents who do not have charging at home
- Provides fast charge for some BEVs



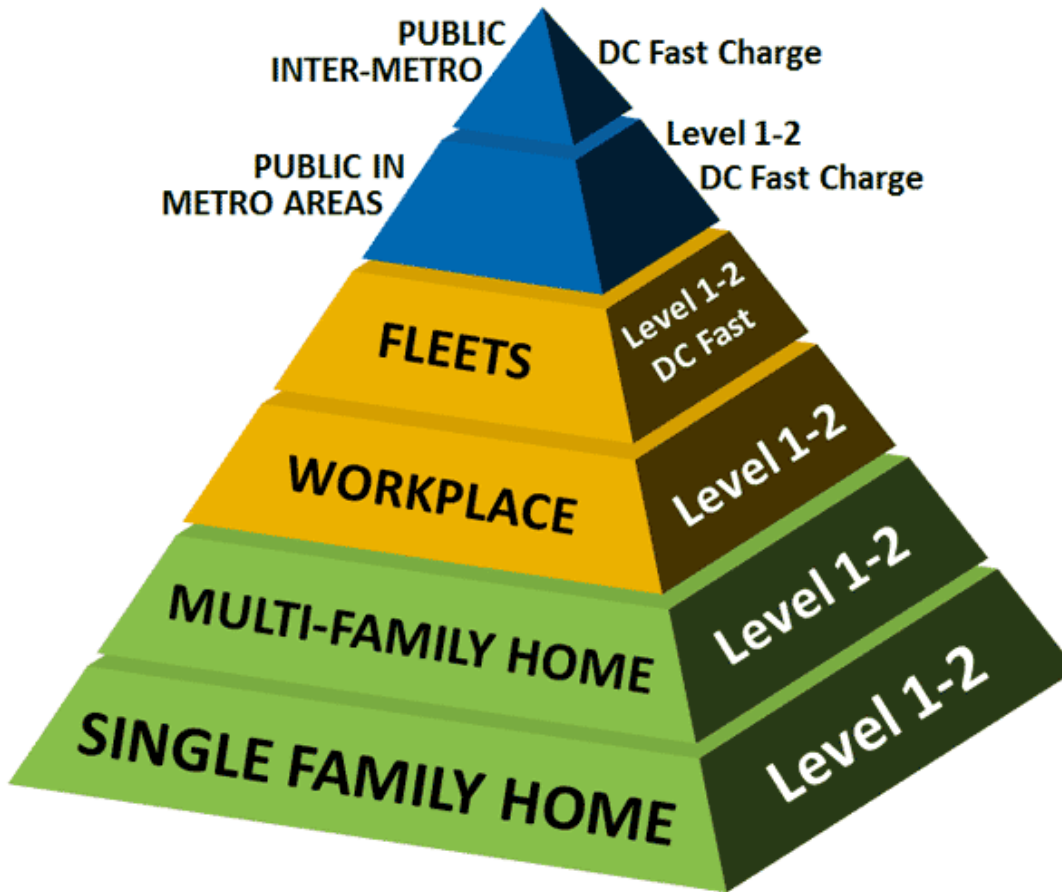
# How Fast Can You Charge?

Type of Charging	Power Levels (installed circuit rating)	Miles of Range per Hour of Charging*
<b>AC Level 1</b>	110/120VAC at 15 or 20 Amps	~4-6 miles/hr.
<b>AC Level 2</b>		
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.
<b>DC Fast Charging</b>	200-500VDC at up to 200 Amps	Generally up to 80% charge in less than 30 minutes

\* Refer to vehicle specifications for exact ratings.



