



California Zero-Emission Vehicle and Infrastructure Seminars:

Chapter 1 - Charging Your ZEV at Home and On the Go

April 17, 2025



California's Ecosystem of Infrastructure Development





Current Light Duty EV Sales

CEC ZEV Dashboard

LIGHT-DUTY ZEV						TOTAL LIGHT-DUTY	
CUMULATIVE SALES			ANNUAL SALES			ANNUAL SALES	
Sales through 2024			YTD Sales in 2024			Sales in 2024	
2,213,296			443,374			Q4 Sales	YTD Sales
						431,392	1,752,030
BEV	PHEV	FCEV	BEV	PHEV	FCEV	Q4 ZEV Share	YTD ZEV Share
1,655,001	540,123	18,172	378,910	63,864	600	25.1%	25.3%

One in four new car sales in CA is a ZEV!

CA accounts for 39% of all ZEV sales in US!

129 models of ZEVs in CA!



What Is ZEV Infrastructure?

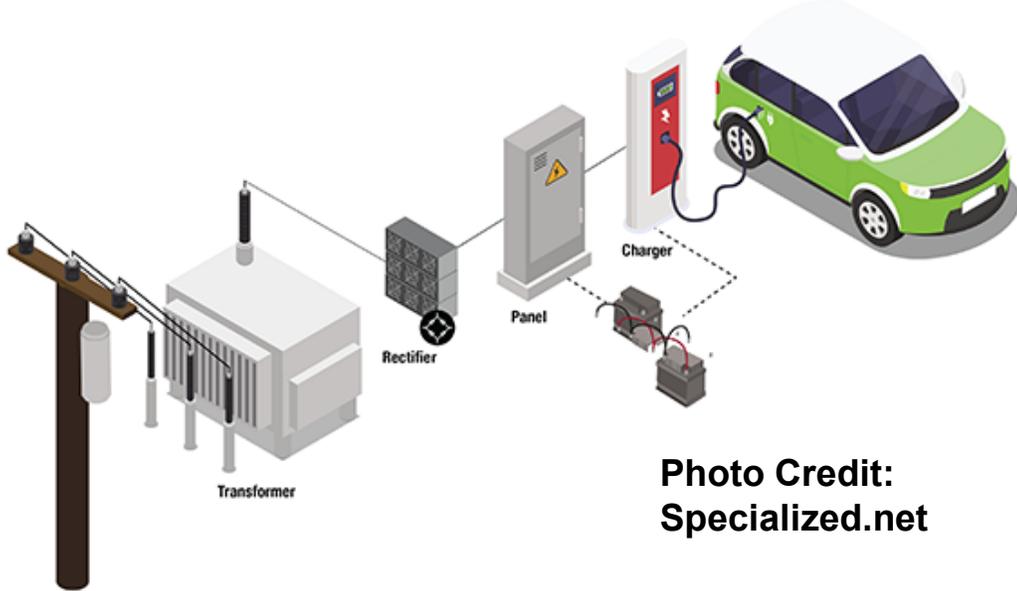


Photo Credit: Specialized.net



Photo Credits: Evgo and GM Energy

Charger Type	Input Voltage	Charge Power	Charge Time and Miles
Level 1	120 Volt AC	Up to 1.4 kW	4 miles per hour of charge time
Level 2	240 Volt AC	Up to 19.2 kW	32 miles per hour of charge time
DC Fast	480 Volt AC	Up to 350 kW w CCS	140 miles per 10 minute charge time



CEC Roles and Authorities

Designated Lead Role:

- ZEV Infrastructure Planning and Analysis
- EV Charging Equipment Funding
- Reliability Regulations

CEC Charging Infrastructure Funding for Light Duty Vehicles:

- \$590 million funding for 35,000 chargers since 2010
- \$2.3 billion total investments in alternative fuel infrastructure, manufacturing, ZEV truck technologies, and workforce development



CTP Future Investments: 2024 to 2028

Total: \$1.39 Billion

Not counting base Clean Transportation Program funds after 2024–2025, nor federal funds
Amounts subject to change



\$659 Million

Light-Duty EV
Charging
Infrastructure



\$668.2 Million

Medium- and
Heavy-Duty ZEV
Infrastructure



\$15 Million

Hydrogen-Specific
Funding



\$46 Million

Emerging
Opportunities



\$2 Million

ZEV Workforce
Development



2024-25 Targeted Solicitations

Multifamily

- Charging for multifamily housing residents
- ~\$19M proposed

Rural

- Charging for rural areas
- ~10M proposed

Urban

- Community charging in urban areas
- ~\$10M proposed

Hydrogen

- Hydrogen refueling stations, and operations and maintenance
- \$15M, deadline January

