

EV Charging Infrastructure Toolkit – Workplaces



Why Install Electric Vehicle Charging?

Electric vehicle (EV) adoption is experiencing rapid growth. In 2018, nearly 8% of new car sales in California were EVs.¹ Plug-In Electric Vehicles (PEV) are projected to reach 4.56% of total vehicle market share in Kern County by 2025². As more drivers adopt EVs, charging at destinations becomes increasingly important as a means of facilitating inter/intra-regional EV travel in Kern County and serving EV driving customers

Installing EV charging stations (EVCS) at your business or workplace has numerous benefits. Providing EV charging demonstrates your business's commitment to reducing the environmental impact of its operations. Showing that value and reducing commuting costs for your employees can help attract and retain high-value employees. EV Charging at the workplace is highly prized by EV drivers – it allows them to get to work and back or even run errands during the day with confidence. For drivers without reliable access to charging at home, it can be a must-have. In addition, EVCS can contribute to corporate sustainability goals and count toward Leadership in Energy and Environmental Design (LEED) certification³. Additionally, the San Joaquin Valley Air Pollution Control District Rule 9410 (Employee Trip Reduction Planning) mandates that workplaces with over 100 employees select a certain number of approved actions to implement; one of which can be installing onsite EVCS.

Benefits of EV Charging

Attract Top
Employees

Strengthen Brand
& Environmental
Image

Reduce
Operational
Impacts

Enhance
Employee
Programs

Enhance Property
Value

¹ California New Car Dealers Association. California Auto Outlook. Vol. 15 No. 1. Available at: <https://www.cncda.org/wp-content/uploads/Cal-Covering-4Q-18.pdf>

² EMFAC, 2017

³ USGBC Leadership in Energy and Environmental Design. <https://www.usgbc.org/credits/schools-new-construction/v4-draft/lfc8>

Site Owner EV Charging Checklist

While each installation is unique, many properties have similar questions and challenges when planning for EVCS. This document summarizes common steps to help you consider options and understand how and when to engage the experts – your local utility, licensed contractors and EVCS vendors. The toolkit provides general information and helpful resources to guide you through each step of the checklist provided below.

While this checklist is presented in a linear format, the process of installing EVCS will be dynamic, with various interrelated considerations. Steps 1-4 will be preliminary explorations of issues that can be revisited with expert help once you've decided to move forward and contacted your utility and/or EVCS vendors. Actions listed are from the perspective of the project lead for your site. Your utility, vendors, and contractors will guide you through actual installation steps and more detailed considerations.

STEP 1: Estimate Demand

- 1.** Survey employees to determine who currently owns an EV, who plans to purchase an EV, typical daily driving distance, workplace charging availability, and similar data to inform decision-making.
- 2.** Look at similar sized workplaces with charging to evaluate demand/EVCS needs.
- 3.** Estimate volume of customer/visitor drivers with EVs to evaluate if public charging is warranted.

STEP 2: Consider EVCS Options

- 4.** Consider appropriate charging equipment types based on estimated demand. Explore Level I solutions for employees that do not have long daily travel needs and will charge overnight. Explore Level II solutions for employees with long daily commutes. DCFC is not typically recommended for workplaces.
- 5.** Examine physical siting constraints (e.g., access to electrical infrastructure, ADA, visibility etc.).
- 6.** Weigh EVCS ownership models - tenant, property owner, or third-party vendor.
- 7.** Determine if you want to measure EVCS use and require payment from users. This will lead to other considerations such as EVCS software, networked vs. non-networked EVCS, in-house or third-party payment companies, using pricing to drive parking space turnover, etc.
- 8.** Consider increasing the installation of EV-ready/ready-make spaces to account for growing demand, reducing future capital costs related to site development (e.g. trenching, wiring).
- 9.** Decide if electricity will be supplied from residents' individual meters or from a common load meter. If common load, determine how users will be billed.
- 10.** Determine ownership (e.g., residents, property owner, or HOA).

STEP 3: Estimate Capital Costs

- 11.** Determine the number and type of EVCS you want to install onsite.
- 12.** Measure distance to EVCS location from power point of connection to estimate make-ready costs, which cover laying the infrastructure needed for the immediate installation of a charging station in the future (e.g., trenching and conduit installation).

- 13.** Determine if your electrical panel requires an upgrade to handle increases in load, or to separately meter EVCS from other electrical demand (engage utility or technology provider).
- 14.** Have technology provider estimate operations & maintenance costs (e.g., electricity use, demand charges, networking fees).