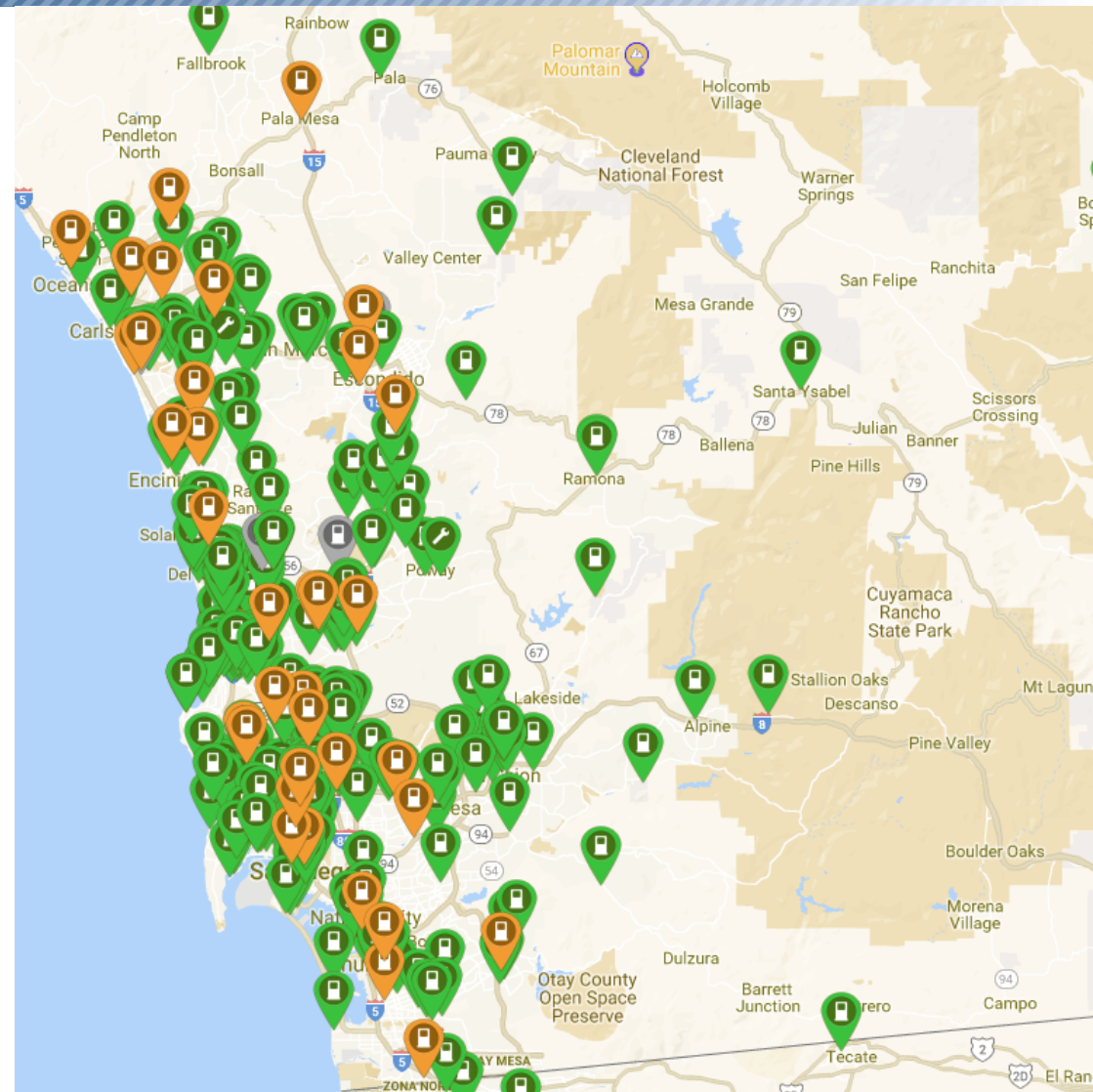
# Where do EV drivers plug-in?



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

# 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



# MUD Charging Installation

# Why Install MUD charging

- Amenity that attracts tenants
- Provides a “green” image for marketing
- Makes property a leader in sustainable practices
- Points for Leadership in Energy & Environmental Design (LEED) certification
- EV sales are growing
- Residents are asking for it



# Why Install MUD charging

- It is supported by state law and policy
- Senate Bill 880 (2012) prohibits an HOA from placing unreasonable restrictions which inhibit a resident from installing a charging station.
  - It does not require the HOA to pay for or offer any specific charging solution.
- AB 2565 (2014) Rental Properties
  - Lets tenant break lease if landlord does not allow charging station installation
- Newly constructed MUDs (2013+), will have EV readiness built in.

