EV Charging Stations: Permitting and Inspection

Sub-regional Workshop for Local Governments

June 2, 2016

SANDAG and Center for Sustainable Energy

SANDAG & Center for Sustainable Energy

San Diego Association of Governments

- Forum for regional decision-making
- Transportation planning and construction
- Sustainable development

Center for Sustainable Energy®

Independent nonprofit organization
Our mission: Accelerating the transition to a sustainable world powered by clean energy

- Program management
- Training and education
- Technical assistance

Plug-in SD

Plug-in San Diego

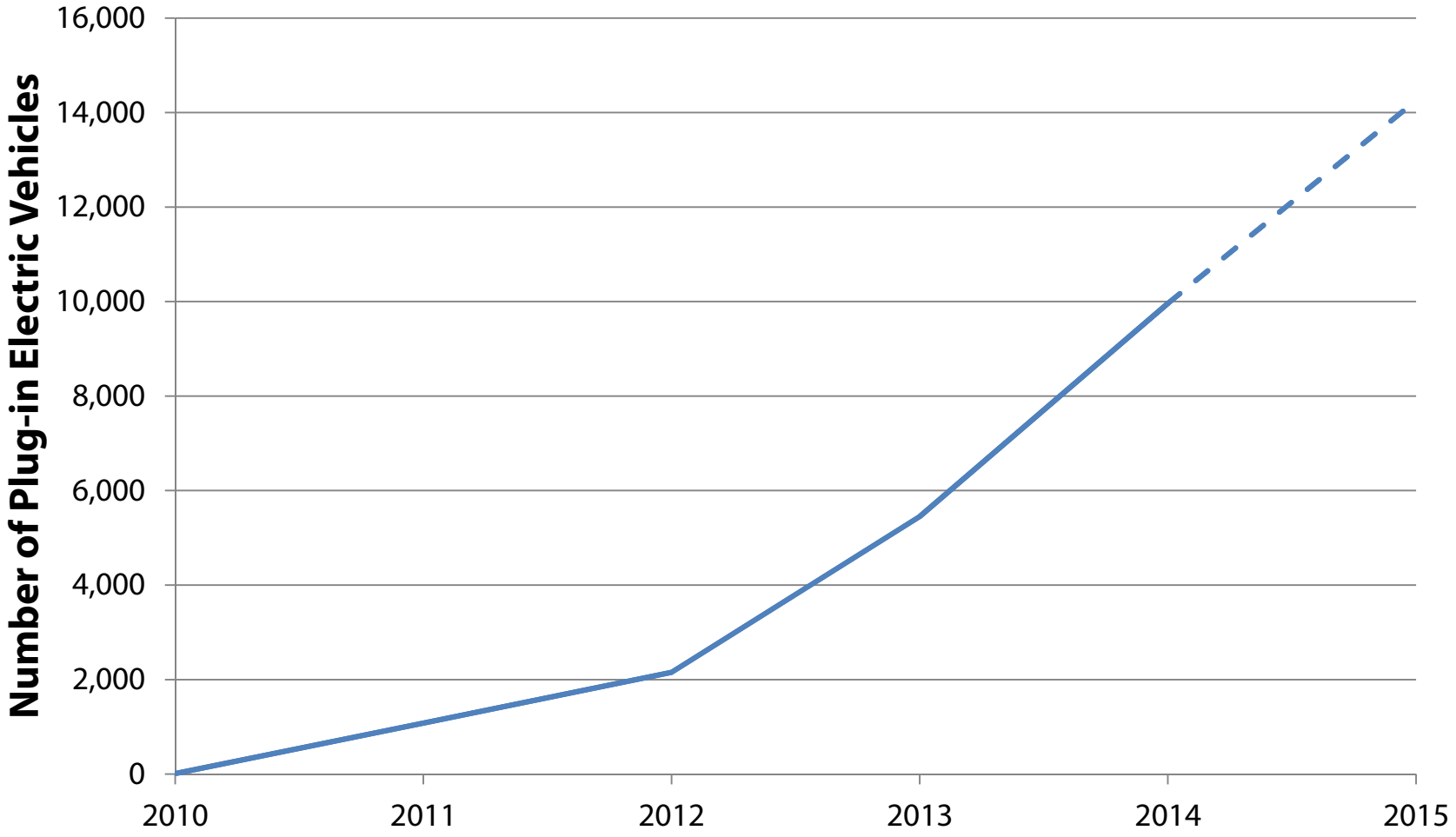
Program Goal:

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

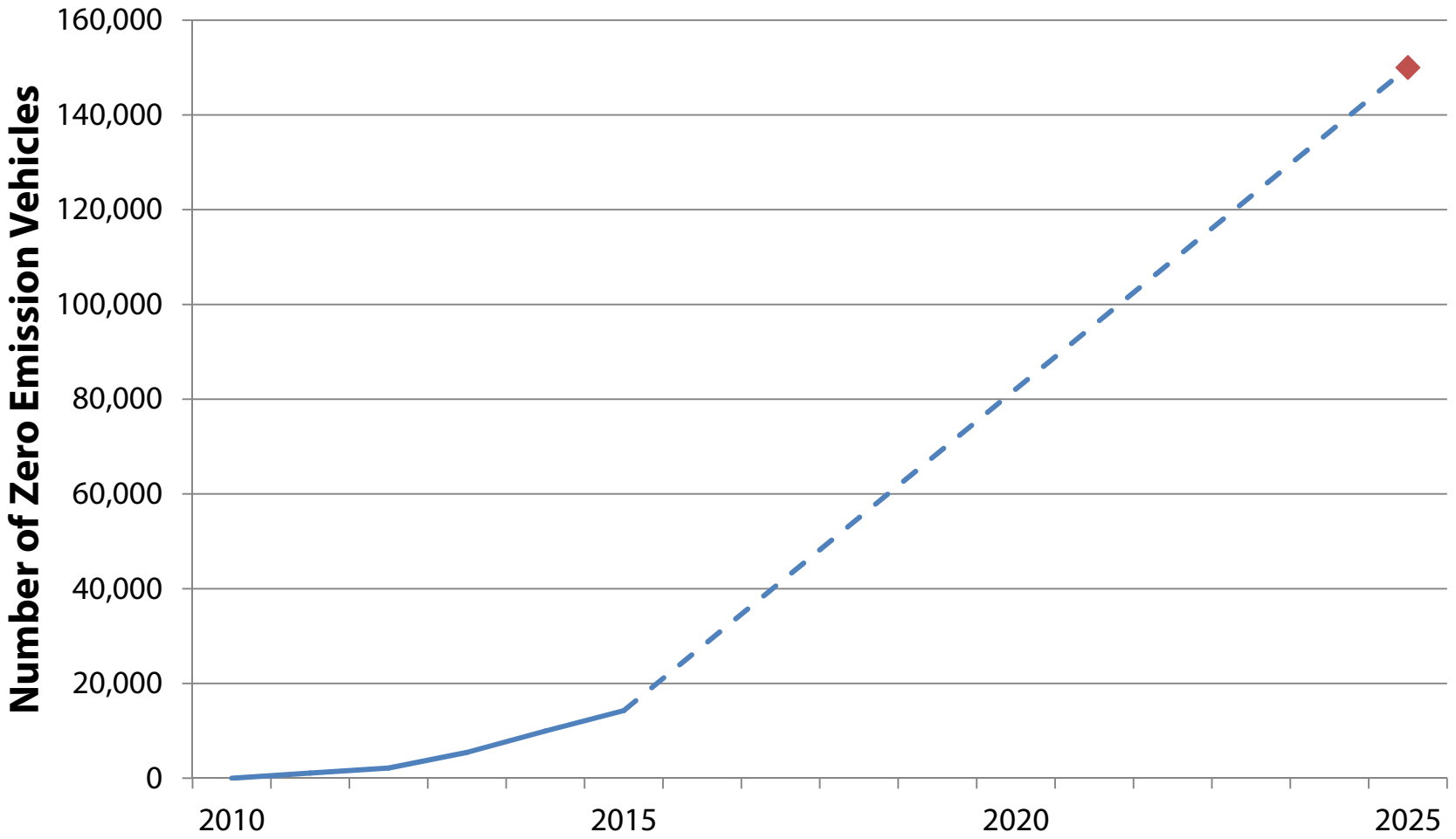
Local Governments:

Resources to advance regional consistency in EV charging plan review, inspection and installation

Growth of the PEV Market in San Diego



Anticipated Growth in ZEVs



AB 1236, Streamlined EV Permitting

What is AB1236?