STEP 4: Evaluate Cost Recovery Options

- 15.** Research available incentive and funding programs (e.g., PG&E Fast Charge Program & EV Charge Network Program, SCE Charge Ready Program, CALeVIP, EKAPCD DMV Grant, SJVAPCD Charge Up! Program etc.) Note that some programs (ex. CALeVIP) require approval prior to equipment purchase to guarantee coverage.
- 16.** Consider contracting with EVCS network provider to recover ongoing charging costs.
- 17.** Look into vendors offering free charging for advertising space.

STEP 5: Contact Utility (PG&E or SCE) to Conduct Site Evaluation

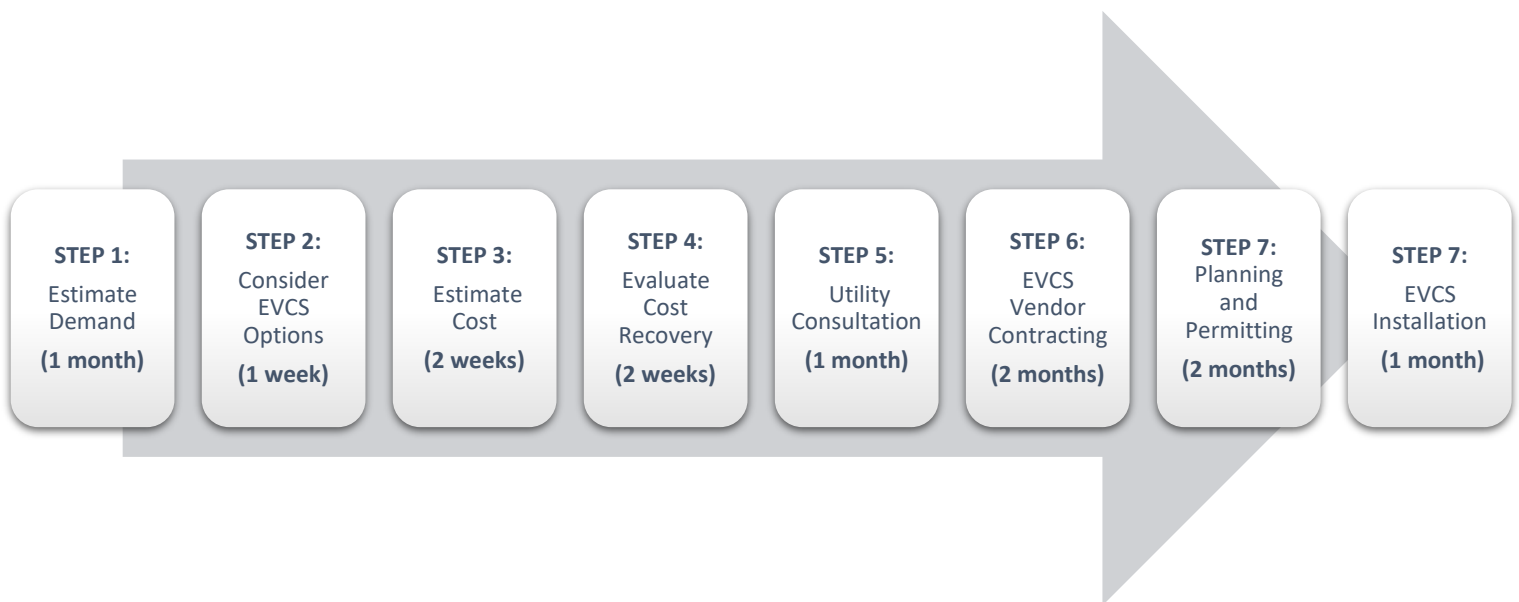
STEP 6: Contract with Vendors - Choose from offered equipment and service contracts

STEP 7: Hire Installers - Work with utility, vendors to plan, permit, and install EV charging

STEP 8: Implement Management Policies

- 18.** Ensure compliance with ADA regulations, consider general parking and traffic flow issues.
- 19.** Contact insurer regarding potential liability issues.
- 20.** Consider installing signage guiding visitors to EV charging.
- 21.** Communicate with site tenants and other stakeholders regarding installation and use of EVCS.
- 22.** Set schedule to review EVCS usage and contracts with third parties to consider adjustments.

