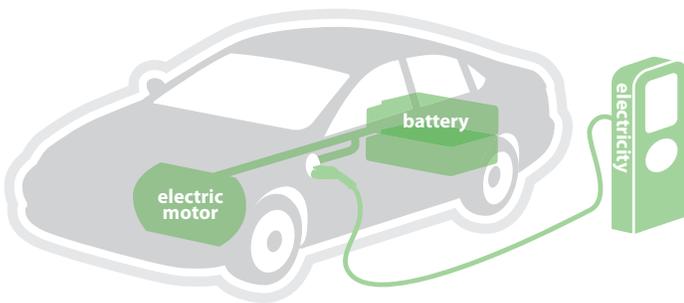


The Basics: A Guide to Plug-in Electric Vehicles and Charging Infrastructure

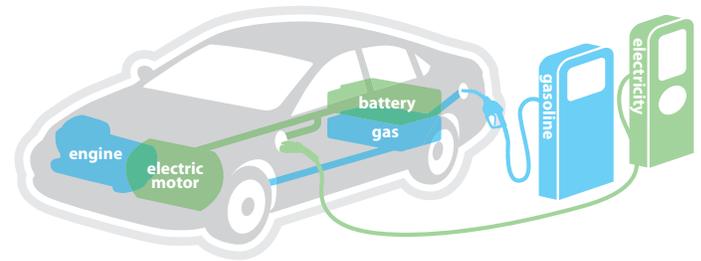
What is a Plug-in Electric Vehicle?

A plug-in electric vehicle (PEV) is a vehicle fueled at least partially by an onboard battery charged from the electrical grid. There are two types of PEVs that are commercially available: battery electric vehicles and plug-in hybrid electric vehicles.

A **battery electric vehicle (BEV)** is a fully electric vehicle fueled only by the onboard battery. Most BEVs available on the market have a range of approximately 60-100 miles on a full charge.



A **plug-in hybrid electric vehicle (PHEV)** uses both an onboard battery charged from the electrical grid and gasoline. After battery power dips below a specific charge threshold, the vehicle seamlessly switches to gasoline power.



PEVs are not limited to light-duty passenger vehicles. There are many trucks and heavy-duty vehicles that also run on electric power. For a complete list of heavy-duty electric vehicles and drivetrains, visit the Department of Energy's [Alternative Fuels Data Center \(AFDC\)](#) website.

How Do You Charge a PEV?

The time needed to charge a PEV depends on factors such as the size of the battery, the battery's initial state of charge, the size of the onboard charger and available power from the charging station. In general, BEVs have a larger battery compared to PHEVs. Both the onboard charger and available power from the charging source determine the vehicle's specific rate of charge. DC fast charging is often referred to as "Level 3 charging" and uses direct current to charge PEVs. It typically provides the fastest PEV charging times available.

Type of Charging	Power Levels (installed circuit rating)	Miles of Range per Hour of Charge*	Where to Charge
Level 1	110/120 VAC at 15 or 20 Amps	~4–6 miles/hour	Standard three-pronged outlet
Level 2 3.3 kW (low) 6.6 kW (medium) 9.6 kW (high) 19.2 kW (highest)	208/240VAC at 30 Amps 208/240VAC at 40 Amps 208/240VAC at 50 Amps 208/240VAC at 100 Amps	8-12 miles/hour 16-24 miles/hour 32-48 miles/hour >60 miles/hour	At home, workplace or public charging station
DC Fast Charging	440 or 480 VAC	~80% in < 30 min.	Public or commercial sites

* Refer to vehicle specifications for exact ratings.

Source: Adapted from PEV Collaborative MUD Guidelines

Types of Charging Equipment

Level 1 charging infrastructure consists of a charging cord set that comes standard with every PEV. The charging cord can be plugged into any standard three-pronged, 120-volt outlet.

Level 2 charging infrastructure consists of a designated charging unit (known as electric vehicle supply equipment, or EVSE) that plugs into or hardwires into a 208/240-volt circuit.

There are two common types of Level 2 installation styles.

Level 2 Installation Style	Installation Method	Considerations
Floor mount (bollard style)	Mounted to the ground and wired through the base	Generally requires concrete work along with underground trenching
Wall/Pole mount	Installed on any wall or pole and can be wired through a garage wall	Offers flexible placement options and takes up less floor space than a floor mount



Where are Public Charging Stations?

Publicly available charging locations in the San Joaquin Valley can be found easily online through the AFDC's station locator at www.afdc.energy.gov/locator/stations/ and by mobile apps such as PlugShare (www.plugshare.com/).

The map displays Level 2 charging station locations in the San Joaquin Valley as of March 2014.

DC fast charging infrastructure is complex and requires commercial-grade electrical capacity. The equipment can cost more than \$10,000, and installations of a single unit can cost up to \$50,000.