Bill requires adoption of an ordinance to streamline and expedite the permitting process for EV charging stations

- September 30, 2016 requirement for larger cities (population>200,000)
- September 30, 2017 requirement for smaller cities (population<200,000)
- Checklist for expedited permit review
- Publish checklist and permit documents on the web
- Allow for electronic submittal

AB 1236 vs. AB 2188

AB 2188 (Muratsuchi), Solar Permitting	Like AB 2188, AB 1236 says	AB 1236 (Chiu and Low), EV Permitting
✓ Assures a single inspection that must be performed in a timely manner ✓ Substantially conform to the current version of OPR's California Solar Permitting Guidebook ✓ 45 days from the date of application receipt to be denied in writing, otherwise shall be deemed approved	✓ Requires cities and counties to adopt an expedited permitting ordinance ✓ Permits electronic signatures on relevant permitting documents and electronic submittals ✓ Adopt a checklist of requirements to be eligible for expedited review ✓ Allows modification of checklists and standards found in the Guidebooks due to unique conditions	✓ Permit application must demonstrate compliance with the utility's policies prior to approval ✓ Refer to guidelines contained in OPR's ZEV Guidebook and the PEV Infrastructure Permitting Checklist

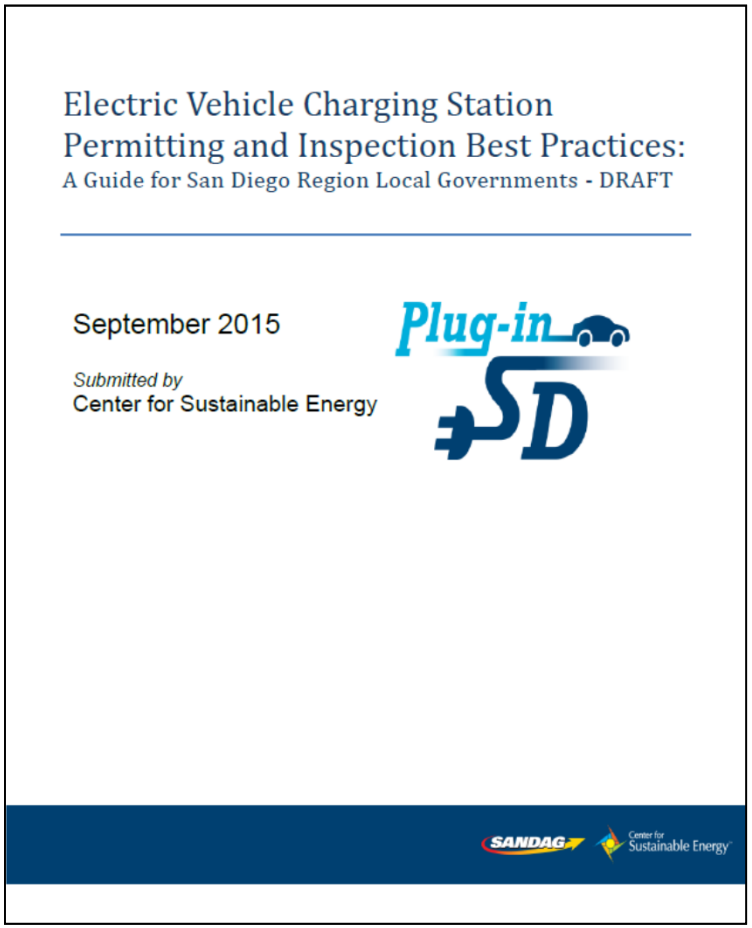
Plug-in SD

AB 1236 & Plug-in SD

Plug-in SD can help with AB1236 compliance

- Best Practices Report
- Permit and inspection correction sheets
- Installation checklists
- Standardized language for websites
- EV Expert assistance

Best Practices Report



- **Common barriers to EVCS installations**
- **Existing permit processes**
- **Best practices:**
  - Clear, consistent website language
  - EVCS permit guide/checklist
  - Plan review/inspection correction lists
  - Online services
  - Fillable application
  - Permit fee incentives

Regional Best Practices

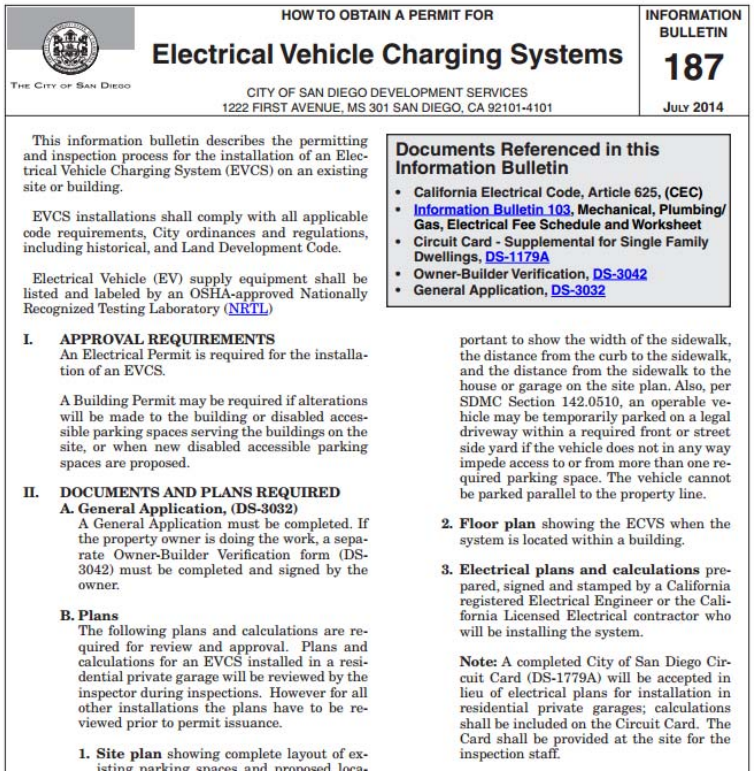
Regional Efforts

What is your jurisdiction doing?
What plans does your jurisdiction have?

Plug-in SD

What the Region is Doing

- **Information Bulletins for Permits for Electrical Vehicle Charging Systems**
- **Electric Vehicle Charging Station Permit Application**



HOW TO OBTAIN A PERMIT FOR

Electrical Vehicle Charging Systems

THE CITY OF SAN DIEGO

CITY OF SAN DIEGO DEVELOPMENT SERVICES
1222 FIRST AVENUE, MS 301 SAN DIEGO, CA 92101-4101

INFORMATION BULLETIN **187**
JULY 2014

This information bulletin describes the permitting and inspection process for the installation of an Electrical Vehicle Charging System (EVCS) on an existing site or building.

EVCS installations shall comply with all applicable code requirements, City ordinances and regulations, including historical, and Land Development Code.

Electrical Vehicle (EV) supply equipment shall be listed and labeled by an OSHA-approved Nationally Recognized Testing Laboratory (NRTL)

Documents Referenced in this Information Bulletin

- California Electrical Code, Article 625, (CEC)
- Information Bulletin 103, Mechanical, Plumbing/ Gas, Electrical Fee Schedule and Worksheet
- Circuit Card - Supplemental for Single Family Dwellings, DS-1179A
- Owner-Builder Verification, DS-3042
- General Application, DS-3032

I. APPROVAL REQUIREMENTS

An Electrical Permit is required for the installation of an EVCS.

A Building Permit may be required if alterations will be made to the building or disabled accessible parking spaces serving the buildings on the site, or when new disabled accessible parking spaces are proposed.

II. DOCUMENTS AND PLANS REQUIRED

A. General Application, (DS-3032)

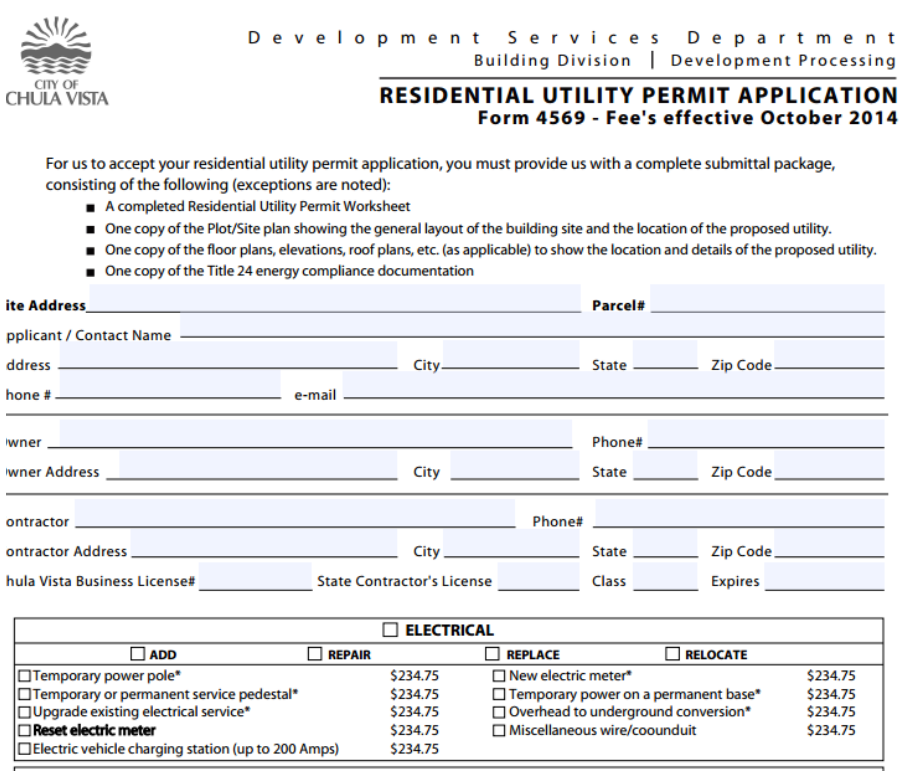
A General Application must be completed. If the property owner is doing the work, a separate Owner-Builder Verification form (DS-3042) must be completed and signed by the owner.

