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Electrical Car Charging Station Information

With the growing adoption of plug-in electric vehicles (PEVs) there is increasing need for installing both residential and commercial charging stations, also known as electric vehicle supply equipment (EVSE).



Please read this information for homeowners and electrical contractors about residential and commercial EVSE permitting requirements.

How can I charge my plug-in electric vehicle at home?

The type of PEV purchased will determine the way people charge their vehicles. Homeowners may plug their vehicles into a conventional 120-volt household outlet or install a 240-volt circuit for faster charging. PEVs come with a 120-volt charging cord that enables owners to charge their vehicle with a conventional outlet (Level 1 charging). This is a very practical solution for owners of plug-in hybrid electric vehicles (PHEVs), such as a Toyota Plug-in Prius or Chevrolet Volt.

Someone who purchases a battery electric vehicle (BEV), such as the Nissan Leaf, may choose to use a Level 2 charging station. Level 2 chargers use 240 volts and cut the charging time by about one-half compared with 120 volt charging. Level 2 charging generally requires installation of a dedicated circuit and a charging station at your home (usually in the garage). In this case, the homeowner will be required to obtain a permit from their local jurisdiction.

The following table illustrates the charging time associated with the most popular BEVs and PHEVs on the market.

Charging Level	Power Supply	Charger Power	Miles/Hour of Charge	Type of PEV	
				Nissan LEAF	Chevrolet Volt
Level 1 	120 VAC	1.4 kW (onboard charger)	~3–4 miles	~17 hours	~9 hours
Level 2 	240 VAC	3.3 kW (onboard charger)	~8–10 miles	~7 hours	~3 hours
		6.6 kW (onboard charger)	~17–20 miles	~3.5 hours	~1.5 hours

Source: California PEV Collaborative

Basic Charging Station Circuit Requirements

In accordance with the National Electrical Code (NEC), all residential plug-in vehicle charging circuits are required to (or should) include the following:

Circuit Breaker

Level 1 — A 15- or 20-amp, single-pole breaker is required.

Level 2 — A 40-amp, two-pole breaker and dedicated circuit are necessary.

Electric Vehicle Charging Stations

Level 1 — A 15- or 20-amp standard residential wall plug and receptacle are acceptable for 120-volt charging.

Level 2 — According to the NEC, installation of 240-volt electric vehicle charging station should be wired permanently to the electrical supply circuit.

The charging station may vary in design, depending on the manufacturer and vehicle type, but it must meet specifications set forth in the NEC. These specifications include:

- Equipment that is listed and labeled
- A connector in compliance with Society of Automotive Engineers standard J1772
- Ground fault protection
- Diagnostic capability to prohibit charging from taking place when the batteries or vehicle is damaged or an unsafe condition exists
- An interlock that de-energizes the charging cable when the vehicle is disconnected from the charging station or if excessive strain is placed on the cable/cord

You should check with the auto manufacturer to determine what type of plug-in vehicle charging station is required, and should consult local code officials to determine specific installation requirements.

What do I need to provide to obtain an installation permit?

PEV owners and contractors are encouraged to check with City of Lakeport's Community Development Department – Building & Safety Division for permit requirements. Owners will need to visit the permitting office for an over-the-counter review and permit issuance.

If all of the information is provided and the proposal complies with the applicable codes, the review and approval process occurs shortly thereafter. It is important to note that load calculations per California Electrical Code (CEC), Article 220, are required if the existing service panel is rated less than 200 amps. Electrical panel upgrades and electrical wiring must be in conformance with the current edition of the CEC.

Commercial EVSE Permits

Installation of EVSE at commercial locations can be more complex than residential installations and may require additional permits or submittal documentation. The following are considerations for commercial EVSE.

- Zoning Requirements
- Community or Design Guidelines
- Existing Use Permits
- Electrical Source/Metering
- Parking and Signage Requirements
- Permit and Inspection Fees

A simple commercial EVSE installation may have similar permitting requirements as a residential installation with the addition of a tenant improvement electrical permit. A more complex commercial installation may require a modification to an existing use permit or site plan addressing specific community or zoning design criteria. It is important to meet with staff at the Lake County's building department and, if necessary, planning department, to understand fully all of the requirements and fees prior to submitting permits.

Do I need to get my charging station inspected by the permitting jurisdiction?

Simple answer is yes. When the installation is complete, an inspection of the work is scheduled with the building inspector upon request. Generally, inspections occur less than one week after the request. Typically, the homeowner or property owner (or tenant) needs to be present during the inspection so that the inspector can access the charging station location and review any other electrical or structural change.

Residential Installations

Installing residential EVSE may require changes to the home's electrical wiring and prompt selecting different utility electricity rates.

Commercial Installations

Commercial EVSE installations are often specific to the location and the proposed use. It is advisable to consult the permitting and/or planning agency before breaking ground.

When installing a home or commercial charging station, property owners are encouraged to choose a local electrical contractor with the proper expertise, information, tools and training for installing EVSE to ensure a high-quality and efficient installation experience. Please reference the wiring methods based on the California Electrical Code.

Why would PG&E need to know about your charging station?

Pacific Gas & Electric (PG&E) needs to accurately track the number of PEV charging stations installed to properly plan for local increases in electricity demand due to vehicle charging. The combined effect of several chargers in the same area could result in overloads on utility secondary wires and transformers. Therefore, utility notification is an important component of providing safe, reliable electricity to all PG&E customers. PG&E can help businesses understand pricing options and identify potential EVSE rebates and incentives.

Permits

The City of Lakeport's Building and Safety Division should be consulted to determine specific requirements. If an electrical contractor is hired to perform the work, it is still the homeowner's responsibility to ensure that the appropriate permits have been obtained.

Inspections

If permits are required, the permit inspection must be completed prior to activation of the new charging circuit for the plug-in vehicle. It is the homeowner's responsibility to verify that all required inspections are completed satisfactorily.