Commercial Corridors

- Infrastructure along designated corridors
- ~\$30M proposed

Ports

- Port infrastructure
- ~\$40M proposed

Tribal

- Address barriers identified by Tribes
- \$10M, awards anticipated October 2024

Technical Assistance

- Providers to assist potential grant applicants
- ~\$4M proposed

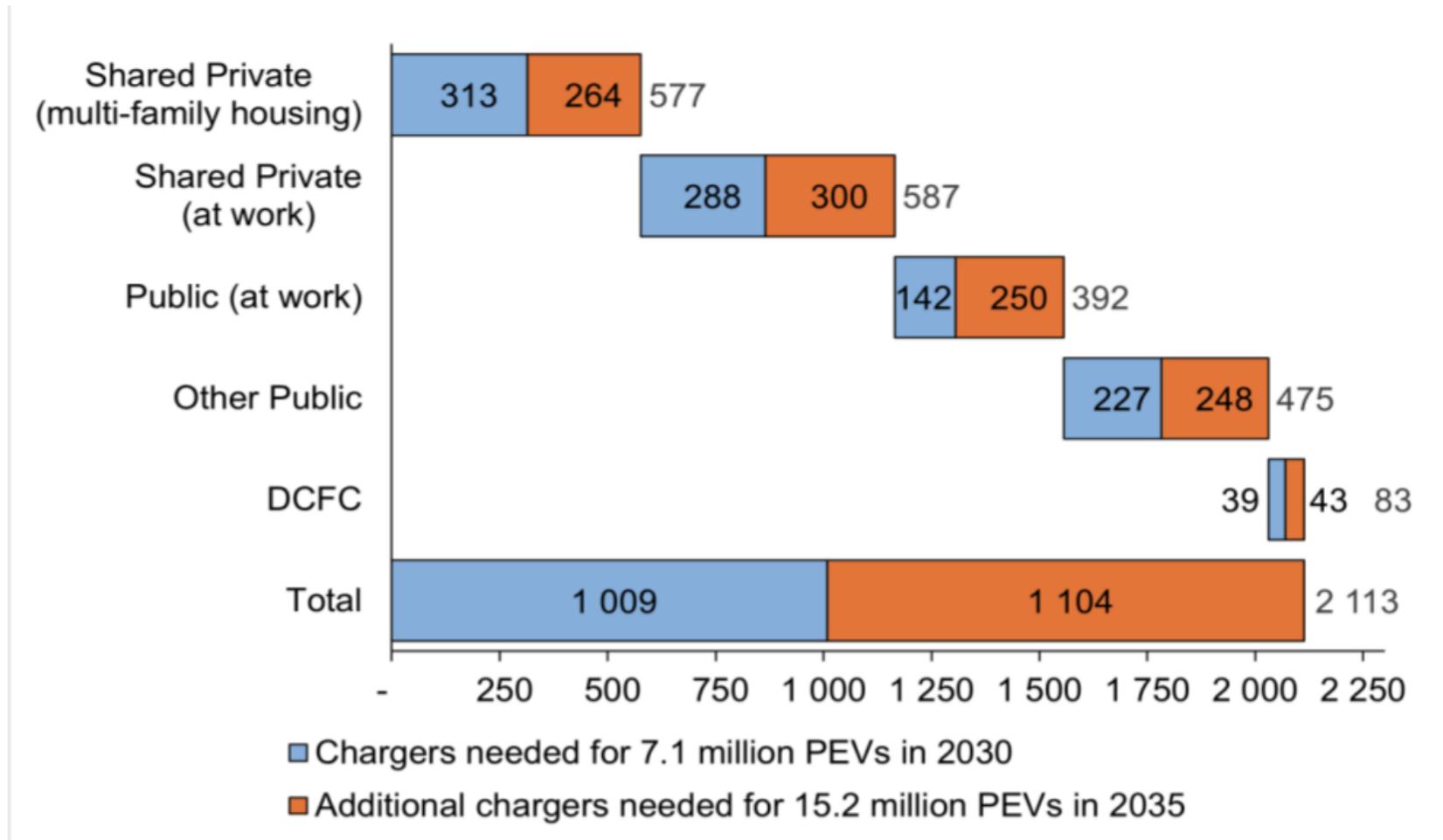


CARB ZEV Infrastructure Funding

- Greenhouse Gas Reduction Funds for Low Carbon Transportation Programs
 - \$2.8 B in GGRF and AQIP funding
- Volkswagen Settlement - \$800 M + \$423 M Mitigation Trust Fund
- NRG Settlement - \$102 M
- LCFS Credits (capacity payments)
 - Dispensed electricity: 2011 – 2023 = \$1.1 B
 - Dispensed electricity: 2025 – 2030 = \$721 M