B. Plans

The following plans and calculations are required for review and approval. Plans and calculations for an EVCS installed in a residential private garage will be reviewed by the inspector during inspections. However for all other installations the plans have to be reviewed prior to permit issuance.

1. **Site plan** showing complete layout of existing parking spaces and proposed location... portant to show the width of the sidewalk, the distance from the curb to the sidewalk, and the distance from the sidewalk to the house or garage on the site plan. Also, per SDMC Section 142.0510, an operable vehicle may be temporarily parked on a legal driveway within a required front or street side yard if the vehicle does not in any way impede access to or from more than one required parking space. The vehicle cannot be parked parallel to the property line.
2. **Floor plan** showing the ECVS when the system is located within a building.
3. **Electrical plans and calculations** prepared, signed and stamped by a California registered Electrical Engineer or the California Licensed Electrical contractor who will be installing the system.

Note: A completed City of San Diego Circuit Card (DS-1779A) will be accepted in lieu of electrical plans for installation in residential private garages; calculations shall be included on the Circuit Card. The Card shall be provided at the site for the inspection staff.



CITY OF CHULA VISTA

Development Services Department
Building Division | Development Processing

RESIDENTIAL UTILITY PERMIT APPLICATION
Form 4569 - Fee's effective October 2014

For us to accept your residential utility permit application, you must provide us with a complete submittal package, consisting of the following (exceptions are noted):

- A completed Residential Utility Permit Worksheet
- One copy of the Plot/Site plan showing the general layout of the building site and the location of the proposed utility.
- One copy of the floor plans, elevations, roof plans, etc. (as applicable) to show the location and details of the proposed utility.
- One copy of the Title 24 energy compliance documentation

ite Address _____ **Parcel#** _____

pplicant / Contact Name _____

ddress _____ City _____ State _____ Zip Code _____

hone # _____ e-mail _____

wner _____ Phone# _____

wner Address _____ City _____ State _____ Zip Code _____

ontractor _____ Phone# _____

ontractor Address _____ City _____ State _____ Zip Code _____

hula Vista Business License# _____ State Contractor's License _____ Class _____ Expires _____

☐ **ELECTRICAL**

☐ ADD / ☐ REPAIR		☐ REPLACE / ☐ RELOCATE	
☐ Temporary power pole*	$234.75	☐ New electric meter*	$234.75
☐ Temporary or permanent service pedestal*	$234.75	☐ Temporary power on a permanent base*	$234.75
☐ Upgrade existing electrical service*	$234.75	☐ Overhead to underground conversion*	$234.75
☐ **Reset electric meter**	$234.75	☐ Miscellaneous wire/coounduit	$234.75
☐ Electric vehicle charging station (up to 200 Amps)	$234.75		

What the Region is Doing

- **Permit Guide for Electric Vehicle Supply Equipment (EVSE)**
- **Electric Vehicle Charger Guidelines**

City of Oceanside
Building Division
300 N. Coast Hwy
Oceanside, CA 92054
(760) 435-3950

Residential Electric Vehicle Charger Guidelines

The purpose of this guideline is to assist permit applicants in streamlining the Permitting, installation and inspection process for Residential EV Chargers.

Be aware that there are different types of Electric Vehicle (EV) Chargers. There are 2 basic types of EV chargers for home use (Level 1 and Level 2). Level 1 Chargers are smaller units that plug directly into a standard 120 volt receptacle outlet. These types of chargers typically require a longer period of time to recharge the vehicle. As long as the receptacle outlet being used to plug-in the Level 1 Charger exists, there is no requirement to secure a permit from the Building Division. On the other hand, if you will be installing a new 120 volt receptacle outlet for the charger, you will need to obtain a permit – but you will not need to provide any plans or electrical load calculations as would be required for the more powerful Level 2 type charging systems.

A Level 2 EV charging system requires a 240 volt electrical circuit and charges the vehicle battery much faster than a Level 1 charger. Level 2 charger installations typically require an electrical permit and inspections of the installation. In order to obtain the permit you will need to provide some basic information to show that your existing electrical service can handle the added load.

What information do I need to provide in order to obtain the permit?
This Residential EV Charger Permit Guideline has been developed to streamline the permit, installation and inspection process. In most cases, you or your contractor merely need to fill-in the blanks on this document, attach the manufacturer's installation instructions and charger specifications and submit it to the Building Division for an over-the-counter review and permit issuance. If all of the information is provided and the proposal complies with the applicable codes, the review and approval process can usually be performed over-the-counter or within a day or two depending upon workloads and staffing levels at the time of submittal. Once the permit is issued, the installation may begin. When the installation is complete, an inspection of the work must be scheduled with the Building Inspector. Inspections are typically performed on the work day following your request for inspection. Keep in mind that someone will need to be present during the inspection so that the Building Inspector can access the location of the electrical meter and EV charger (typically in the garage).

CITY OF NATIONAL CITY
Building and Safety Department
1243 National City Blvd. National City, CA 91950
(619) 336-4210; Fax (619) 336-4321

INFORMATION BULLETIN
E-1
May 2015

Electric Vehicle Supply Equipment Permit Guide

If you install Electric Vehicle Supply Equipment (EVSE), otherwise known as electric vehicle charging stations, you must first obtain a building permit. As a permit applicant, you will need to complete the forms listed below and pay the necessary plan check fees to the Finance Department. For rules describing who can obtain a permit, visit: http://www.ci.national-city.ca.us/index.aspx?page=166.

1. **Forms to Complete**

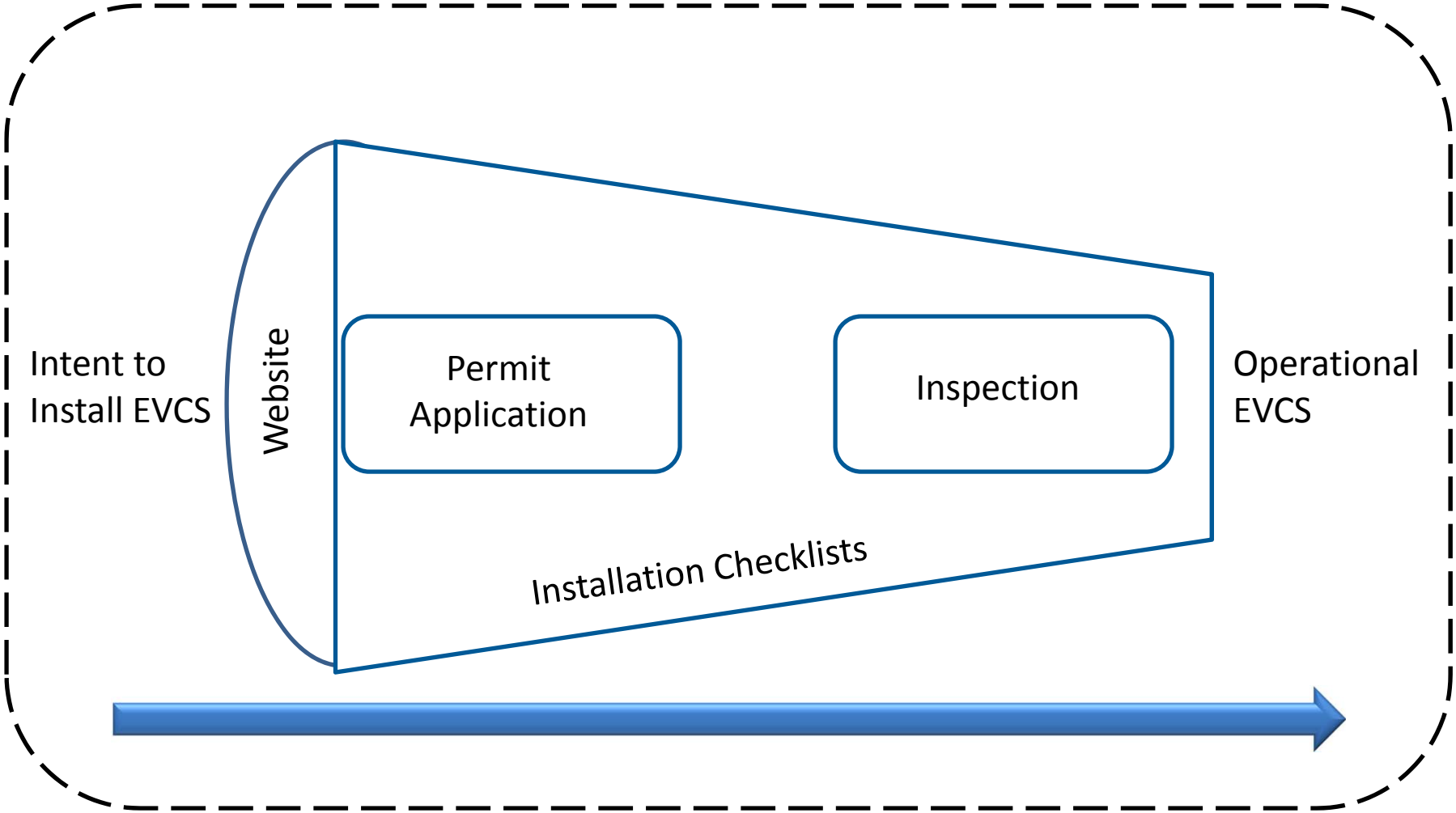
   Building Permit Application:
   At plan submittal time, you will need the job address (a unique address for the EVSE installation that is used for billing), parcel number, existing use, description of work, name, address, and contact information of the applicant and the owner.
   - For both residential and non-residential permits:
     You must submit a completed and signed "Building Permit Application" to a Building Services Technician in the Building Department

