

## ELECTRICAL VEHICLE CHARGING AT HOME

If the location of existing outlets is not convenient for vehicle charging, consider having new wiring and outlets installed in strategic locations in your garage.

The following elements of your home's electrical system should be evaluated to see that they are adequate for EV charging:

- **Electrical service:** This includes the utility lines and electric meter, which are owned and controlled by the local electric utility.
- **Electrical panel:** This regulates the flow of electricity to individual circuits in your home.
- **Premises wiring:** The wiring delivers electricity from the panel to the circuit that services either a 120-volt outlet (Level 1) or the EV power supply device (Level 2).

A licensed electrician can determine if an upgrade is needed to support an electric vehicle charging system and work with your utility. Check with your local building department about permit requirements if you need to make any changes to your electrical service, wiring, or outlets.

More information on electrical vehicles is available at:

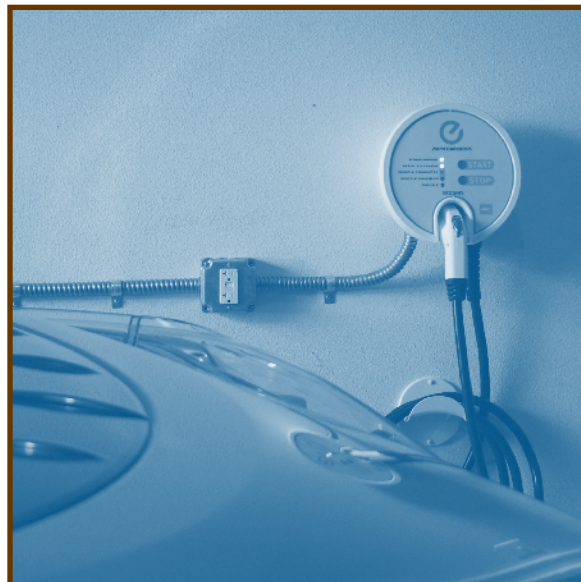
- **Oregon Building Codes Division (BCD):**  
<http://www.cbs.state.or.us/external/bcd/programs/green.html>
- **List of state and federal tax credits, Plug in America:**  
<http://www.pluginamerica.org/why-plug-vehicles/state-federal-incentives>
- **Charging station locations:**  
[http://www.afdc.energy.gov/afdc/fuels/electricity\\_locations.html](http://www.afdc.energy.gov/afdc/fuels/electricity_locations.html)
- **Oregon Transportation Research & Education Consortium (OTREC):**  
<http://evroadmap.org/>
- **Charge Portland:**  
<http://chargeportland.com>
- **Oregon Electric Vehicle Association (OEVA):**  
<http://www.oeva.org/>
- **Electric Drive Transportation Association:**  
<http://www.electricdrive.org/>
- **Portland General Electric (PGE):**  
[http://www.portlandgeneral.com/community\\_environment/initiatives/electric\\_vehicles/default.aspx](http://www.portlandgeneral.com/community_environment/initiatives/electric_vehicles/default.aspx)
- **Pacific Power:**  
<http://www.pacificpower.net/env/ev.html>

- **The EV Project:**  
<http://www.theevproject.com/>
- **Oregon Dept. of Transportation:**  
[http://www.oregon.gov/odot/hwy/oipp/inn\\_ev-charging.shtml](http://www.oregon.gov/odot/hwy/oipp/inn_ev-charging.shtml)
- **Drive Oregon:**  
<http://driveoregon.org>

Department of Consumer and Business Services  
**Building Codes Division**  
1535 Edgewater St. NW  
P.O. Box 14470  
Salem, OR 97309-0404  
503-378-4133  
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# ELECTRICAL VEHICLE CHARGING AT HOME

HELPING YOU UNDERSTAND MORE ABOUT INSTALLING ELECTRIC VEHICLE CHARGING EQUIPMENT IN YOUR HOME

## FACTS ABOUT ELECTRIC VEHICLE (EV) CHARGING IN OREGON

Interest in alternative fueled transportation, including electric-powered vehicles, is growing in Oregon.

**The Hybrid Electric Vehicle (HEV)** is powered by an internal combustion engine, which produces electric power to charge on-board batteries, helping reduce gasoline consumption. The **Plug-in Hybrid Electric Vehicle (PHEV)** is a hybrid electric vehicle with additional battery capacity, allowing the car to travel limited distances on electric power alone. The **Battery Electric Vehicle (BEV)** is powered 100 percent by the battery energy storage system onboard the vehicle. Both the BEV and PHEV require the owner to charge the car's batteries by plugging into a charging unit.