Chargers Needed to Support 2030 and 2035 Light Duty ZEV Adoption Goals



Source: AB 2127
Second Assessment



EV Chargers in California: CEC Dashboard

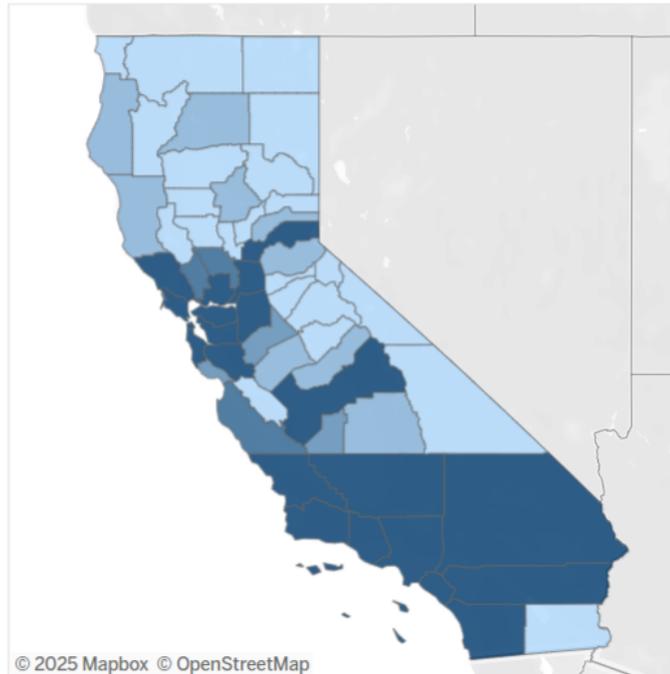
ELECTRIC VEHICLE CHARGERS

Total Public and Shared Private Electric Vehicle Chargers

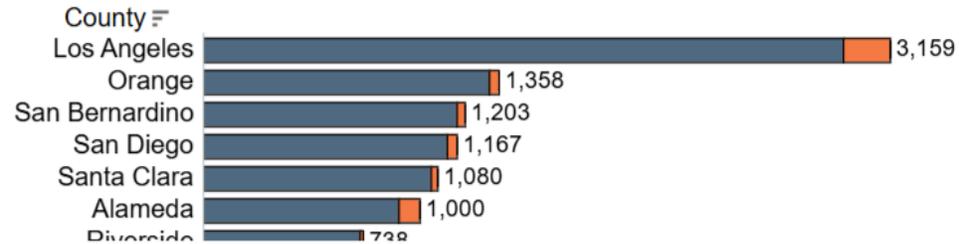
178,549

Public
47.198%
84,271

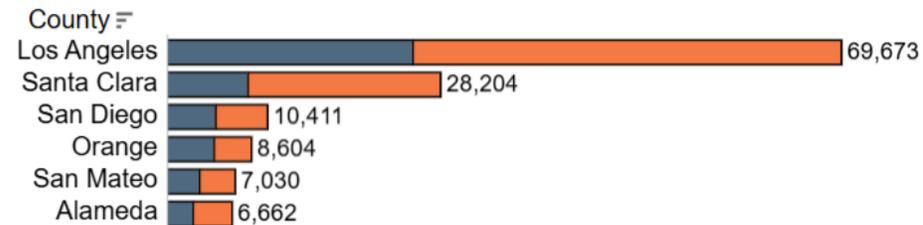
Shared Private
52.802%
94,278



DC Fast Chargers by County



Level 2 Chargers by County



County
(All)

Access
 (All)
 Public
 Shared Private

Legend
 Public
 Shared Private

	Public	Shared Private	Grand Total
Level 2	68,632	93,546	162,178
DC Fast	15,639	732	16,371
Total Chargers	84,271	94,278	178,549



Charging at Home:

Single Family and Multi-Family Residential Housing



Charging at Home: Single-Family and Multifamily Residential Buildings

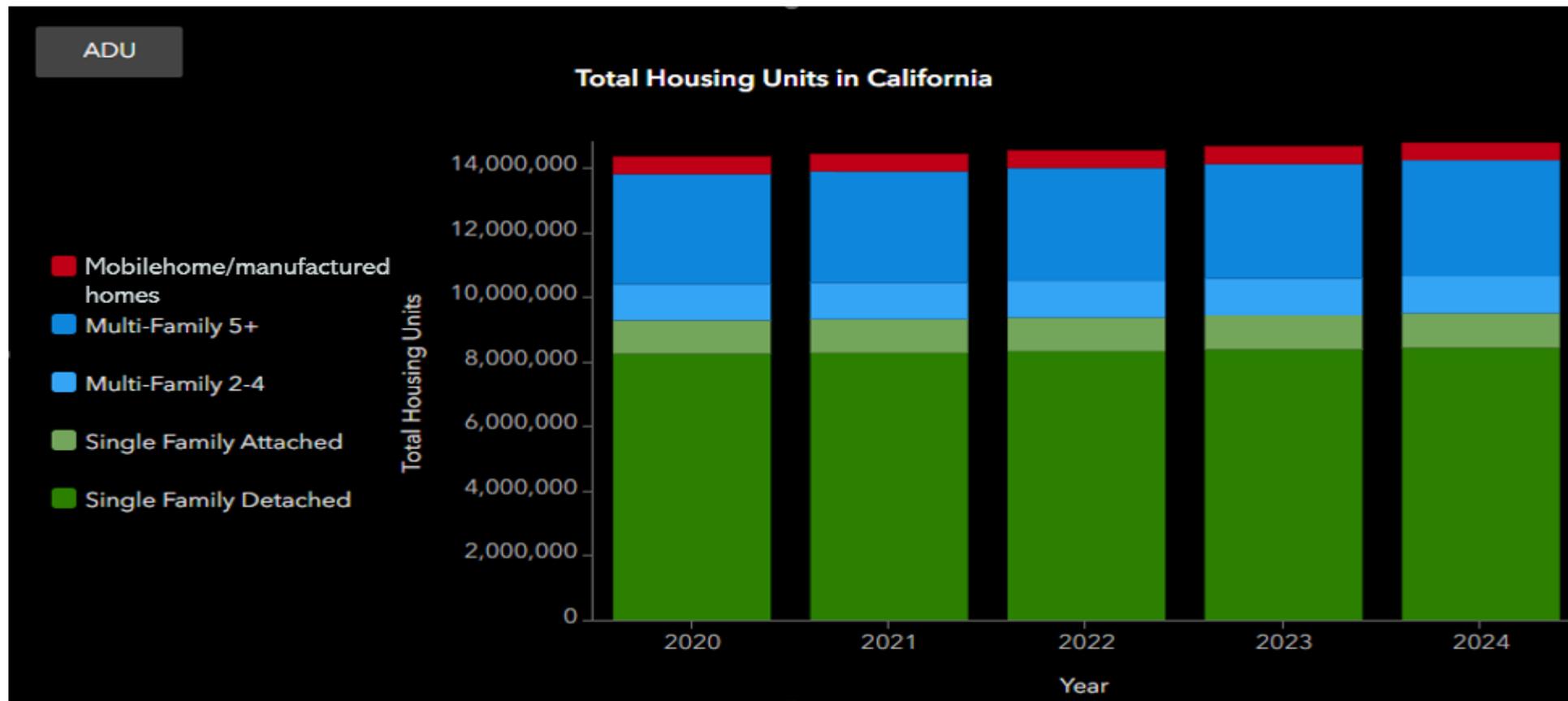
HCD Scope and Authority:

- **Health and Safety Code, Section 17928**
- **Health and Safety Code, Section 18941.10(a)(2)**