2. **Plan Check and Permit Fees**

   The plan check fees must be paid at the time the plans are submitted. The payment can be submitted by cash, credit card, or check. Please make checks payable to the "City of National City". A description of the fees is below.
   - The cost is $118.00/hour of plan check
   - One hour is due at the time of submittal
   - There is a $148.00 fee for the permit issuance and two inspections, due at the time the permit is issued. Additionally, if the plan review exceeds one hour, the additional fees will be due at this time
   - An electrical service upgrade costs $39.00/100 amps on the electric service panel

Resources for the San Diego Region

Plug-in SD Resource Integration



Plug-in SD Resources for EV Charging

- **Website Language**
  - Specific direction for the general public
  - Guide covers requirements and approach for permitting

Correction Sheets & Checklists

Intended to cover common situations (80% of installations across SF, MF, and commercial property types)

Plug-in SD Resources for EV Charging

INSTALLATION CHECKLIST FOR RESIDENTIAL ELECTRIC VEHICLE CHARGING STATION (EVCS)

Installations must be completed by a licensed electrical contractor (C-10). (Local Regulations, California Electrical Code CEC Article 625) Plans must show conformance with the California Electrical Code Title 24, Part 3, the California Building Code (Volume 1 and 2), Title 24, Part 2, and other applicable local municipal codes.

Submittal Documents required*

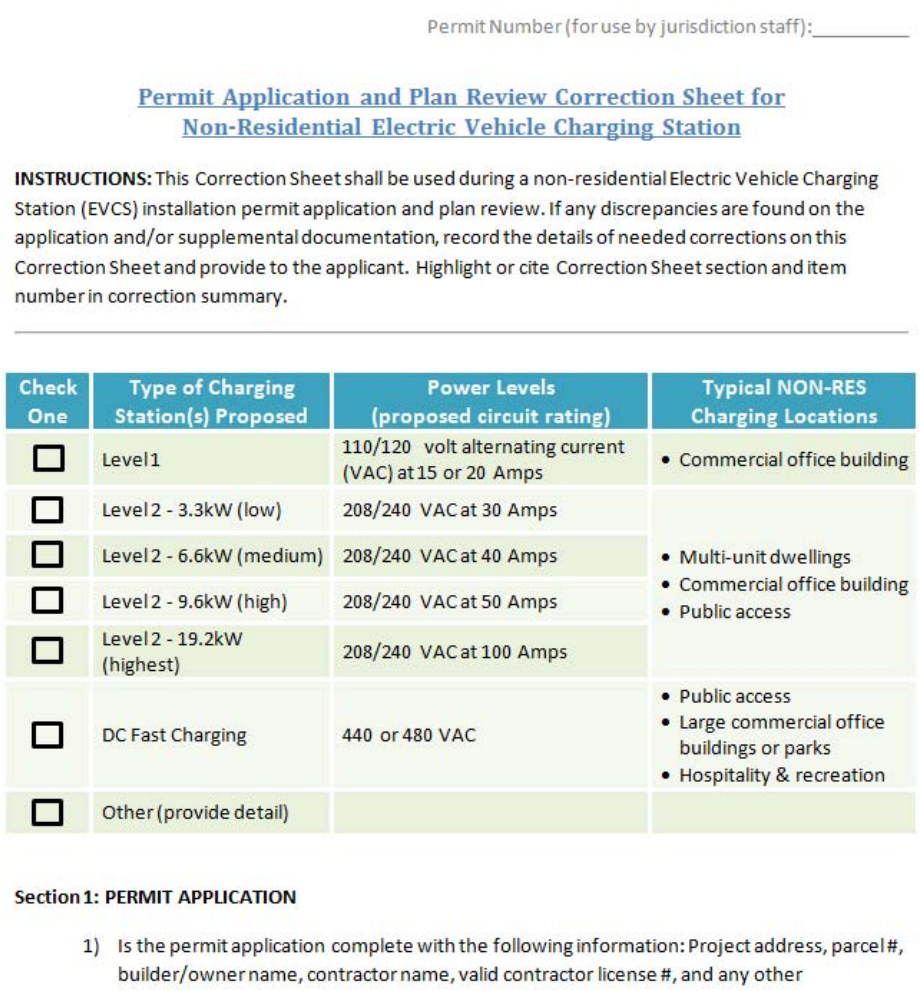
- ☐ **Permit Application**
  - a. Include job address (a unique address for the EVCS installation that is used for billing), parcel number, existing use, description of work, name, address, and contact information of the applicant and the owner
- ☐ **Plan Sets (#, size of plans)**
  - a. **Site/Plot Plan**
    - i. Show the proposed location of the EV charging unit.
  - b. **Electrical Plan**
    - i. Provide a complete electrical single line drawing showing the main service, sub panels and disconnecting means as applicable, and proposed EV charging unit, include; size of overcurrent protection devices (in amperes) for main service, sub panels, disconnects and EV charger circuit supply, show conduit sizes and types, and conductor sizes and types.
    - ii. If trenching is required, provide a trenching detail and call out trench work in scope of work. Trenching may result in a structural plan review if conduit trenches undermine foundations.
    - i. Note electrical feeder requirements when trenching structure to structure (CEC 225). The feeder from structure to structure should be noted in the scope of work.
    - ii. Provide EVSE manufacturer's specification sheets showing listing to UL 2200 and indoor or outdoor rating.
- ☐ **Electrical Load Calculation Worksheet**
  - a. Include existing and proposed load to estimate if existing electrical service will handle the new load from EVCS and wiring methods. Note: Unless electrical service equipment is 100% rated, the calculated load demand on the main service shall not exceed 80% of the nameplate rating of the main service over-current protection device (OCPD).

***All plans and documents listed above must be provided for residential electric vehicle charging stations at time of permit submittal prior to issuance.**

- **Installation Checklists**
  - Broken down by type: Residential, Non-Residential, MUD
  - General and electrical contractors permitting and installing EVCS
  - More consistent applications, plans and installations

Plug-in SD Resources for EV Charging

- **Permitting and Inspection Correction Sheets**
  - Broken down by type: Residential, Non-Residential, MUD
  - AHJ staff performing plan review and inspection
  - Consistent expedited execution



Permit Number (for use by jurisdiction staff):_____

Permit Application and Plan Review Correction Sheet for Non-Residential Electric Vehicle Charging Station

INSTRUCTIONS: This Correction Sheet shall be used during a non-residential Electric Vehicle Charging Station (EVCS) installation permit application and plan review. If any discrepancies are found on the application and/or supplemental documentation, record the details of needed corrections on this Correction Sheet and provide to the applicant. Highlight or cite Correction Sheet section and item number in correction summary.

Check One	Type of Charging Station(s) Proposed	Power Levels (proposed circuit rating)	Typical NON-RES Charging Locations
☐	Level 1	110/120 volt alternating current (VAC) at 15 or 20 Amps	• Commercial office building
☐	Level 2 - 3.3kW (low)	208/240 VAC at 30 Amps	• Multi-unit dwellings • Commercial office building • Public access
☐	Level 2 - 6.6kW (medium)	208/240 VAC at 40 Amps	
☐	Level 2 - 9.6kW (high)	208/240 VAC at 50 Amps	
☐	Level 2 - 19.2kW (highest)	208/240 VAC at 100 Amps	
☐	DC Fast Charging	440 or 480 VAC	• Public access • Large commercial office buildings or parks • Hospitality & recreation
☐	Other (provide detail)		

