

Things to Consider When Installing a Public EV Charging Station



Electric vehicle charging stations, also known as electric vehicle supply equipment (EVSE), consist of the equipment used to deliver electrical energy from an electricity source to an electric vehicle battery. This is done by securely connecting the EVSE plug to the EV to supply a flow of electricity. Many EV charging stations can be found at the residences of EV owners (single family homes or multi-family complexes) and non-residential areas such as public access for the general public, workplace for employees, and fleet stations for commercial or government purposes. If you are planning on installing an EV charging station, here are some things to consider.

Types of EV Charging Equipment (EVSE)

There are three primary types of EVSE. Level 1 and Level 2 charging provide alternating current (AC) to the vehicle which converts to direct current (DC) needed to charge the battery. The third type, DC fast charging, provides electricity directly to the vehicle's battery. The charge times vary depending on the type of EVSE, on-board vehicle charging equipment, the vehicle's battery capacity and type of battery, and how depleted the battery is.

Level 1 (AC) Charging	Level 2 (AC) Charging	DC Fast Charging
<ul style="list-style-type: none"> • Lower Power AC • 120-volt (V) AC circuit or 20 amperes (A) • 4-6 miles of range per hour of charge • EVSE unit cost (single port) range: \$300-\$1,500 • Installation cost: \$0-3,000 • Most often used in homes, sometimes used at workplaces 	<ul style="list-style-type: none"> • Mid-High Power AC • 208/240-volt (V) AC circuit or 20-100 amperes (A) • 10-20 miles of range per hour of charge • EVSE unit cost range: \$400-\$6,500 • Installation cost: \$600-12,700 (~\$3,000 average) • Used in homes, workplaces, and for public charging 	<ul style="list-style-type: none"> • DC Fast Charging • 208/480-volt (V) AC 3-phase or 20-400 amperes (A) • 60-80 miles of range per 20 minutes of charge • EVSE unit cost range: \$10,000-\$40,000 • Installation cost: \$4,000-51,000 (~\$21,000 average) • Most often used for public charging, along heavy traffic corridors

Types of Connectors/Plugs

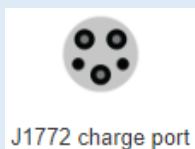
Level 1 & 2 - SAE J1772: Any vehicle with this plug receptacle can use any Level 1 or Level 2 EVSE. All major vehicle and charging system manufacturers support this standard, so your vehicle should be compatible with nearly all non-fast charging workplace and public chargers (right port shown in the picture on the right)

DC Fast Charging:

CHAdEMO: This is the most common DC fast charger plug (left port shown in the picture on the right)

J1772 combo: Can use the same charge port when charging with Level1, 2, or DC Fast Charging.

Tesla combo: This is a unique charge port for Tesla vehicles also called a supercharger.



Benefits of Hosting an EV Charging Station

Customer Attraction and Retention (Corporate Branding):

Offering charging is a direct way to attract and retain EV driving customers.

User Charging and Parking Fees: Charging-station hosts can generate revenue directly from people who use their services. There are various ways to collect revenue for charging such as subscription-based, pay-per-charge, and pay-for-parking systems.

Contribution to LEED Certification: Installing a charging station contributes toward attaining LEED (Leadership in Energy and Environmental Design) certification.

Value of Avoided Carbon Emissions: With a growing number of local and regional carbon-reduction policies, charging station owners may be able to benefit from the value of carbon emissions offset by their stations.

Increased Energy Security: Many station owners have an interest in promoting the energy-security benefits of EV's by making charging stations available.



EV Charging Station (EVSE) Charging Time Per Hour

Level 2 Charging when battery is at 0%									
Battery at 0%		% Charged Per Hour							
Charging Hours		1	2	3	4	5	6	7	8
Battery Size	100 kWh	7%	13%	20%	26%	33%	39%	46%	52%
	50 kWh	13%	26%	39%	52%	65%	78%	91%	104%
	25 kWh	26%	52%	78%	104%	-	-	-	-

Level 2 Charging when battery is at 50%								
Battery at 50%		% Charged Per Hour						
Charging Hours		1	2	3	4	5	6	7
Battery Size	100 kWh	57%	63%	70%	76%	83%	89%	96%
	50 kWh	63%	76%	89%	102%	-	-	-
	25 kWh	76%	102%	-	-	-	-	-

DC Fast Charging when battery is at 0%					
Battery at 0%		% Charged Per Hour			
Charging Hours		0.5	1	1.5	2
Battery Size	100 kWh	13%	25%	38%	50%
	50 kWh	25%	50%	75%	100%
	25 kWh	50%	100%	-	-



The tables on the left show how much % of the electric vehicle's battery will be charged per hour based on the level of charging (Level 2 or DC Fast) and the size of the battery (25, 50, or 100 kWh).

Costs associated with installing & operating EVSE

- Charging Level and Amperage Rating
- Charging Ports
- Type of Mounting System
- Networked or Non-Networked
- Connecting the EVSE to the Electrical Service
- Electricity Consumption Charges

Tips for Minimizing EVSE Unit and Installation Costs

EVSE Unit Selection

- Choose the EVSE unit with the minimum level of features that you will need.
- Choose a dual port EVSE unit to minimize installation costs per charge port.

Location

- Place the EVSE unit close to the electrical service to minimize the need for trenching and the costs of potential electrical upgrades.
- Use signage to direct EV drivers to the EVSE unit instead of locating it a great distance from the electrical panel.

Long Term Planning

- Contact your utility early in the planning stages to discuss electricity consumption and demand charges as well as electric services need. Avoid utility demand charges by balancing charging time windows with other electricity usage and working closely with your utility.
- Consider the quantity and location of EVSE that you plan to install over the next 10-20 years when installing your first unit. Upgrade your electrical service for your long term EVSE load and run conduit to your anticipated future EVSE locations. This will minimize the cost of installing future units.



Checklist for Installing a Public EV Charging Station

<input type="checkbox"/>	Types of EV Charging Equipment (EVSE)
<input type="checkbox"/>	Types of Connectors/Plugs
<input type="checkbox"/>	EVSE Charging Time Per Hour
<input type="checkbox"/>	Benefits of Hosting an EV Charging Station
<input type="checkbox"/>	Minimizing EVSE Unit and Installation Costs