Housing Statistics 2020-2024



Questions? Email: Title24@hcd.ca.gov



Existing Buildings vs New Construction



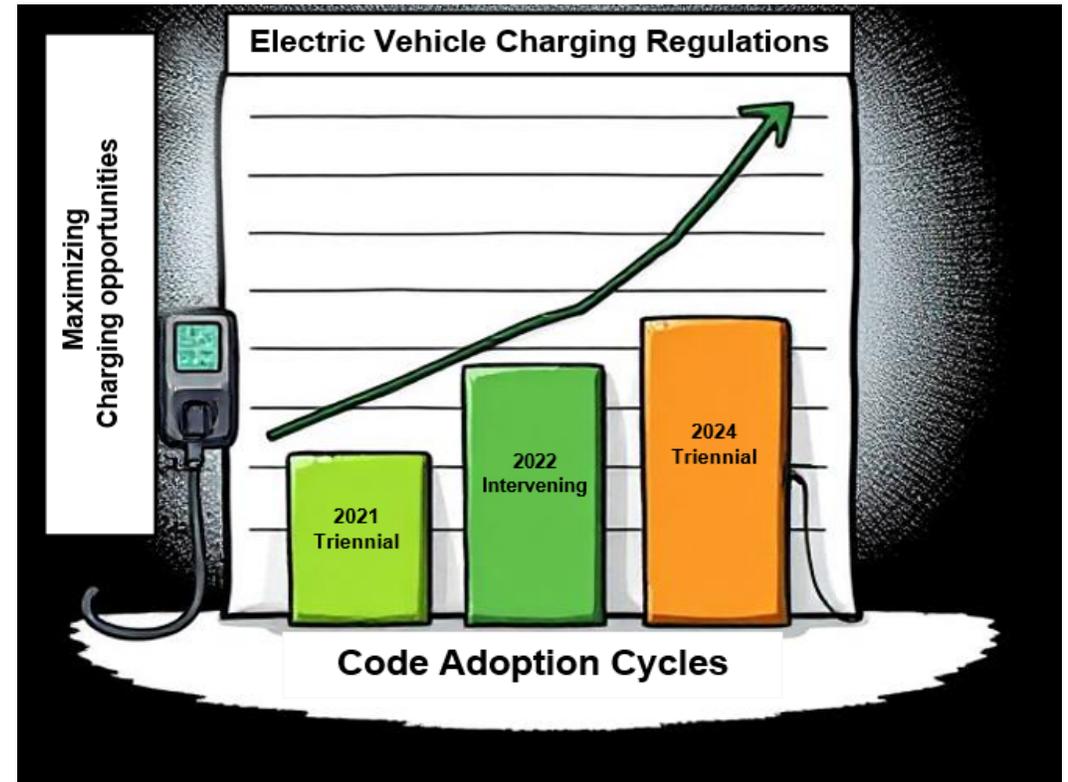
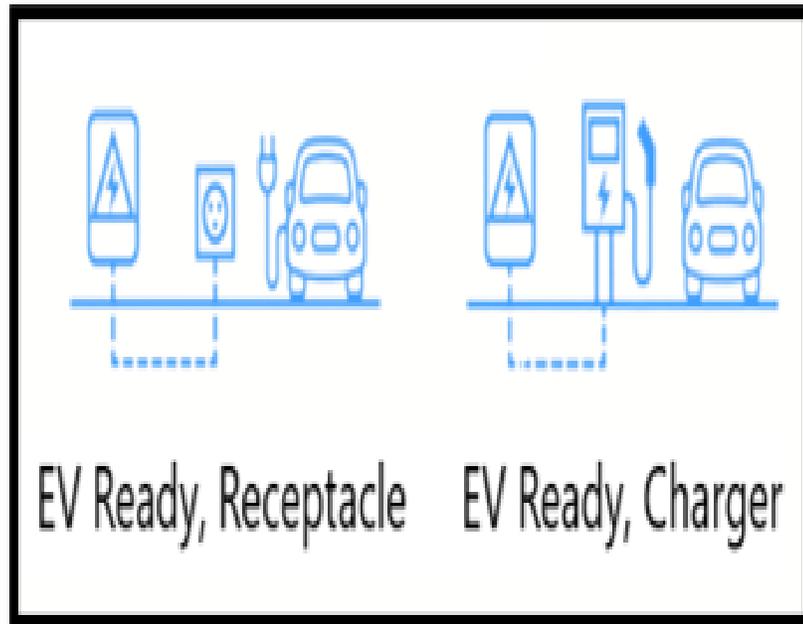
Electric vehicle charging for additions and alterations of parking facilities serving existing multifamily buildings

Questions? Email: Title24@hcd.ca.gov



Compliance with 2025 Building Standards

2024 Triennial Code Adoption Cycle
2025 CALGreen – effective January 1, 2026



Questions? Email: Title24@hcd.ca.gov



Multifamily Housing: Applicable CALGreen Building Standards

Mandatory Measures

- **These measures are required and must be enforced by local enforcing agency.**

Voluntary Measures

- **These measures are not required unless adopted as mandatory by the local enforcing agency. Voluntary measures offer increased opportunities for higher EV charging standards.**





Charging for Single Family Residences: L1 and L2

- Home Charging Preferred as Primary Location
 - OEMs bundling L2 chargers with lease or purchase
- AB 2127 Estimates of Needed Residential Chargers



Photo Credit: IOC CHarging

Charger Type	2025	2030	2035
L1	703,993	1,373,064	2,328,896
L2	1,078,200	2,728,362	5,717,384

Source: AB 2127, Table 6, page 42



Photo Credit: Ford

Complimentary Home Charger and Standard Installation With Any Qualifying Ford Electric Vehicle*

Plus take advantage of competitive finance and leasing offers.

*Must purchase or lease a 2024 or 2025 F-150 Lightning®, Mustang Mach-E®, or E-Transit™ Cargo Van from a Ford dealer between 1/31/2025 and 3/31/2025 to receive (a) one (1) complimentary Ford Charge Station Pro (Ford charger model may vary based on availability) with complimentary home installation, or (b) \$1,000 bonus required. Offer not available to fleet or commercial customers. Complimentary home installation must be completed through Qmerit Electrification LLC by 9/30/2025. Offer may apply based on structural and electrical limitations. Must take retail delivery from an authorized Ford dealer's stock by 3/31/2025. See your Ford dealer for details.