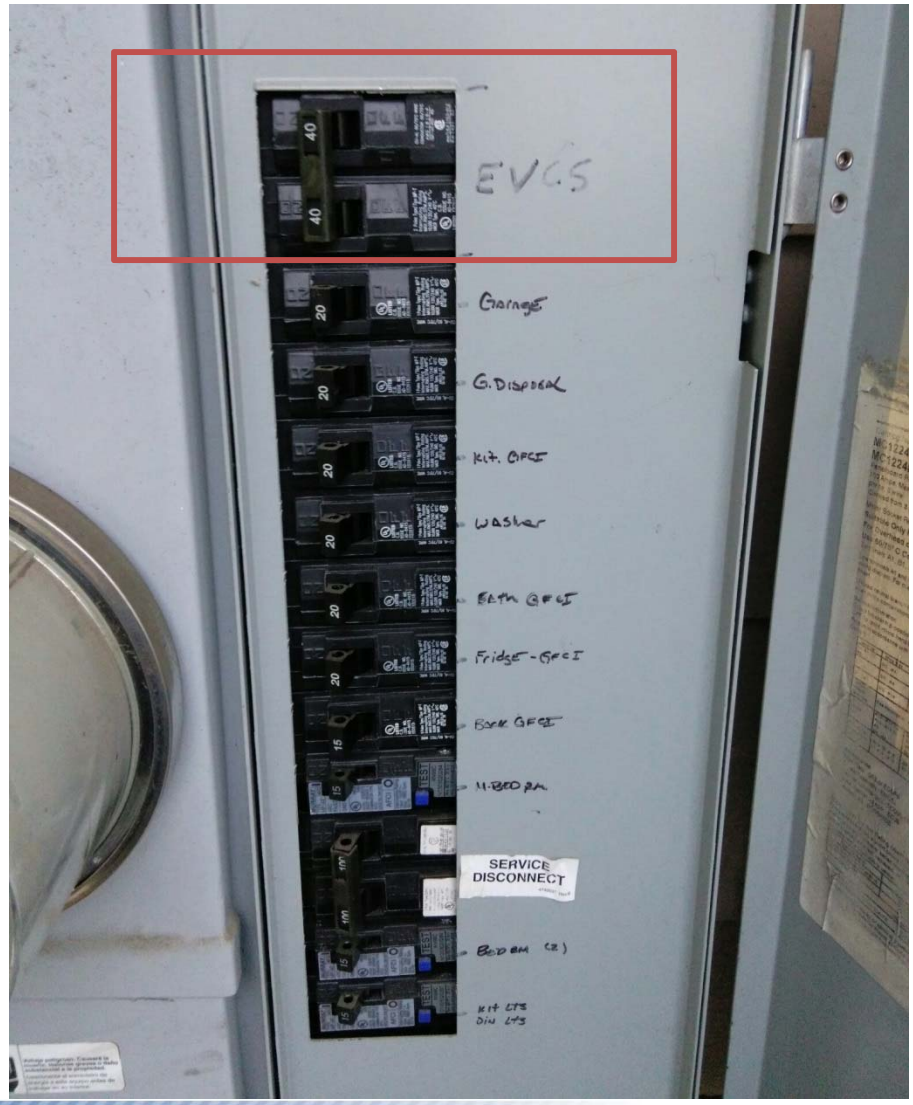
Section 1: PERMIT APPLICATION

1) Is the permit application complete with the following information: Project address, parcel #, builder/owner name, contractor name, valid contractor license #, and any other

Key Considerations for EVCS

- **Electrical System Evaluation**
  - Power supply requirements
  - Equipment Upgrades (Transformer, Wiring, Panel)
- **Physical Requirements**
  - Proximity of electrical power supply to desired charging location (service room, transformer, etc.)
  - Physical protection of equipment (wheel stops, bollards, clear floor space, etc.)
  - Signage, stencil, and striping
  - Layout within parking areas

Residential Installation

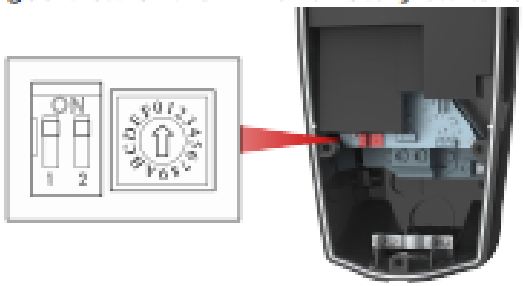


Operating Current

Rotary Switch Position	Maximum Output Current	Circuit Breaker
0	Test mode	N/A
1	12A	15A
2	16A	20A
3	20A	25A
4	24A	30A
5	28A	35A
6	32A	40A
7	36A	45A
8	40A	50A
9	48A	60A
A	56A	70A
B	64A	80A
C	72A	90A
D	80A	100A
E	Not a valid selection	N/A
F	Slave mode	N/A

Set the Operating Current

Follow these instructions to configure the DIP switch. The following illustration shows an enlarged view of the DIP and rotary switches.



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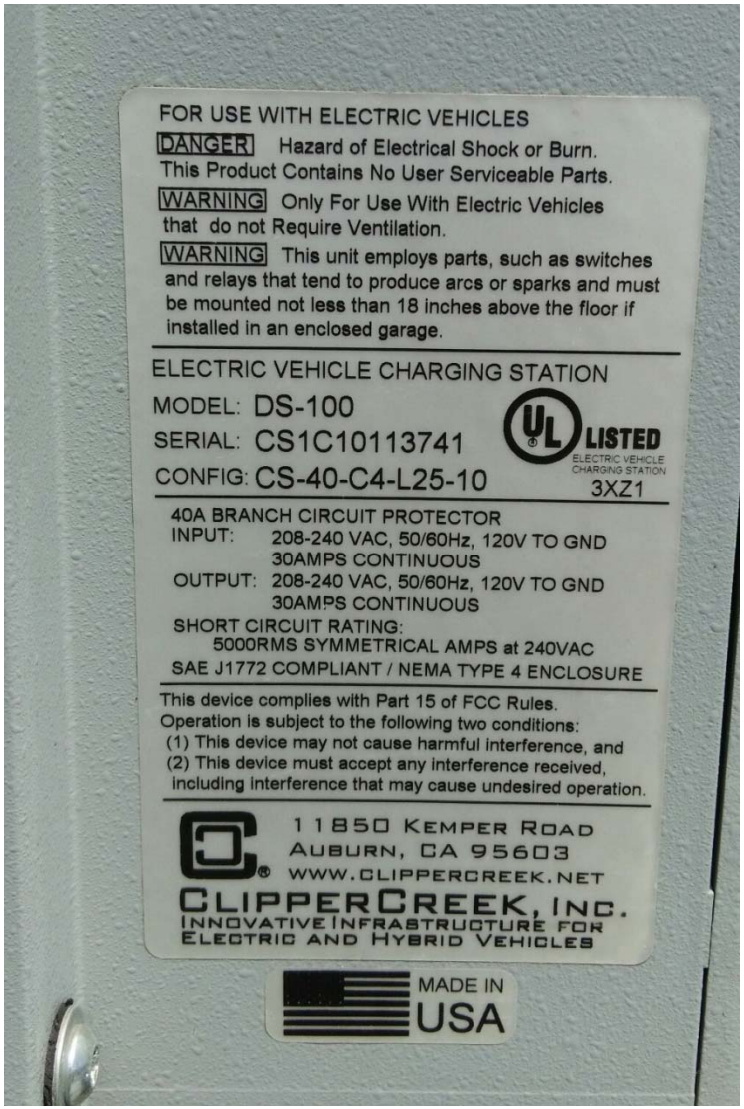
Residential Installation



MODEL	TURBODOCK
VOLTAGE	120VAC/240VAC
OUTPUT POWER	16 Amps continuous @120VAC 16 Amps continuous @240VAC
CIRCUIT BREAKER RATING	20 Amps @120VAC 20 Amps @240/208VAC
FREQUENCY	60Hz
CABLE LENGTH	20 ft. (6.1 m)
WEIGHT (MODULE)	5.5 lbs (2.5 kg)
WEIGHT (MOUNTING OPTIONS)	28.5 lbs. (12.9 kg) - pedestal kit 2.5 lbs (1.1 kg) - wall mount
OPERATING TEMPERATURE	-40C to +50C (-40F to 122F)
INDOOR / OUTDOOR	Yes | NEMA 3R
CHARGE COUPLER	SAE J1772 compliant
CERTIFICATION	UL and cUL

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EV Charging at Multi-Unit Dwellings

