Electric Vehicle Charging Level Options and Considerations

What You Need to Know

- Having a firm understanding of the different types of charging equipment and the appropriate use cases for different locations and user types is beneficial when considering EV charging.
- Choosing the appropriate equipment for your property should be taken with a sense of strategy in mind to keep user and operator satisfaction high for years to come, while minimizing costly future retrofits to meet charging demand.

Current Options

As of Spring 2025, the industry offers four levels of power and equipment for EV charging:

Type of EV Charging (Voltage Required)	Miles of Range per Hour	Miles of Range per 8-Hour Charging Session	Use Case
Level 1 Charging (L1) (120V circuit)	2-5 miles	20-40 miles	7+ Hours Overnight/All Day Parking Best for longer dwell times in residential, work, and school applications
Low-Power Level 2 Charging (LPL2) (208/240V circuit)	8-12 miles	50-150 miles	4-7+ Hours Overnight/All Day Parking Best for long dwell times in residential, work, schools, and some retail & public access applications
Level 2 Charging (L2) (208/240V circuit)	20-30 miles	150-240 miles	2-7+ Hours of Parking Best for medium to long dwell times in residential, work, schools, retail, public access, travel corridors, and fleet center applications
DC Fast Charger (DCFC or L3/Level 3 Charger) (480V, 3-phase power required)	100-200 miles	Typically, battery is 80% charged in <1 hour	<1 Hour Quick Charging Example: On the road charging or regular quick daily charging for drivers without access to L1 or L2 chargers

Pro Tip: Higher levels of charging will add range to EVs faster but will require greater electrical capacity to be installed at the premise, which can add costs to your project. Higher power charging can also incur higher electric rates if not properly managed.

The EV Charge SF Technical Assistance Team can guide you through equipment options and help your project team choose the best charger types for your needs.

Charging Needs

The appropriate EV charging equipment for your property varies depending on setting, EV users' charging needs and expectations, and how the EV is used.

Appropriate Charging Level	Dwell Time (Hours)					Setting				
	<1	1-2	3-6	7+		Fleet Center	Travel Corridor or Refueling Stations	Retail or Public	Work or School	Residential
DCFC						✓	✓			
L2						✓	✓	✓	✓	✓
LPL2								✓	✓	✓
L1									✓	✓

Smart Charging Equipment

Property Managers may want to consider purchasing smart charging equipment with capabilities such as advanced payment options, tracking, load management, time of use charging, and remote access. These "smart" technologies can improve the user experience as well as the operators' ability to minimize costs.

Future Charging Requirements to Consider

Property Managers are encouraged to consider the installation of ISO-15118 compliant chargers when selecting equipment. ISO-15118 provides a communication link to coordinate charging with local grid conditions and supports the exchange of data including estimated departure time, energy (kWh) needed by the vehicle, current electricity prices, current carbon intensity of local electricity, and other relevant information. While not required to qualify for EV Charge SF incentives, ISO-15118 compliance will enable participation in future load shifting, demand response, and other programs offered through the SFPUC, PG&E, and statewide.

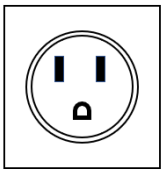
Charger Alternatives: Smart Outlets and Bring Your Own Cord (BYOC)

Installing L1 or L2 EV outlets in lieu of chargers can save on both project and operational costs due to lower upfront installation costs, fewer parts to maintain/replace, and likely reduced maintenance by in-house or contracted staff – especially in the case of "dumb" (i.e., non-networked) outlets. This outlet option requires drivers to bring their own charging cord, which can make sense in many residential or workplace settings, especially if energy use is not being actively tracked for billing purposes.

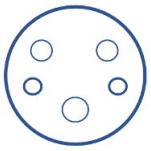
If the Property Manager still wants the capabilities of a smart L2 EV charger, "smart EV outlets" offer billing of users and some other capabilities, with the EV driver still bringing their own cord.

Standard Connector Types

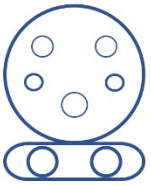
Most EVs come standard with a Level 1 “convenience charger” with a typical three-pronged NEMA 5-15 or 5-20 plug which can use a standard 120V wall outlet on a 15 Amp circuit. This “trickle charge” can provide ample charging to meet typical daily driving of most Americans.



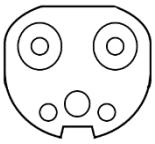
In North America, the standard EV connector (also known as a “plug”) has been the Society of Automotive Engineers (SAE) J-1772, more commonly referred to as the “J-plug”. The J-plug can be used for L1, LPL2, and L2 charging. At present, most EV chargers and new-car charger cords have this J-plug connector type, though an industry transition to the North American Charging Standard (NACS) is underway.



The Combined Charging System (CCS), or the DC Fast Combo, connector uses the J-plug plus two additional connectors at the bottom to provide direct current fast charging (DCFC, AKA “Level 3”). Only DCFC charging stations (those not in Tesla’s charger network) have this connector type.



The new SAE J3400, based on Tesla’s NACS charging connector, also allows L1, LPL2, L2, and DCFC charging. Recent decisions by most EV manufacturers to design new cars with the NACS inlet means those drivers will need adapters to charge at existing or new charging stations that use the J-plug or CCS connector.



Tesla drivers can already use an adapter to access EV chargers equipped only with J-plug or CCS connectors. Likewise, drivers of EVs with J-plug connectors can purchase an NACS-to-J-plug or NACS-to-CCS adapter to access NACS-type EV chargers. Using adapters, in addition to being less convenient, can limit some functionality of the charger; that said, adapters are now expected to be increasingly common for EV drivers.

Next Steps

Now that you’re familiar with the basic EV charging equipment options, the EV Charge SF program has additional fact sheets to help understand how to stretch your electrical capacity to serve more parking stalls, ownership options for EV charging equipment, and good questions to ask potential EV charging equipment vendors. See the EV Charge SF website.

Questions?

Contact **San Francisco Public Utilities Commission** at (415) 554-0773 or email PowerPrograms@sfwater.org

For more information about SFPUC’s **EV Charge SF program**, please visit our program website.

Prepared By: CLEAResult for SFPUC’s EV Charge SF Program