SCAG EV Charging Station Study

EV Charging Station Guide For Property Managers

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ABOUT SCAG

SCAG is the nation's largest metropolitan planning organization (MPO), representing six counties, 191 cities and more than 19 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future.

VISION

Southern California's Catalyst for a Brighter Future

MISSION

To foster innovative regional solutions that improve the lives of Southern Californians through inclusive collaboration, visionary planning, regional advocacy, information sharing, and promoting best practices.

EXECUTIVE SUMMARY

This guide was developed to assist commercial, retail, and multiunit dwelling (MUD) property owners and managers within the SCAG region understand the benefits and considerations of installing EV charging stations (EVCS) at their facilities.

Property managers should familiarize themselves with EV charging basics, including the types of chargers, appropriate use cases, and typical costs so the correct charging solution can be identified early in the planning process. Site design will vary on a case-by-case basis, but projects should consider key variables such as access to electrical power, ADA requirements, and ease of accessibility to drivers and tenants. Site hosts will need to familiarize themselves with local permitting requirements and may need to work closely with private and public sector partners for a smooth project installation.

Benefits of EVCS

- Direct revenue generation from electricity sales
- Indirect revenue generation from higher rents or retail sales
- Differentiate from competition
- Align with sustainability goals

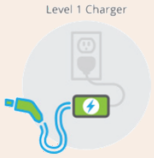
As EV adoption grows, property managers have an incentive to provide this service to attract and retain customers, patrons, and tenants who will have a greater need for charging. EVCS can provide direct revenue through the sale of electricity, and supplemental revenue through increased retail sales or higher rents. When funding is limited, property managers can explore alternate ownership structures to reduce upfront costs to project implementation.

EV CHARGING BASICS

CHARGER TYPES AND TYPICAL UPFRONT COSTS

EVCS are categorized into three different levels depending on their power output (Table 1). Product and installation costs generally increase with power output because increased loads are more likely to require electrical upgrades. After installation there are two primary ongoing costs: networking costs and maintenance costs. Most Level 2 and Level 3 EVCS are networked charging stations, where they connect to a cloud platform and allow the EVCS owner to monitor utilization and set prices. Charger maintenance responsibility, while typically minimal, generally falls on the EVCS owner. Most charger issues are software related and can be resolved by rebooting the EVCS. EVCS owners can choose to maintain the stations in-house or contract this service out to the charging manufacturer or another 3rd party through a service agreement. These agreements; however, may not cover damage from improper use or vandalism.

TABLE 1: OVERVIEW OF CHARGING TYPES

Charger Level	Plug Type and Power Output	Recommended Use Case	Typical Installation Costs ($/port)	Typical Ongoing Cost ($/port/yr)	Image
Level 1	Standard household outlet, 1.9kW @ 110V	Overnight residential charging. Optional low-cost charging option in MUDs. Can use pre-existing outlets. Recharges 3.5-6.5 miles per hour.	$1,000-$2,000	Networking: N/A. Maitenance: minimal	

Charger Level	Plug Type and Power Output	Recommended Use Case	Typical Installation Costs ($/port)	Typical Ongoing Cost ($/port/yr)	Image
Level 2	Standard SAE J1722; 1.9kW-19.2kW. Typical 7.2kW @ 240V.	Overnight residential, workplace, and commercial charging (2-4+hrs). Recharges 14-35 miles of range per hour.	$10,000-$50,000	Networking: $120-$360. Maitenance: $150-$1,000	
Level 3 Direct Current Fast Charger (DCFC)	Multiple types CCS1, CHAdeMO, Tesla; 25kW-350kW+ @ 480V 3 Phase	Short stops along major corridors and commercial charging (<1hr). The typical EV can expect to recharge from 20% up to 80% in under 30 minutes.	$50,000-$100,000+	Networking: $120-$360. Maitenance: $1,000+	

SITE SELECTION & INSTALLATION GUIDELINES

Designing an EVCS project and placement requires thought and planning to be cost effective and beneficial to EV drivers and site hosts. In the earliest deployments vendors and other third parties dictated site selection and charger placement. While that may have worked reasonably well to date with the limited number of charging stations installed, a lack of knowledge about where to site charger stations is still a significant barrier to expansion of an EV charging network. Additionally, sites need guidance on how to choose what type of charging (Level 2 or DCFC) to install at various locations. SCAG hosts a PEV ATLAS which includes a variety of suitability results throughout the region to help property managers understand if their site has a high need for charging infrastructure. Cities and project developers can use the tool to help identify areas charging stations are most needed in an area. Other resources related to EV charging can be found online at SCAG's Alternative Fuels & Vehicles Projects.