Aquaterra Apartments

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

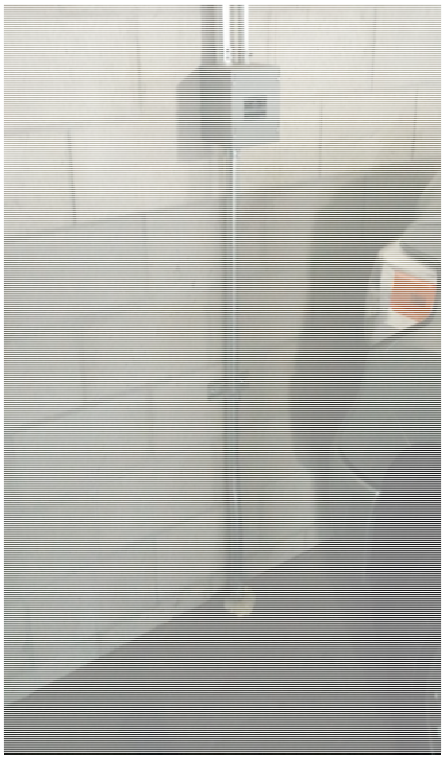
EV Charging at Multi-Unit Dwellings

Existing charging cord

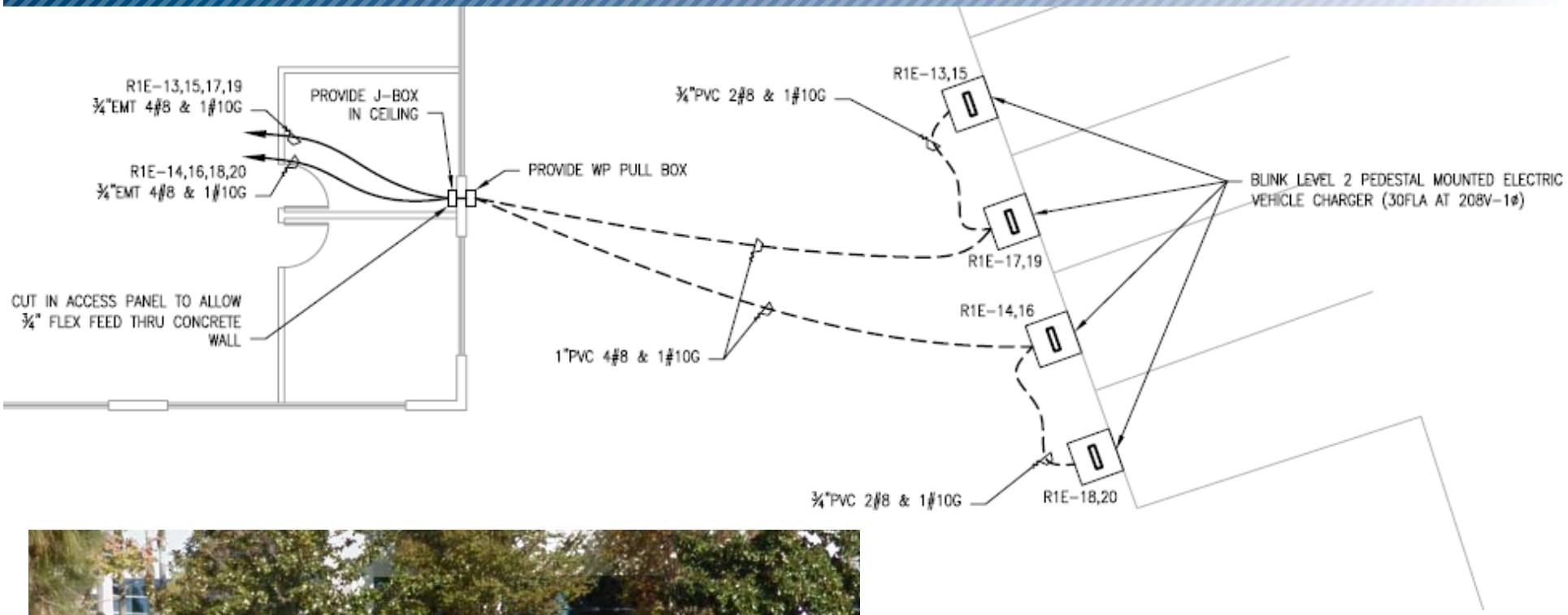
For future EV charging

EV Charging at Multi-Unit Dwellings

Broadstone Corsair Multi-Unit Apartments



Site Plan- Workplace Installation



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

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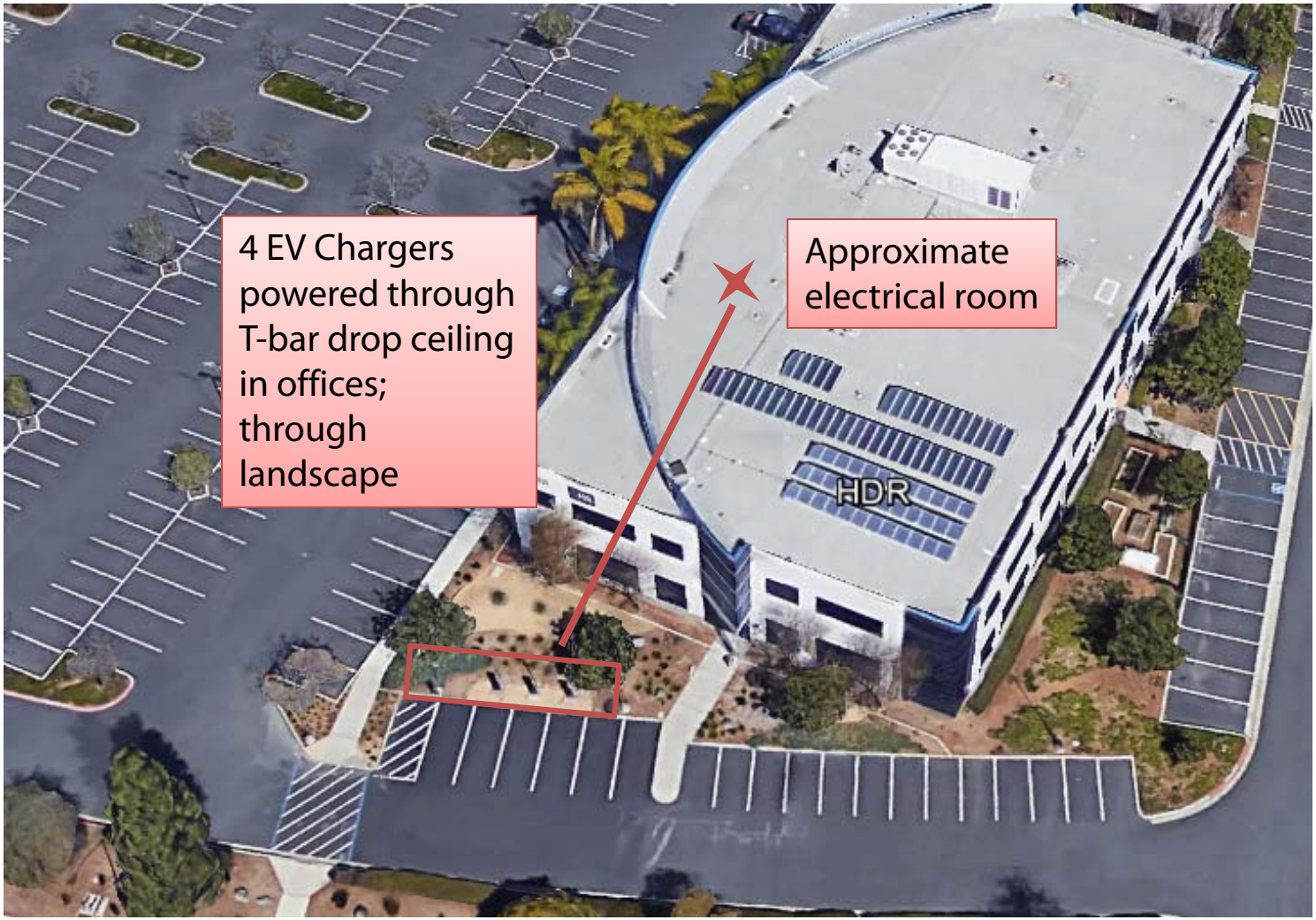
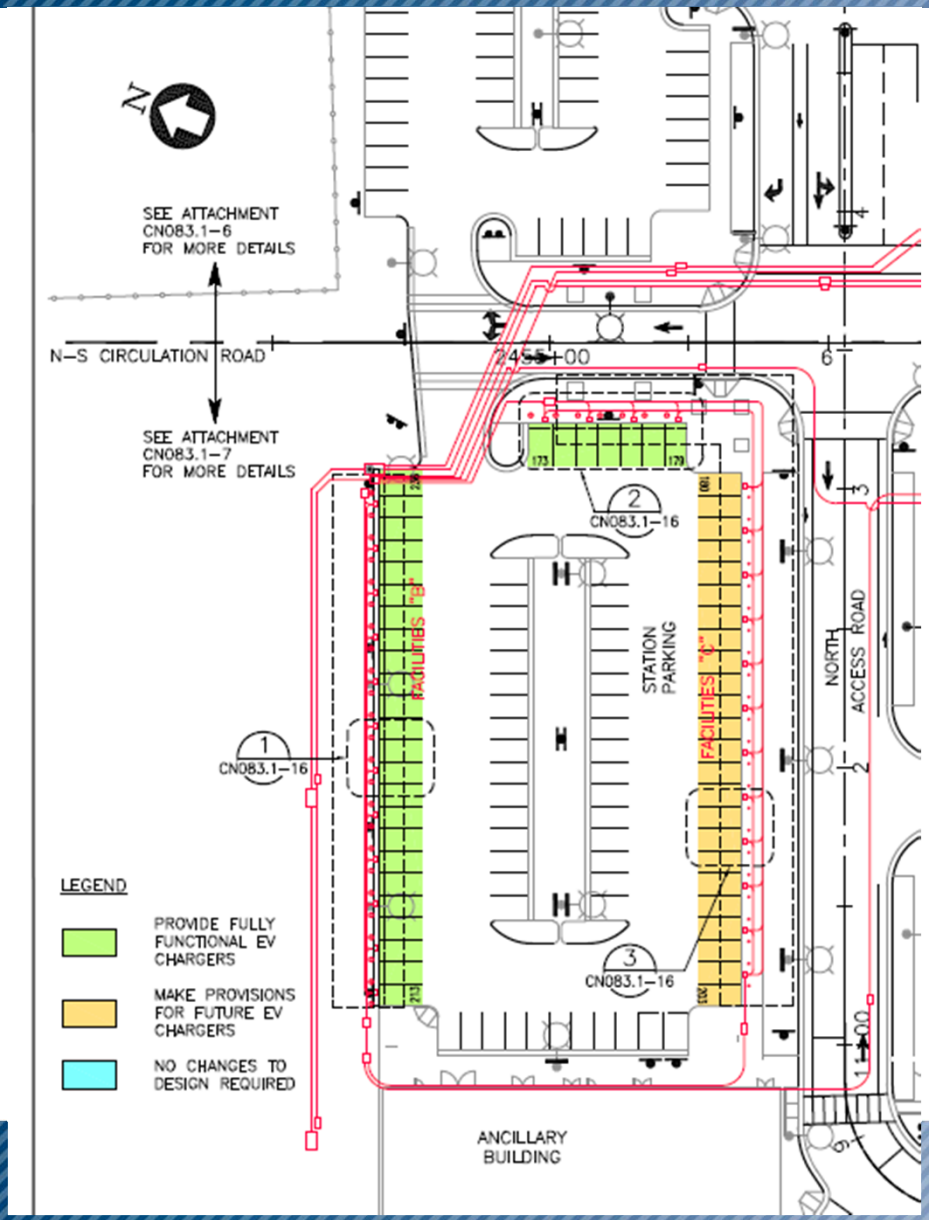
Workplace Installation