Although there is a network of public charging stations popping up across the state, the first priority for EV owners is to be able to charge their cars at home. There are a number of options for purchasing EV charging equipment specifically made for home use. Home charging equipment can be available as part of the EV purchase or sold directly from charging equipment manufacturers.

This guide is designed to help you get started on installing a charging unit in your home.

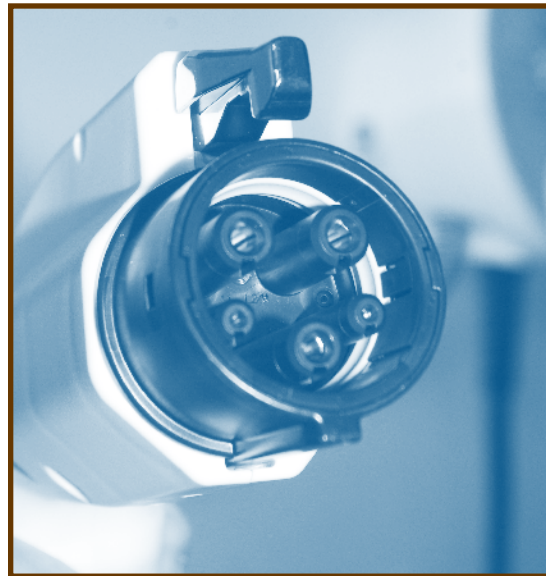
## THINGS TO CONSIDER

### CHARGING REQUIREMENTS

Check with the manufacturer's representative to find out what the charging requirements are for your electric vehicle or battery system.

Electric vehicle charging can be performed at three levels.

- **Level 1** uses 120 volts and takes roughly eight to 12 hours to fully charge a car's batteries.
- **Level 2** uses 240 volts and takes roughly six to eight hours to fully charge a car's batteries.
- **Level 3**, also known as DC fast charging, converts 208 volts or 480 volts into direct current (DC). While it can take as little as 30 minutes to fully charge a car's batteries, DC Fast charging technology is currently impractical for home-based charging units.



Here are some questions to ask the manufacturer:

***What levels of charging can the vehicle use?***

***Does the vehicle or battery system require ventilation during charging?***

***How long will it take to fully charge the batteries?***

***What recommendations does the manufacturer have for home charging unit locations?***

## PURCHASING OPTIONS

You can purchase the basic charging equipment or participate in a program that might include other services for your vehicle. The cost of the charging equipment, installation, and subscription programs will vary.

Be sure to research the availability of state and federal tax credits for both the vehicle and the charging unit.

## PERMITTING AND INSTALLATION

In Oregon, charging stations can be installed by the homeowner with a homeowner's electrical permit or by a licensed electrical contractor. Make sure you or your contractor obtain required permits and inspections from your local building department.

## EVALUATING YOUR HOME FOR CHARGING EQUIPMENT

Check with your electrical utility or a licensed electrical contractor to make sure the existing electrical service in your home is adequate to support the additional load of the charging equipment. With this information, you may decide to upgrade your service. Then, you can decide on a safe and convenient location for your charging equipment.

Many homes already have sufficient electrical capacity to accommodate Level 1 or 2 charging units.

- **Level 1 charging** uses a regular three-prong 120-volt outlet
- **Level 2 charging** uses 240 volts, the same voltage as most electric clothes dryers or kitchen stoves



## THE HOME CHARGING EQUIPMENT

HOME CHARGING EQUIPMENT IS MADE UP OF THE FOLLOWING KEY COMPONENTS:

- **Power Supply Device (charging station):** For Level 2 charging, this is a piece of equipment that mounts on your garage wall to safely supply 240 volts of electrical power.
- **Power cord:** For Level 1 and Level 2 charging, this cord or cable conducts electricity from the power supply device to the charger or receiving unit onboard the vehicle.
- **Connector:** This is a plug on the power cord that connects the supply device to the onboard charger. The Society of Automotive Engineers (SAE) has approved the J1772 "Electrical Vehicle Conductive Charge Coupler" as the national standard for charging equipment connectors. All electric vehicles sold in the United States come equipped with an SAE J1772 plug that can accommodate both Level 1 and Level 2 charging.