F-150 Lightning Offers

Mustang Mach-E Offers



VGI and Integrated Home Systems



Ford's Integrated Home Charging System with F150 Lightning

Utilizing Vehicle-To-Grid Technology

HOW V2G - VEHICLE TO GRID WORKS



Photo Credit: Greenc-ev.com



Multi-Family Residential Charging



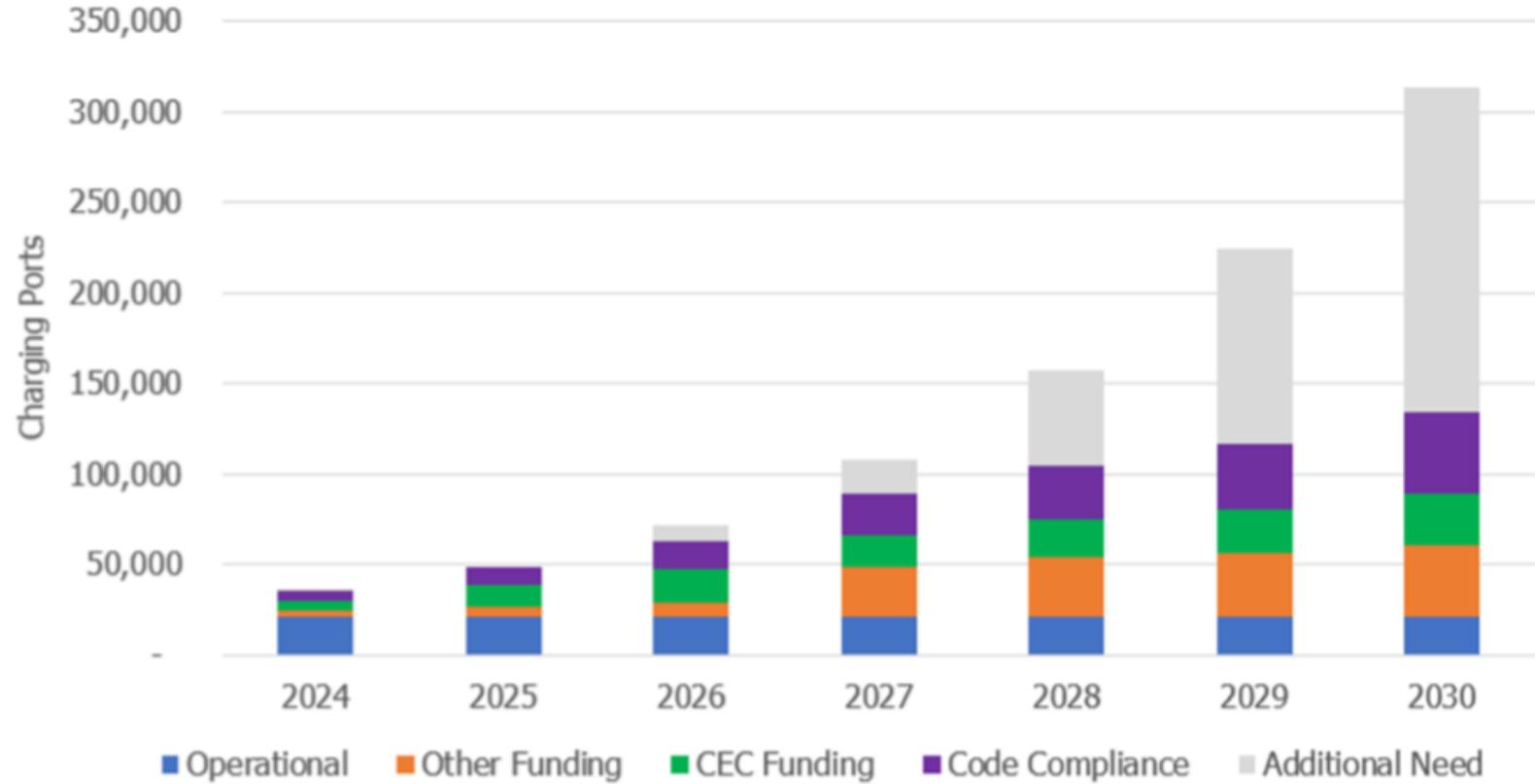
EV Charging For Multifamily Properties

Photo Credit: Pinnacle List



Photo Credit: EV Bite

Charging Ports Deployed at Multifamily by Funding Source



Source: CEC Staff Analysis

2025 ZEV Implementation Plan



Fast Charge Options for Urban Areas



Shell Recharge Stations
Upper Left – Conceptual
Upper Right – Piedmont CA

GM Energy/EVgo – Lower Left
Whole Foods – Lower Right

EV for Commercial Enterprise

- ▶ The California Building Standards Commission (BSC-CG) develops EV regulations for commercial buildings in the CALGreen Code):
 - State-owned buildings, colleges and universities
 - Nonresidential buildings for which other agencies do not have authority
- BSC's EV regulations apply to:
 - Other than Office & Retail (commercial): warehouses, manufacturing, industrial, movie theaters and restaurants.
 - Office & Retail (workplace): Office buildings, shopping center and supermarkets.