PRIMARY SITE DEVELOPMENT CONSIDERATIONS

As property managers evaluate their own properties, highly visible and/or highly trafficked sites such as large employment centers, commercial plazas, schools and colleges, hotels, and other popular destinations make for good options to add EVCS. These sites tend to have long dwell times and are well suited for Level 2 charging stations. Multifamily residential locations can consider adding Level 2 EVCS in shared parking areas. If multifamily residential properties want to provide charging infrastructure to every tenant, they may consider Level 1 charging or circuit sharing Level 2 charging technology to reduce electrical upgrade costs. Sites near major travel corridors or sites with high parking turnover may be appropriate for DCFC.

EVCS Site Selection Best Practices

- High vehicle traffic
- Easy for drivers to see
- Close to power source
- ADA compliant
- Near amenities

As sites are evaluated, the site host should think about where the EVCS are placed in reference to the site as a whole. Placing EVCS closer to site amenities can act as a perk for EV drivers, though that needs to be balanced with ADA and access to power considerations. It is common for EVCS projects to require a new electrical service, so locating EVCS near utility transformers, power poles, or vaults can reduce overall installation costs. In some cases, buildings may have spare electrical capacity the EVCS can tie into. Networked EVCS require access to the internet or cellular signal. Sites with poor signal, such as underground parking garages, may need cellular repeaters or consider EVCS products

with integrated cellular or Wi-Fi capabilities. Some cities may have additional aesthetic requirements that need to be factored into the final EVCS project design. In some cases, these design considerations line up well with each other and result in a cost-effective project. In other cases, the final design may need to balance between opposing considerations if for example utility power is far away from a building entrance. Site hosts may need to decide how to prioritize different factors in the final design.

DETERMINING QUANTITY OF STANDARD AND ADA EVCS

Once a site has been selected for an EVCS project, the site host or project developer must determine how many charging stations to install. California Building Code (CBC) has minimum requirements for EVCS infrastructure for new construction or major modification projects. Adding EVCS to existing sites typically does not trigger CBC requirements; but these minimum requirements can be a useful reference for determining how many EVCS to install at commercial sites. 2019 and 2022 Non-Residential mandatory measures are summarized in Table 2. The 2022 building adds trigger requirements to existing MUDs. If parking stalls are added or altered, or the lighting or other electron systems are altered such that an electrical permit is required, 10% of the affected stalls must be EV capable.

TABLE 2: CALIFORNIA BUILDING CODE NON-RESIDENTIAL MANDATORY MEASURES

Total number of Actual Parking Spaces	Number of Required EV Charging Spaces (2019 Code)	Number of Required EV Charging Spaces (2022 Code)
0-9	0	0
10-25	2	4
26-50	4	8
51-75	7	13
76-100	9	17
101-150	13	25
151-200	18	35
201 and over	10% of total	20% of total

Additionally, any time EVCS are installed at a publicly accessible location, California requires a minimum number of chargers to be ADA compliant (Table 3). EVCS in common areas at multifamily properties would be subject to ADA requirements but would be exempt if EVCS are assigned to specific tenants. ADA compliance can introduce design constraints as these standard and van accessible stalls must have access aisles with truncated domes at the curb, paths of travel, and be graded less than 2%. Sample ADA compliant layouts are shown in Figure 2 and Figure 1. Installing EVCS for dedicated stalls at MUDs may be exempt from ADA requirements.

TABLE 3: PUBLICALLY ACCESSIBLE EVCS ADA REQUIREMENTS

Number of EVCS at a Facility	Van Accessible	Standard Accessible	Ambulatory
1-4	1	0	0
4-25	1	1	0
26-50	1	1	1
51-75	1	2	2
76-100	1	3	3
101+	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

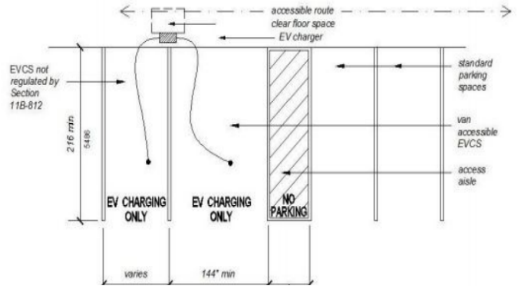


Figure 2. Sample layout with 2 EV Chargers and 1 Van Accessible Stall

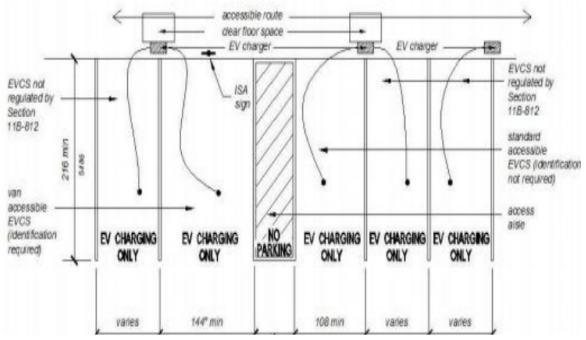


Figure 1. Sample layout with 5 EV Chargers, 1 Van Accessible Stall, and 1 Standard Accessible Stall