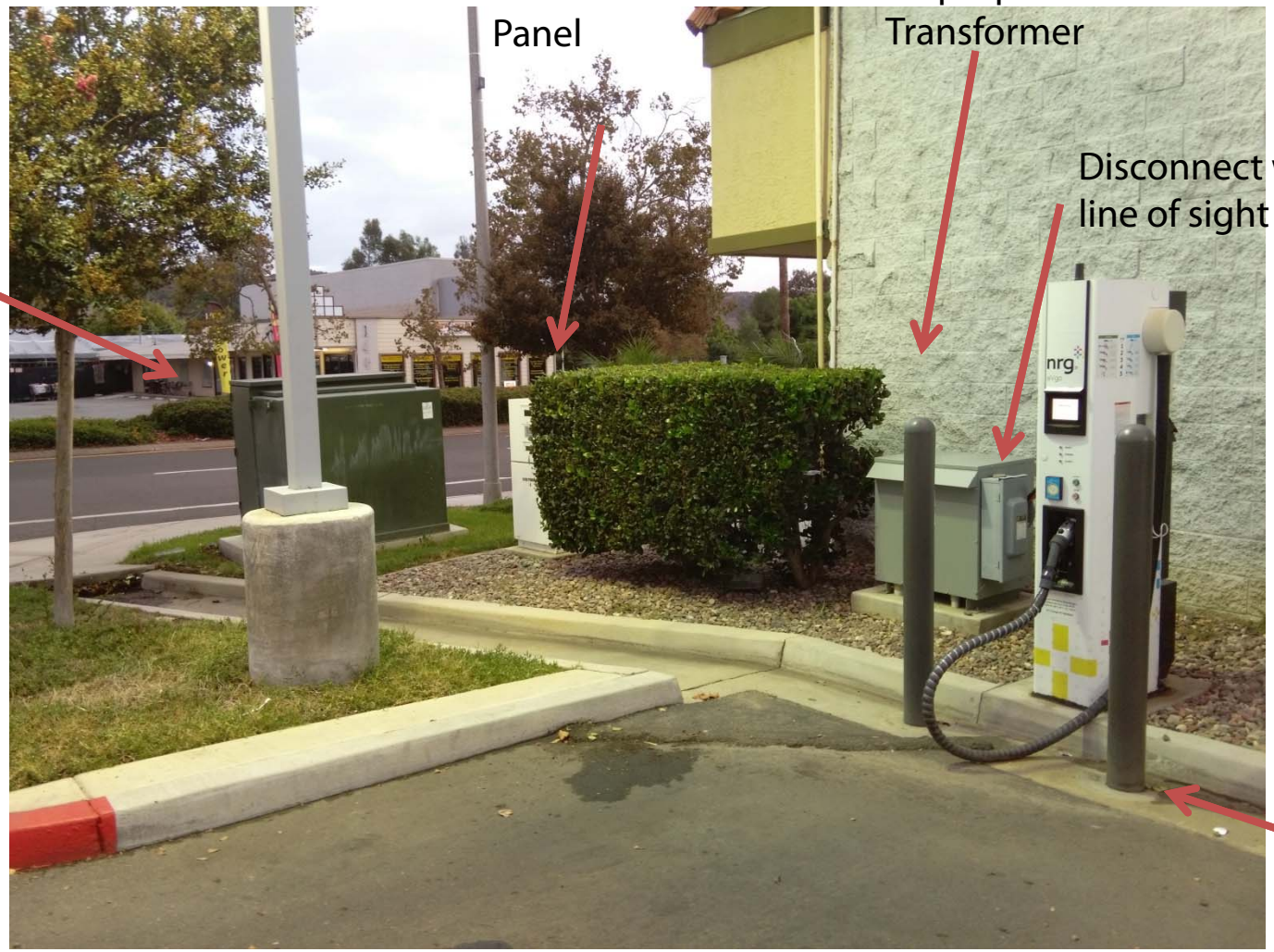


Site Plan- Commercial Installation



- Spaces for existing and future charging identified
- CALGreen requirements for new construction to be “EV Capable”
  - Raceway
  - Panel capacity for 40A 208/240V
  - Identifying future spaces

Commercial Installation



Commercial Installation- Indoor Garage

Vertical clearance

Installing Infrastructure

EV Infrastructure Requirements

CALGreen Non-Residential Requirements

- For non-residential new construction only

Requirement	Current Mandatory	Proposed new CALGreen Mandatory	Proposed new CALGreen Voluntary	
			Tier 1	Tier 2
Minimum threshold	51 parking spaces	10 parking spaces	10 parking spaces	1 parking space
Percent of new parking spaces that are EV capable	3%	~6%	~8%	~10%

CALGreen Residential Requirements

Single family New Construction

Requirement	Mandatory	Voluntary
Electrical panel capacity; raceway	yes	yes
Wiring	no	yes

Multi-family New Construction

Requirement	Mandatory	Voluntary
Minimum threshold	17 units	17 units
Percent of new parking spaces that are EV-capable	3%	5%

Plug-in SD

EVCS for Public and Common Use

Table 11B-228.3.2.1

Total Number of EVCS at a Facility[1]	Minimum Number (by type) of EVCS Required to Comply with Section 11B-812[1]		
	Van Accessible	Standard Accessible	Ambulatory
1 to 4	1	0	0
5 to 25	1	1	0
26 to 50	1	1	1
51 to 75	1	2	2
76 to 100	1	3	3
101 and over	1, plus 1 for each 300, or fraction thereof, over 100	3, plus 1 for each 60, or fraction thereof, over 100	3, plus 1 for each 50, or fraction thereof, over 100

The number of charging ports that can simultaneously charge vehicles is considered the number of EVCS at a facility for regulatory purposes

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Accessibility for EV Charging