*CAL*Green



EV Charging – Definitions

- ▶ EV Capable, EV Charger, EV Charging Station (EVCS)
- ▶ EV Supply Equipment (EVSE)
- ▶ Low power level 2 (20 amps)
- ▶ Level 2 chargers (40 amps) & Direct Current Fast Chargers (DCFC)



EV Charging Option #1

EV capable spaces

- ▶ CALGreen allows 1 DCFC to be used to equal 5 EV capable spaces or 5 EV Charging Stations (EVCS)
- ▶ Also, 2 Low Power Level 2 receptacles 20 amps each = 1 Level 2 EV capable space 40 amps



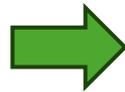
Green Building Code for Commercial Charging

(other than Office & Retail)

EV CAPABLE SPACES AND EVCS



TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	Other than Office and Retail NUMBER OF REQUIRED EVCS ^{2, 3}	Office and Retail NUMBER OF REQUIRED EVCS ^{2, 3}
1-9	0	0	0
10-25	4	2	3
26-50	8	4	6
51-75	13	6	8
76-100	17	8	13
101-150	25	12	19
151-200	35	18	26
201 and over	20 percent of actual parking spaces ¹	50 percent of EV capable spaces ¹	75 percent of EV capable spaces ¹



1. Calculation for spaces shall be rounded up to the nearest whole number.
2. Each EVCS shall reduce the number of required EV capable spaces by the same number.
3. At least one level 2 EVSE shall be provided.



CALGreen



Option #1 EV Capable Spaces

EV Capable Spaces And EVCS



TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	Other than Office and Retail NUMBER OF REQUIRED EVCS _{2,3}	Office and Retail NUMBER OF REQUIRED EVCS _{2,3}
101–150	25	12	19
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EV Capable Spaces – Option #1

Code Minimum

- ▶ Install 13 EV capable spaces and 12 EVCS
- ▶ This is the code minimum



*CAL*Green



EV Charging Option #2

Power allocation method

- ▶ The power allocation method is an alternative method for designers and developers to meet the same code requirements as listed in the previous slides for Option #1.
- ▶ Tables in CALGreen use total required kVA (electrical power) at the site to meet the same code requirements using amperes to create EV charging stations





Charging on the Go

Workplace and Travel Charging



Workplace Charging

- Most convenient and cost-effective charging option after home charging
 - “Shared Private:” Chargers within closed or fenced parking areas shared by employees.
 - “Public Work Charging” occurs at publicly available charging stations near the driver’s workplace.
 - Primarily Level 2 charging.
 - Shared Private charging often offered as amenity for employees.

No. of Chargers Needed to Support Workplace Charging

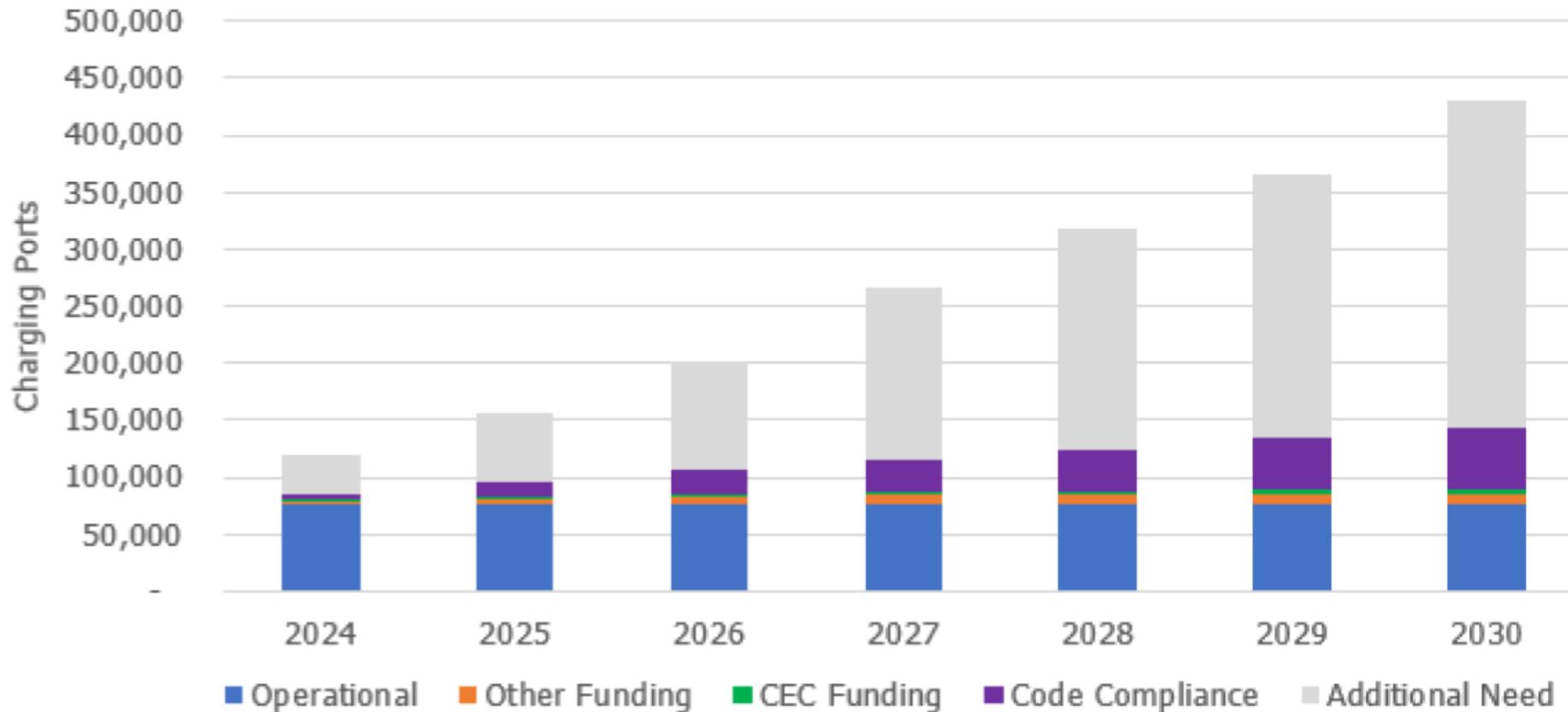
Workplace Charging	Current Count	2030	2035
Shared Private at Work	94,000	288,000	587,000
Public at Work	NA	142,000	392,000