# Home Installation

- Single Family Homes
- Multifamily  
Apartments, Condos



# General Process

- Conduct a survey of residents
- Consider different approaches for installing Chargers
- Contact electrical contractor(s)
- Consider SDG&E Rate Options
- Contractor will coordinate installation, including permitting and inspections
- Charge up and monitor results

# Considerations

- Building layout and physical electrical Design
  - Proximity of electrical service room to desired charging location
  - Wiring needed to accommodate charging stations
- Commercial electricity rates for common-area meters
- Cost of installation
- Parking ownership models
  - Deeded, assigned, open, valet



# Example of Challenge



# EV Charging at Multi-Unit Dwellings

## Aquaterra Apartments

Transformer



- EV Chargers are noted in the green boxes
- EV Charger in the yellow box is for future charging; pedestal in place but no charger

# EV Charging at Multi-Unit Dwellings



Existing charging cord



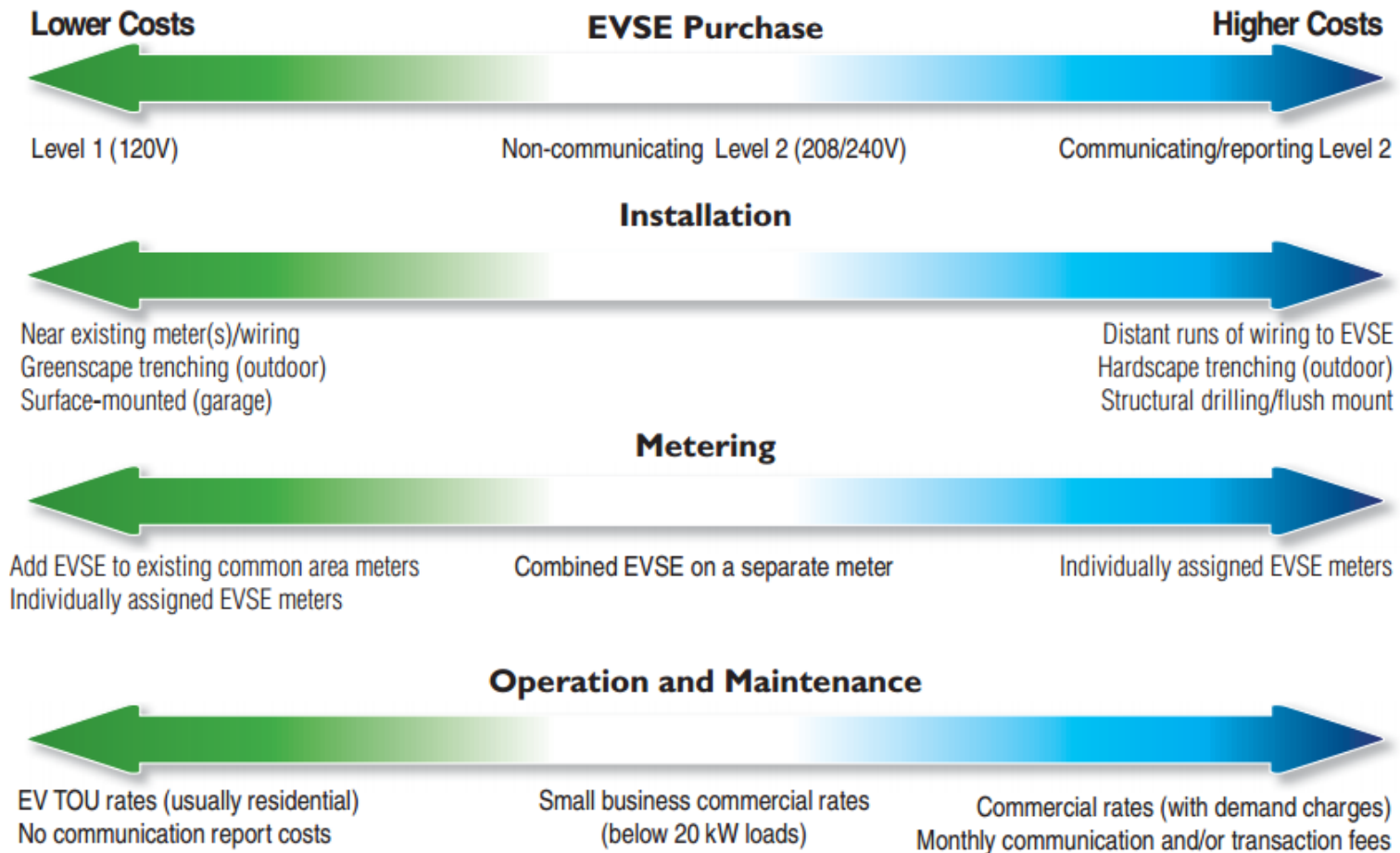
For future EV charging

# EV Charging at Multi-Unit Dwellings

## Broadstone Corsair Multi-Unit Apartments



# Costs



# Different approaches

- Hire turnkey operator to handle all charging and payments