EV Charging Installation Timeline



EV Charging Resources

STEP 1. Estimate Demand

What is your current EV charging need, and how will it grow into the future? Weighing the need for EVCS at your commercial destination will require reaching out to stakeholders at your site and researching existing EV charging locations nearby. A simple first step is to contact each tenant or property stakeholder at the site to inquire about EV charging interest or their employees or visitors. A key question will be evaluating the typical vehicle dwell times at your site to consider the appropriate charging speed.

Tool 1: EV Charging Demand Sample Survey



The U.S. Department of Energy has prepared a sample survey for workplaces to gather information on employee EVCS demand. This may not be appropriate for tenants at your site unless they have many employees, but it gives a good idea of what types of questions to consider:

https://afdc.energy.gov/files/u/publication/WPCC_sample_employee_survey_0816.pdf

Tool 2: EV Charging Location Maps



Use these maps to see where nearby chargers are located, how many chargers are available, and their rates and access rules. Keep in mind that demand will continue to grow. PlugShare:

<https://www.plugshare.com/>. U.S. DOE: <https://afdc.energy.gov/stations/#/find/nearest>.

STEP 2. Consider EVCS Options

What charging speeds, controls and billing capabilities do you require? You will want to consider the demand and dwell times of visitors to your location to select appropriate charging equipment. The table below provides a summary of EVCS types. Levels 1-3 offer increasing charging speed but with added cost and complexity.



Tool 3: EV Charging Information

The U.S. Department of Energy maintains a clearinghouse of information and resources for alternative fuels, including EV charging: <https://afdc.energy.gov/fuels/electricity.html>

	Level 1	Level 2	Level 3 (DCFC)
Charging Speed	3-5 miles of range/hour	10-54 miles of range/hour	75-300 miles of range/hour
Typical Locations	Single-family homes Townhomes Multi-family dwellings Office buildings	One and two-family homes Townhomes Multi-family dwellings Office buildings	Public access Retail shops Highway corridors Hospitality & recreation facilities
Equipment Description	Standard 120 VAC outlet and cord set charger that typically comes with EV Metering and billing not available	240 VAC outlet and wall-mounted or bollard style charging port Networked units available, allowing for advanced controls, billing options	Commercial-grade 208, 440 or 480 VAC converted into direct current (DC) through large standing unit Often requires upgrades to a site's electrical service Not all EVs can utilize

An important consideration is the number of EVCS that you will install at your location. California green building codes for new construction currently require that 6% of parking spaces be EV-ready, meaning with electrical capacity and raceway to support future charging. Charging stations placed in 3-6% of spaces is appropriate for

an initial installation, with future expansion based on demand. When trenching to install conduit for chargers, it is cost-effective to install additional conduit to support future charging.

STEP 3: Estimate Cost

The cost of installing EV charging varies considerably based on specific site requirements. Aside from the actual cost of the EV charging equipment, often referred to as electric vehicle supply equipment (EVSE), typical installation costs include trenching for electrical conduit and upgrades to the site’s electrical service.



Tool 4: EV Charging Cost Report

The U.S. Department of Energy has prepared a report on average equipment and installation costs for non-residential EV charging projects:

https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

The table below provides a simplified estimation tool based primarily on costs provided in the Department of Energy report. It includes average potential costs that may or may not apply to every project. Early consultations with your utility and EVCS providers will help refine these estimates.

EVCS Installation Cost Estimator

Cost Driver	Average Costs	Example
Installation Costs		2x Dual Port (4 Ports)
Equipment – Level 2 (Non- Networked)	\$500 - \$2,000 x Ports	=
Equipment – Level 2 (Networked)	\$1,500-\$6,000 x Ports	= \$3,000 x 4 Ports
Equipment – DCFC Equipment	10,000-\$40,000 x Units	=
Installation – Level 2 Equipment	\$3,000 - \$6,000 x Ports	= \$3,800 x 4 Ports
Installation – DCFC Equipment	\$8,500 - \$51,000 x Units	=
Trenching for Electrical Conduit	\$100 x Feet	= \$100 x 45 feet
Transformer Upgrade	\$10,000-\$25,000	=
Total Estimated Cost:		= \$31,700

Additionally, site hosts must consider the ongoing costs of EV charging. The primary ongoing cost for EV charging stations is the cost of electricity used to charge EVs, and demand charges. You can choose to provide charging as a free amenity or select a networked charging solution by which electricity usage is tracked and EV owners pay for the cost of electricity associated with their individual charging. In this case, you may need to cover ongoing network operation and data fees.