Source: Second AB 2127 Report



Private Sector Will Continue to Deploy Workplace Charging

Figure 16: Private Sector Expected to Continue to Deploy Workplace Charging
Workplace Charging Ports Deployed by Funding Source



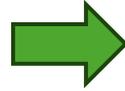
Source: CEC Staff Analysis

Green Building Code for Workplace Charging (Office & Retail)

EV CAPABLE SPACES AND EVCS



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3. At least one level 2 EVSE shall be provided.

Note: Same table but requires more chargers for the workplace





Intercity and Destination Travel



Photo Credit: Rivian



Photo Credit: ChargePoint



Photo Credit: Greencars.com



Photo Credit: TeslaLounge / Reddit



Photo Credits:

Rolling Hills Casino

Love's Travel Centers





DC Fast Charging on Travel Corridors

- Critical Part of Consumer Confidence and EV Utility
- CEC Funds Corridor Charging Through CALeVIP
- DCFC Needed to Support Policy Goals for ZEV Adoption
 - 2025 – 10,000
 - 2030 – 39,000
 - 2035 – 83,000

California Electric Vehicle Infrastructure Project (CALeVIP 1.0)

- DC fast and/or Level 2 chargers
- Closed to new applications
- \$226 million



Photo credit: CEC

CALeVIP 2.0

- 150 kW or greater DC fast chargers
- Closed to new applications
- \$68 million



Photo credit: PlugShare

National Electric Vehicle Infrastructure Program

1. IIJA program that will establish a nationwide network of publicly available EV chargers along Alternative Fuel Corridors (7,000 miles in California)
2. California will receive \$384 million over five years
3. At least 4 x 150 kW chargers per site
4. Stations every 50 miles or less and no more than one mile from corridor
5. Each charging port required to maintain 97% uptime for five years



EV Charger Reliability and Accessibility Accelerator (EVC RAA)



Summary

- California was awarded \$63.7 million in IIJA funding to replace and install 1,302 chargers at over 300 sites across the state (43% of national award)
- Each funded site must be brought up to NEVI standards
 - Four ports; 150 kW near corridors
 - 97% uptime for five years
 - Buy America; etc.

Timeline

- Caltrans/CEC RFI: October 2023
- Application submitted to FHWA: November 2023
- Award to Caltrans: January 2024
- Pre-solicitation workshop: March 2024
- Solicitation release: October 2024
- Pre-application workshop: November 2024
- Applications due to CEC: February 2025
- Review of applications: underway



Charger Reliability Critical to Consumer Confidence

- 2022 UC Berkeley Study found that 24% of all Bay Area DCFC were non-functional
 - But EVSPs were claiming 95% to 98% uptime.
- AB 2061 (Ting) requires CEC to develop reliability regulations and reporting requirements for all publicly-funded chargers installed after January 2024:
 - Chargers to meet 97% Uptime Standard
 - Chargers to meet 90% Success Rate – Beginning 2026
 - EVSPs to maintain 6 years of operational data
 - EVSPs to share reliability data publicly



Photo Credit: Minnesota Star Tribune



Interoperability

- Seamless and reliable communication between:
 - Electric vehicles
 - EV chargers
 - Charging network systems
 - Payment systems
- Which are often designed and manufactured by different companies



Q&A Session