



Selecting the Right Plug-in Electric Vehicle Charging Equipment

Plug-in electric vehicle (PEV) owners and charging-site hosts have a lot to consider when selecting electric vehicle supply equipment (EVSE) – including site characteristics, budgets, and expected usage patterns. Below is information on the most common EVSE levels, features and options available today.

Selecting the Right Charging Level

A practical approach for selecting the appropriate charging level is to match charging speed with expected user needs. Relatively low mileage and/or long parking durations are suitable for AC Level-1 charging. AC Level-2 charging should be matched with shorter parking durations of one to four hours and/or longer mileage, and DC-fast charging Levels 1 and 2 belong with high expected mileage and very short parking durations.

Charging Levels

| AC Charging – Home and Public Use | | | DC Charging – Public and Large Fleet Use | |
|---|--|---|--|----------------------------------|
| Type | Level 1 | Level 2 | Level 1 | Level 2 |
| Power | 120V, 1.4 kW @ 12 amp 120V, 1.9 kW @ 16 amp | 240V, up to 19.2 kW (80 amp) | 200–500V, up to 40 kW (80 amp) | 200–500V, up to 100 kW (200 amp) |
| Charge Time (Miles of range per hour charged) | 3 to 5 miles | 3.3 kW – 10 to 14 miles 6.6 kW – 20 to 25 miles 9.6 kW – 40 to 45 miles 19.2 kW – up to 60 miles | 40 kW – up to 120 miles | 100 kW – up to 300 miles |

AC Level-1 Charging

AC Level-1 EVSE can recharge the battery of an electric car within four to eight hours if it is driven less than 30 miles per day. Drivers plug their cars into a standard electrical outlet (NEMA 5-15R or 20R) using the portable Level-1 EVSE cord set that comes standard with the car. Alternatively, site hosts can purchase and install hardwired Level-1 charging equipment that is permanently affixed to the building or post-mounted at the parking space. AC Level-1 charging is the least expensive and most available charging option since 120-volt outlets are so readily available, and the portable/modular equipment comes standard with the vehicle.

AC Level-2 Charging

AC Level-2 EVSE can recharge the batteries of most PEVs two- to four-times faster (or more) than Level-1. Level-2 charging is appropriate for battery-electric vehicle (BEV) drivers who routinely surpass 40 miles per day. It is also practical in certain public venues, where users are typically parked for relatively short durations – while shopping, dining, attending events, etc.

Depending upon the venue and typical mileage of users, a PEV could be parked at a Level-2 charging station for many more hours than is necessary to charge the car. This is suboptimal and can be avoided by using Level-1 charging equipment in locations with long park times. Alternatively, policies can encourage vehicle turnover at a Level-2 charging station, such as charging a fee based on time connected or providing a valet service.

DC-Fast Charging – Levels 1 and 2

DC-fast charging can recharge PEVs in minutes; most vehicles capable of a DC-fast charge today can refuel 80 percent in 30 minutes or less. DC-fast charging is a practical choice along major highway corridors, allowing BEVs to travel beyond their range and plug-in hybrid electric vehicle (PHEV) or extended-range electric vehicle (EREV) drivers to maximize their electric



range, while minimizing gasoline consumption. DC-fast charging can also be practical in major destination locations, such as sporting arenas, theme parks or in major downtown areas where there is a high concentration of multi-unit dwellings (where residential/home charging is a challenge, if not impossible). Because of the high installation and ongoing electrical demand charges, DC-fast charging locations should be carefully selected based on an expected high volume of usage.

Equipment Features and Options

EVSE come with many features and options depending upon the needs and requirements of the site.

Modular vs. Hardwired

AC Level-1 and Level-2 EVSE are available as:

- » **Modular or portable charging equipment**, which is plugged into an electrical outlet dedicated for that purpose. Most PEVs on the market today come equipped with a portable AC Level-1 EVSE.
- » **Permanent or hardwired units**, which are affixed to the home or business' electrical system. These have the capability of coming with more advanced features.

Dual and Quad Units

Some EVSEs can connect up to four cars at once – even at different charging levels. While power requirements are the same, savings are achieved on the equipment, mounting and installation costs.

Cord System

Cords need to be put away for safety reasons when not in use. Most EVSE installed today have a hook or bracket for hanging/wrapping the cord. Some manufacturers offer retractable or suspended cords – which also present fewer safety hazards (i.e. tripping).

Network Communications – Smart Charging Equipment

Smart and networked charging equipment features can include:

- » Advanced, customizable displays
- » Notifications and reports to site operators
- » Remote software upgrades
- » Two-way communications with utility
- » Charging status notifications
- » User reservation services
- » Fee collection and user authorization
- » Advertising and marketing displays

Lighted Screens

Some EVSE offer lighted display screens, which is a good feature if adequate parking lot or garage lighting is unavailable. However, not all lighted screens are suitable for direct sunlight.

Circuit Reclosure

Some charging stations offer a reclosure circuit that automatically restarts charging after a power interruption.

Questions? For additional information and resources on vehicle siting, please visit:

Web: www.FPL.com/electricvehicles | www.DriveElectricFlorida.org

Email: electric-vehicles@FPL.com | Help@DriveElectricFlorida.org

Equipment Selection Checklist

Charging Level

- | | |
|----------------------------------|----------------------------------|
| AC Power | DC Power |
| <input type="checkbox"/> Level-1 | <input type="checkbox"/> Level-1 |
| <input type="checkbox"/> Level-2 | <input type="checkbox"/> Level-2 |

Mounting Style

- | | |
|-----------------------------------|-------------------------------|
| <input type="checkbox"/> Pedestal | <input type="checkbox"/> Pole |
| <input type="checkbox"/> Ceiling | <input type="checkbox"/> Wall |
| <input type="checkbox"/> Post | |

Type

- Modular (portable)
- Hardwired (permanent)

Access Controls

- None: open access
- Restricted
 - RFID Card
 - Key code
 - Credit Card/Card Swipe
 - Other

Smart Features

- Customizable displays
- Reporting
- Remote software upgrades
- Status notifications
- User reservation services
- Fee collection
- User authorization
- Advertising display, messages
- Other

Other

- Customized wrap, branding
- Cord type
 - Standard
 - Coil
 - Retractable
 - Overhead
- Circuit reclosure