  - Monthly service fees
  - Energy management options
- Install individually assigned charging units
  - Residents can individually select and own their charging units
  - Residents can pay directly for their energy use
- Install chargers as shared community resource

# Charging Resources



## Guidance Documents

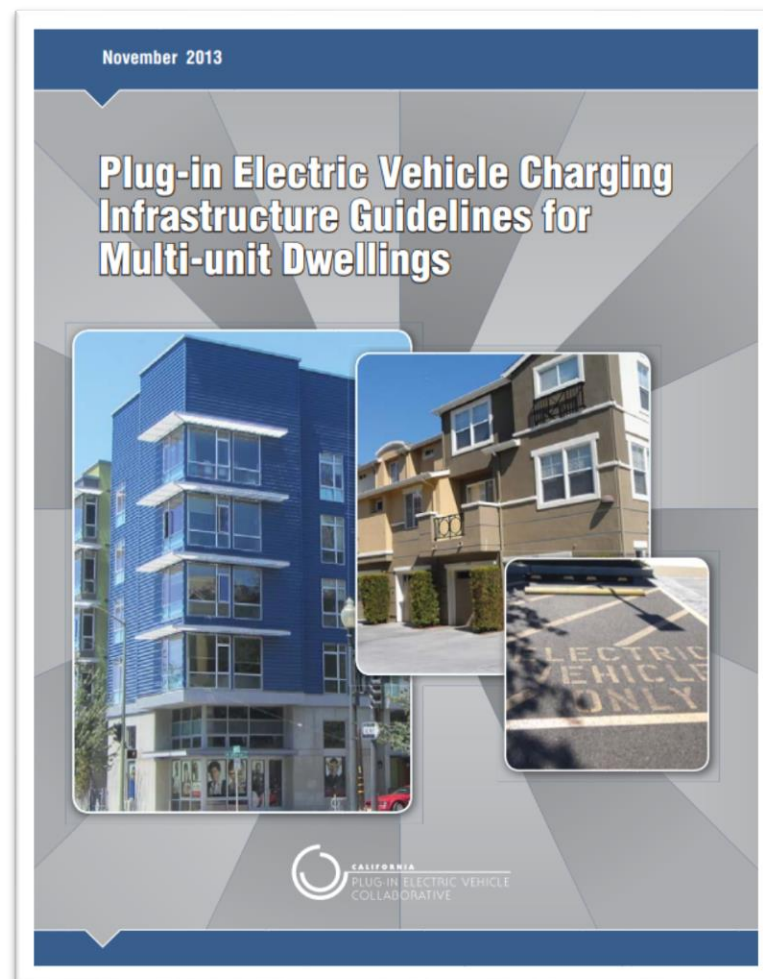
- Where to start
- Assessing demand
- Selecting a solution

<https://energycenter.org/pluginsd>



## Find Vendors and Installers

<https://calevip.org/calevip-connects>



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



# 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](http://www.sandag.org/EVChargingProgram)



# Other Resources



[Clean Vehicle Incentive Program](https://cleanvehiclerebate.org)  
<https://cleanvehiclerebate.org>



[San Diego Gas & Electric Power Your Drive](https://www.sdge.com/poweryourdrive)  
<https://www.sdge.com/poweryourdrive>



[Electric Vehicle Cost Comparison & Planning Tool](http://gis.its.ucdavis.edu/evexplorer/)  
<http://gis.its.ucdavis.edu/evexplorer/>

# Thank you!

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