STEP 4. Evaluate Cost Recovery

Installing EV charging will often require a considerable up-front capital expenditure. Appropriate cost recovery strategies will depend on the ownership situation of your business site and who will be covering the costs of installation. A site owner has different options than a business leasing space. In an office park environment with multiple businesses, property owners may find it most efficient to provide EV charging for multiple businesses in an open-access area.

Site hosts may wish to recover the costs of installation and ongoing use from tenants and visitors based on individual usage, incorporate these costs into rent or lease terms, or elect to absorb the cost themselves and provide EV charging as a free amenity. No matter what cost recovery strategy you choose, there are additional resources that can provide funding for eligible EV charging installation projects, as listed below.



Tool 5: CALeVIP Incentive

The California Electric Vehicle Infrastructure Project (CALeVIP) is a California Energy Commission-funded project that provides incentives for Level 2 and DC fast charging in select locations throughout the state: <https://calevip.org/>



Tool 6: AFDC Incentive Listing Tool

The U.S. Department of Energy's Alternative Fuel Data Center (AFDC) hosts a comprehensive listing of currently available EV incentives within the state of California. Please note that certain programs (ex. CALeVIP) are time-limited: <https://afdc.energy.gov/fuels/laws/ELEC?state=ca>



Tool 7: Add Solar photovoltaics to EV infrastructure

The National Renewable Energy Laboratory created a summary of considerations for adding distributed solar PV with EV charging: <https://www.nrel.gov/docs/fy14osti/62366.pdf>. Solar Sage provides an easy [online calculator](#) for estimating solar panel costs based on electricity demand.

STEP 5. Contact Utility

Once you taken time to consider the items listed in Steps 1-4 of the checklist, you'll be well prepared to begin speaking with your utility, EV service providers and electrical contractors who will be able to recommend solutions suited to the needs and constraints of your location. These experts can also help refine cost estimates and potential recovery strategies. The utility specifically can help walk you through any necessary electrical service upgrades, potential electricity bill impacts, and other technical aspects of the project.



Tool 8: Pacific Gas & Electric EVCS Resources

Explore PG&E's EVCS-related programs and resources, such as the EV Charge Network and a contractor search tool. Contact your account representative for additional support.

https://www.pge.com/en_US/small-medium-business/small-medium-business.page



Tool 9: Southern California Edison EVCS Resources

Explore SCE's EVCS-related programs and resources, such as the Charge Ready program.

Contact your account representative for additional support.

<https://www.sce.com/business/electric-cars>

STEPS 6 & 7: Contract with Vendors & Hire Installers

EVCS equipment and network providers offer a variety of products, services, and unit ownership arrangements. Speaking with several vendors and reviewing case studies and past projects is an important step before finalizing a contract with your chosen provider.



Tool 10: CALeVIP Connects

CALeVIP Connects is provided as part of the CALeVIP incentive program. It is a free online directory that allows you to connect directly with EV service providers and request information for potential EV charging projects. <https://calevip.org/find-an-evsp>

STEP 8: Implement Management Policies

Once your EVCS is operational, you will want to take steps to ensure it is well utilized and enhances your site. Communication with property stakeholders, staff and visitors will be key to success. Distributing a written use and management policy to staff and property stakeholders and installing signage to direct potential users to charging units are two important steps. You may also want to set a schedule to review utilization and ongoing costs to decide whether your current EVCS and services are still serving your needs.



Tool 11: Veloz Accessibility and Signage Guide

Veloz provides a number of EVCS-related resources on its website, including a report with recommendations on parking management, accessibility and signage.

<https://www.veloz.org/resource/accessibility-signage-for-pev-charging-infrastructure/>

Additional Resources

Alternative Fuels Data Center (AFDC) – The U.S. Department of Energy’s AFDC is an information clearinghouse with useful resources like case studies, an EV charging locator and a list of relevant laws and incentives. <https://afdc.energy.gov/fuels/electricity.html>

Veloz/PEV Collaborative – Veloz provides many useful resources including case studies, templates and fact sheets on their website. <https://www.veloz.org/veloz-resources/>

San Joaquin Valley Clean Cities Coalition – Based in Bakersfield and operated by Project Clean Air, the Clean Cities Coalition and Electric Vehicle Partnership offer a variety of support services to help connect businesses interested in EVCS with the support they need. <http://projectcleanair.us/sjvccc/>





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