UTILITY COORDINATION

Coordination with utilities is critical for larger EVCS buildouts, or for projects that include DCFC, as it is likely that significant site and utility infrastructure upgrades may be required. Site owners should contact their utility representative early in the planning process to check if there is sufficient electrical capacity to accommodate the new loads. If significant utility upgrades are needed, it can take up to 12-18 before there is sufficient electrical capacity available. If there is a need for chargers sooner, utility representatives may be able to support the site design, provide recommendations on charger placement, and connect the site to available incentives or programs.

PARKING AND SIGNAGE CONSIDERATIONS

Most EVs still require 30 minutes, or longer, to charge; therefore, clear signage will help ensure a positive and safe user experience. It is generally considered best practice that EVs only park in an EV charging stall while the vehicle is actively charging to increase availability for other EV drivers. In commercial areas, placing time limits for vehicle charging can increase EVCS availability, generally up to 4 hours for Level 2 EVCS. Increasing the cost of charging past established time limits can help keep EVCS open. Non-EVs have been noted to occasionally park in EV charging stalls. As EV ownership increases, the need for consistent signage and enforcement of parking policies may increase. Site hosts can issue warnings on windshields and coordinate with local governments to enforce parking restrictions by ticketing or towing vehicles that do not abide by EVCS parking rules. This should be considered as a last resort for repeat offenders or reserved until EVs have become widely adopted and the drivers become aware of EVCS etiquette.

PERMITTING AND INSPECTIONS

Adding EVCS to existing facilities typically requires a building or electrical permit. While specific permitting requirements vary by City, a plan check is typically required for commercial EVCS which can result in lengthy review periods and occasionally multiple iterations of corrections. Site hosts and project developers should review City permit requirements early in the planning process. Starting January 1, 2023, all California cities will have established deadlines to review and approve EVCS permits. After installation project developers typically need to schedule a final inspection before EVCS can be operated.

BUSINESS OPPORTUNITY FOR EVCS

Commercial property and multifamily property owners have multiple ways to benefit from installing EVCS at their sites. Networked EVCS owners can set rates and charge users for the electricity dispensed and can markup electricity costs to generate a profit. In California, EVCS owners can generate additional revenue by generating and selling low carbon fuel standard credits, though this may only be viable with larger buildouts or if aggregated among multiple properties. Some charging stations have large displays which can be used for advertisement space (if allowed by the City), providing a secondary revenue stream. There are indirect benefits to installing EVCS including increasing the dwell time of business patrons, and thus increased retail sales, and promoting corporate branding to attract new customers, tenants, or employees[1]. Sites can realize these benefits, even if they decide not to charge users for the electricity.

Overall profitability and return on investment of EVCS will depend on how the site chooses to monetize the station. Sites may elect to not charge users for the electricity and derive value strictly through increased retail sales, rents, or branding. For sites that do want to charge for electricity, public charging rates generally fall between $0.20/kWh and $0.60/kWh, with the lower range generally resulting in breaking even and the higher range resulting in net profit over the life of the charger.

PAYMENT MECHANISMS

Site hosts should consider how EV drivers will pay for the electricity they consume. Most networked EVCS come with their own cloud platform where EV drivers can pay through a mobile application or RFID card for certain workplace or tenant charging situations. EV drivers tend to have multiple apps given the variety of charging station vendors they may use. While it may be irrelevant to the site host, this can be cumbersome for users and limits access to those that have a smartphone. As a way to increase access to more EV drivers, site hosts should consider adding credit card readers to charging stations. This is required in California for new Level 2 EVCS as of January 2021, and DCFCs as of January 2023[2]. If a multifamily property intends to electrify all tenant spaces with low cost Level 1 charging or non-networked level 2 charging, it may be simpler to recover costs through increased monthly parking fees or rents. Lastly, the EV industry is currently working on new "plug and charge" protocols, where the charging station automatically identifies the vehicle plugged in and bills the owner at the end of the charging session[3]. This is similar to how the Tesla network already operates, but in an open ecosystem.