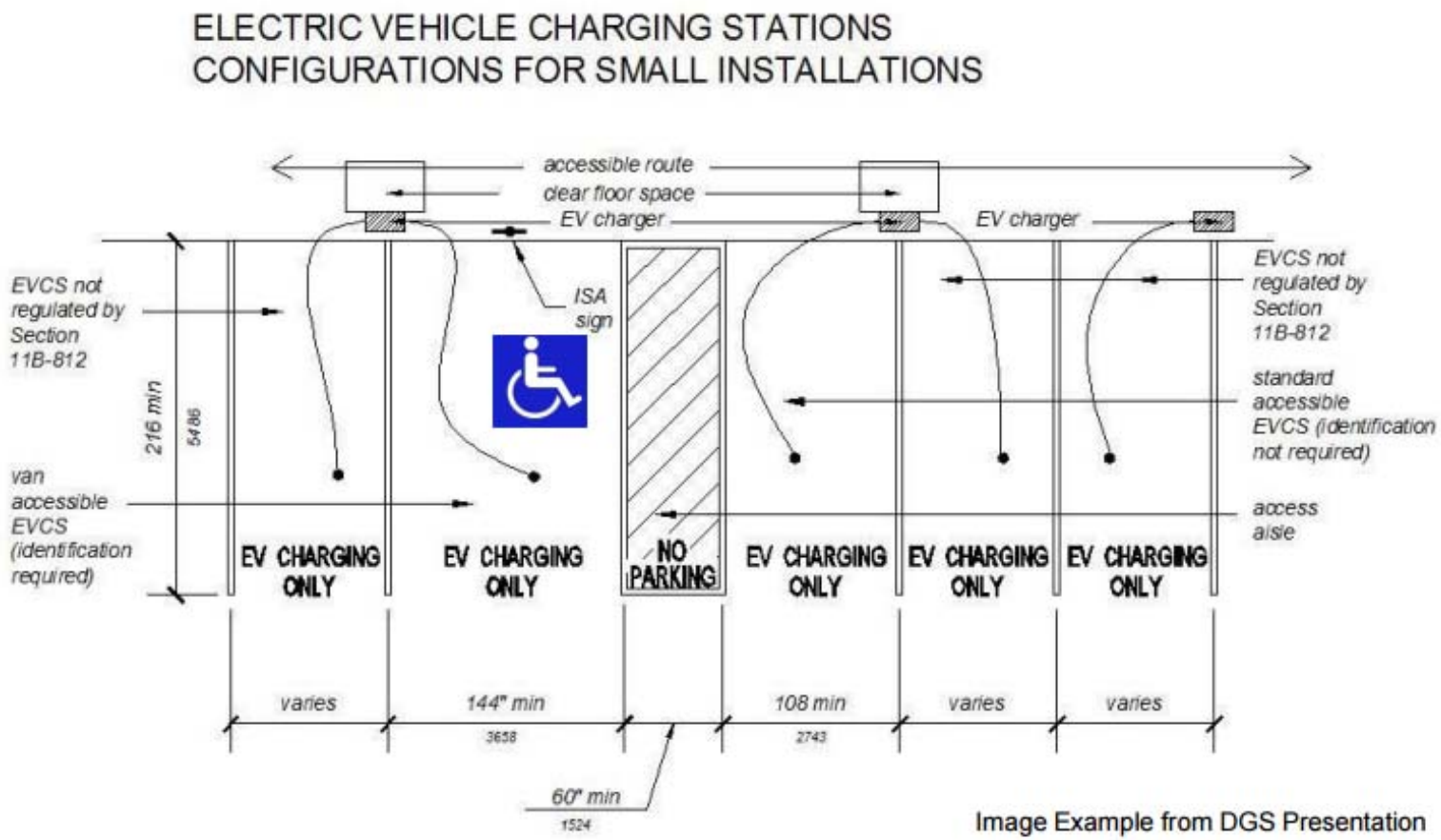

Image Example from DGS Presentation

ISA required for installations of 5 or more EVCS

Best Practices

- EVCS guidelines and checklists
- Clear and consistent website info
- Standardization of EVCS building codes and installation requirements
- Adoption of voluntary CALGreen codes
- Online permitting and inspection services
- Permit application for EVCS
  - Specific, fillable application
- Incentives for permit fees and installations
  - EVCS financing programs
- Training for electrical contractors

Technical Assistance: EV Expert

- Technical infrastructure questions
- Call/email or set up an in-person meeting
- EV Expert FAQ

www.energycenter.org/pluginsd

Email

EVexpert@energycenter.org

Phone (866) 967-5816

Thank You

Thank you to the San Diego Regional Clean Cities Coalition for providing breakfast

Questions and Discussion

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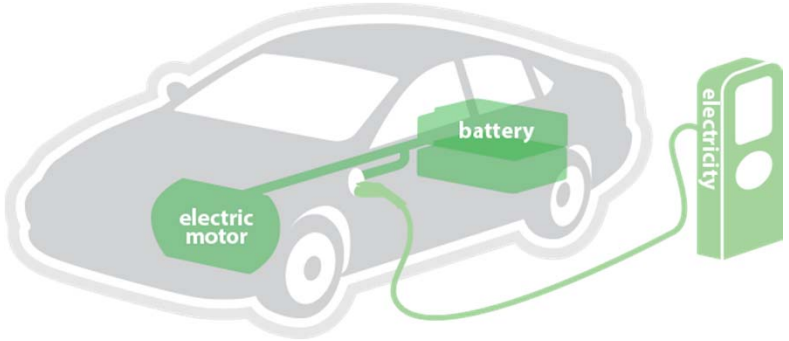
Kevin Wood, kevin.wood@energycenter.org
Candace Chu, candace.chu@energycenter.org
Andy Hoskinson, andy.hoskinson@energycenter.org

Electric Vehicles 101

Plug-in Electric Vehicles (PEVs)

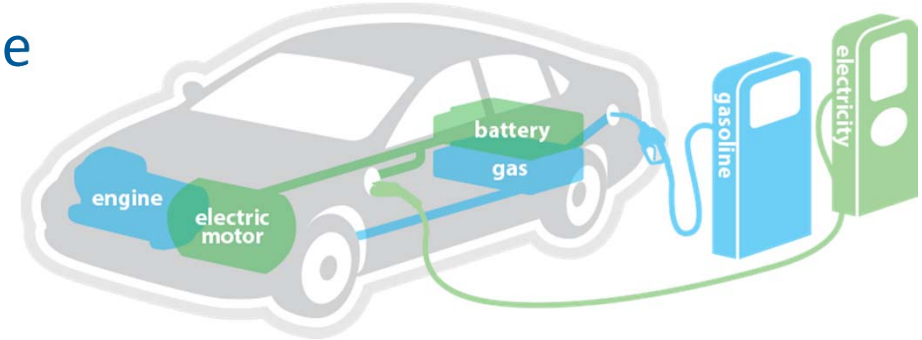
Battery Electric Vehicles

- All electric, zero-emissions
- 16 models available*
- Examples: Nissan Leaf, Tesla Model S, BMW i3



Plug-in Hybrid Electric Vehicles

- Electric battery and gasoline
- 10 models available*
- Examples: Chevrolet Volt, Toyota Plug-in Prius



*Eligible for the California Clean Vehicle Rebate Program (CVRP)

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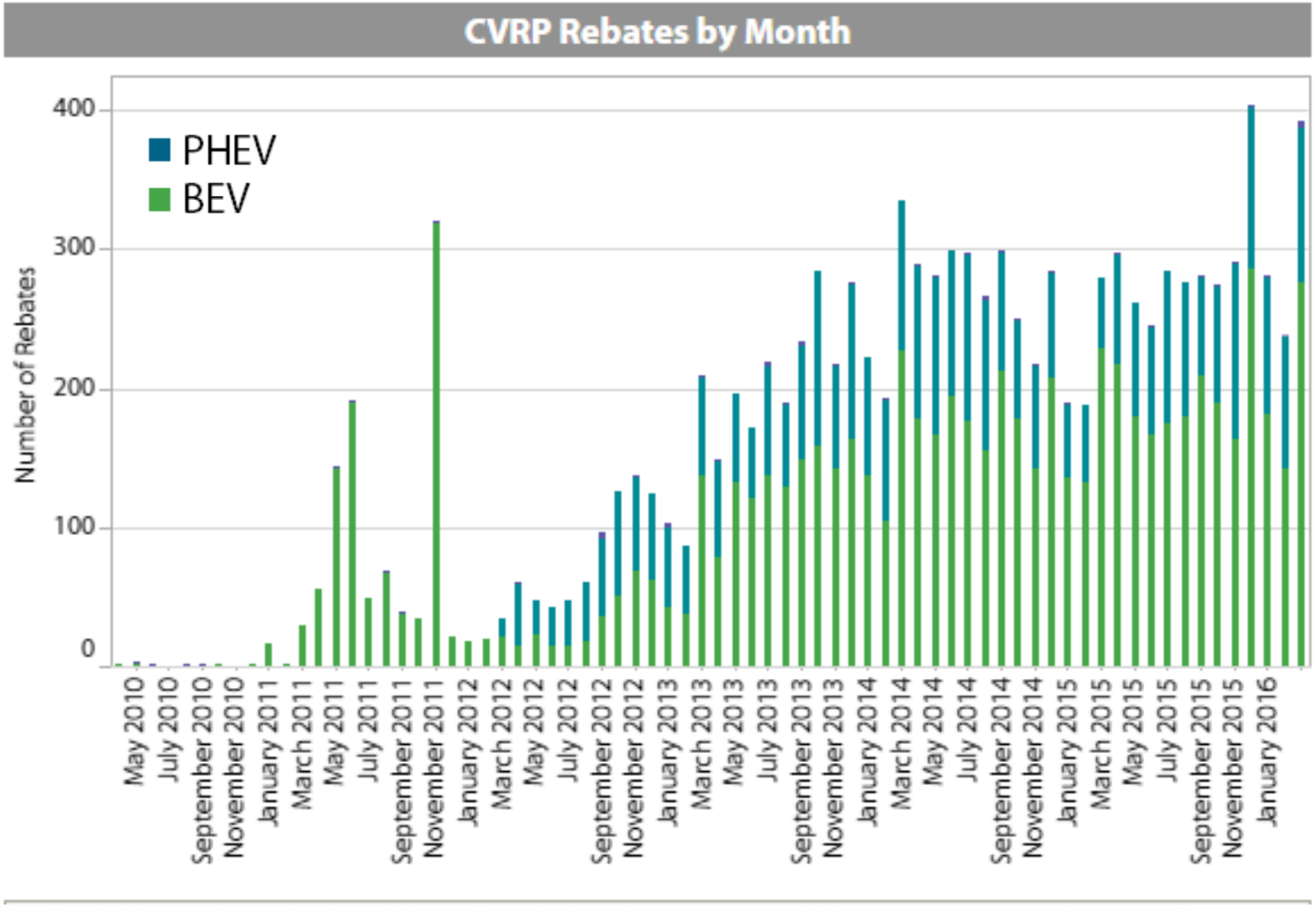
CVRP Rebates in the San Diego Region



Source: Clean Vehicle Rebate Project Statistics as of April 2016

Plug-in SD

EVCS in San Diego

- 377 charging locations in the SD region (with a total of about 1,000 plug-in points)
- 19,000 plug-in vehicles in the region

Source: SANDAG InfoBits (2016)

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