FUNDING AND FINANCING OPPORTUNITIES

DIRECT INCENTIVES AND REBATES

There are currently multiple funding sources available to offset the upfront and ongoing costs of EV charging stations. Table 4 summarizes currently available (as of July 2022) incentives and rebate programs available in the SCAG region. An up-to date list of EVCS funding and incentive programs can be viewed at AFDC Laws and Incentives webpage. Some funding programs may be in high demand and funds can be exhaust

[1] https://atlaspolicy.com/wp-content/uploads/2020/04/Public-EV-Charging-Business-Models-for-Retail-Site-Hosts.pdf

[2] https://calevip.org/sites/default/files/docs/calevip/California_EVCS_Regulations_Guide.pdf

[3] https://www.caranddriver.com/news/a35044132/plug-and-charge-ev-charging-mustang-mach-e/

ed quicky. It is recommended to identify available funding sources, eligibility, and availability requirements early in the planning process to increase the chance of securing funds.

TABLE 4: EVCS REBATE PROGRAMS – JULY 2022

Entity	Program Name	Summary	Other Notes
Southern California Edison	Charge Ready	No-cost infrastructure up to charger stub out and incentives on eligible charging stations.	4 charging port minimum (10+ recommended). Preference for multifamily and DACs
Los Angeles Department of Water and Power	Charge Up LA!	Rebates on qualifying L2 and DCFCs, varies by power output and site type	Maximum incentives vary by charger type and site type. Open Enrollments during specified times
Burbank Water and Power	Lead The Charge	Rebates on qualifying L2 and DCFCs, varies by power output and site type	MUDs may quality for Level 1 chargers in common areas. Rebates can be applied for before or after construction
Glendale Water and Power	Charging Station Rebate	Rebates on qualifying L2 and DCFCs, varies by power output and site type	Rebate application submitted after installation
Pasadena Water and Power	Commercial Charger Incentive Program	Rebates on qualifying L2 and DCFCs	Applies to stations installed after August 2018, until funds are exhausted
California Energy Commission	CAleVIP	Rebates on qualifying L2 and DCFCs for qualifying site types	Funding must be reserved before installation. Funding allocated by region and may be exhausted quickly.
California Air Resources Board	Low Carbon Fuel Standard	Generates low carbon credits from the electricity dispensed to vehicles which can be sold each quarter.	Credit prices are market driven and vary over time. Chargers must be registered with CARB, may need to work with broker to facilitate reporting and credit sale

EV INFRASTRUCTURE OWNERSHIP MODELS

WHILE CALIFORNIA WILL LIKELY CONTINUE TO PROVIDE FUNDING FOR EV INFRASTRUCTURE, IT REMAINS HIGHLY COMPETITIVE. EXPLORING ALTERNATIVE FINANCING AND OWNERSHIP MODELS (

Table 5) can help reduce upfront financial barriers. Site hosts can purchase, own, and operate the chargers themselves but are then responsible for networking fees and maintenance. For this reason, its generally recommended to charge users for the electricity to at least break even on ongoing costs. On the other end of the spectrum, sites may be able to lease parking spaces to third parties and the vendor retains sole ownership of the charging stations and is responsible for maintaining them. Other successful ownership models include charging as a service (CaaS), where the site host pays little to no money upfront and pays the vendor over time via a subscription model, typically on a per kWh basis. Lastly, shared ownership and revenue models may be possible. These ownership models may not be viable for all projects, so site hosts should work closely with project developers to determine the best ownership model for the specific project.

TABLE 5: SAMPLE EV OWNERSHIP MODELS

Line Item	Host Owned	Charging as a Service (CaaS)	Hybrid Host-Vendor Owned	Vendor Owned
Service Model	Host own and operate	Vendor own and operate via subscription	Shared ownership	Vendor own and operate
Ideal for:	Pilot projects, site desire to control charging revenue	Large fleet electrification projects	Sites that want limited control on charger O&M	Sites with very high expected EVCS utilization
Equipment Ownership	Host	Vendor	Host or Vendor	Vendor
Installation Costs	Host	Vendor	Host or Vendor	Vendor
Electricity Costs	Host	Vendor	Vendor	Vendor
Support & Maintenance Costs	Host	Vendor	Vendor	Vendor
Charging Revenue	Goes to Host	Varies	Split with Vendor	Majority Percentage to Vendor
Pricing Controls	Host	Vendor	Vendor	Vendor
Contract Term	Contract Typically Not Required	Contract Typically Required	Contract Typically Required	Contract Typically Required
Network Fees	Yes	No	Yes	Yes
Monthly Subscription Fee	No	Yes	No	No

CONCLUSION

The private sector stands to realize multiple benefits by installing EV infrastructure, from additional revenue generation, attracting and retaining new customers or tenants, differentiating themselves from competition, and furthering applicable sustainability goals. To best realize these benefits, property managers should work closely with experienced project developers that can design projects most appropriate for the site type and expected use case.

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