



Electric Vehicle (EV) Ready Residential Installation Requirements

Developed by Energy Trust of Oregon

Revisions

Energy Trust updates these installation requirements as needed. We are thankful to the industry members, trade allies, and technical specialists that have invested their time to help keep this document current. Revisions from the previous version are summarized in the table below.

Section	Revision Summary
1.10	Changed the requirement for the breaker protecting the EVSE circuit to be located at the opposite end of the panel busbar from the main service feeder into a recommendation.
1.11-1.23	Updated numbering.
1.12	Removed the requirement that the 4-by-4-inch recessed, deep junction box be made of metal.
1.15	Corrected figure number reference.
Figure 1	Updated the graphic that highlight the dedicated branch circuit.
1.19.2 – 1.9.3	Updated language to accommodate electric vehicle supply equipment (EVSE) installed at time of construction in Pacific Power territory, that is in alignment with their new rebate for home EV chargers, which launched on June 2, 2022.
1.23	Corrected figure number reference.
OVERVIEW	Added an EV ready residential installation requirements overview to support field discussions about the requirements.

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Purpose

Residential electric vehicles (EVs) charge using electric vehicle supply equipment (EVSE) commonly known as EV chargers. Most drivers of plug-in electric vehicles - which include all-electric vehicles and plug-in hybrid electric vehicles - charge their vehicles overnight at home¹. Level 1 EVSEs charge EVs using 120-volt circuits at a relatively slow charging rate and may not be able to fully charge many popular EVs - even when parked overnight. Level 2 EVSEs charge EVs using dedicated 240-volt circuits and can easily charge long-range vehicles while parked overnight, allowing homeowners more flexibility to choose when they charge to take advantage of lower time of use electricity rates during off peak hours. Level 2 EVSE can be powered either by using a plug (e.g., NEMA 14-50) or through a hardwired connection.

There is no standard charging port location on EVs. Currently, charging ports can be found just above the front bumper or near the rear fender on either the driver or passenger side of the vehicle. To accommodate a variety of port locations, these guidelines anticipate that EVSEs are equipped standard with a 24-foot charging cable.

These requirements ensure that new homes are ready for the installation of a Level 2 EVSE. The costs of installing the required electrical infrastructure are considerably less when planned for at the time of home construction.

General Requirements

- 1.1 Installation site must be grid-connected and installed on real property in Oregon that receives electrical service directly from Portland General Electric (PGE) or Pacific Power.
- 1.2 The installation must be of industry standard and workmanlike quality.
- 1.3 Equipment installers must be licensed according to the Oregon Building Codes Division and work for a contractor licensed according to the Oregon Construction and Contractors Board.
- 1.4 Dissimilar metals that have galvanic action (such as aluminum and steel) must be isolated from one another using industry standard practices (such as brass unions or nipples, non-conductive shims, washers or other methods).
- 1.5 Aluminum must not be placed in direct contact with concrete materials.
- 1.6 All installed system components must be new.
- 1.7 All components must be mounted securely.
- 1.8 Equipment must not be modified such that it voids the listing or manufacturer warranty.

¹ U.S. Department of Energy – Charging at Home (https://afdc.energy.gov/fuels/electricity_charging_home.html).

Electric Vehicle Ready Electrical

Homebuilders who wish their homes to qualify for EV ready incentives shall:

- 1.9 Follow all applicable codes, standards, and regulations.
- 1.10 Install one 240 volt, 50 ampere dedicated branch circuit to accommodate a future Level 2 EVSE. The breaker protecting that circuit should be located at the opposite end of the panel busbar from the main service feeder.² The breaker must be clearly labeled “Reserved for EV Charger”³ as shown in Figure 1.

NOTE: Energy Trust recommends that the breaker protecting the EVSE circuit be located at the opposite end of the panel busbar from the main service feeder to accommodate the potential for future vehicle-to-home capabilities.
- 1.11 Serve no other circuits with the EVSE breaker.
- 1.12 For an interior installation, the branch circuit must terminate at a NEMA 14-50 outlet that is installed in a 4-by-4-inch recessed, deep junction box and mounted 36 inches above the finished floor. The box must be clearly labeled “Reserved for EV Charger,”³ as shown in Figure 1.
- 1.13 For an exterior installation, the branch circuit must terminate at an outdoor rated NEMA 14-50 outlet, listed for the environment, and mounted 36 inches above the ground. The box must be clearly labeled “Reserved for EV Charger,”³ as shown in Figure 1.
- 1.14 Leave 36-inches above, 24-inches to either side and 24-inches in front of the outlet unobstructed to allow for the future installation of wall-mounted EVSE, as shown in Figure 1.
- 1.15 Locate the outlet, for either interior or exterior installations, such that a connection can be made between the location of the outlet and any location within the adjacent parking area assuming a maximum 24-foot EVSE cord, as shown in 3.
- 1.16 Document all structural and electrical accommodations on the building plans.
- 1.17 Clearly post label on or near the electrical panel stating that “This home is EV Ready.”³

² To accommodate the potential for future vehicle-to-grid or vehicle-to-home charging.

³ Energy Trust New Homes program will provide label. EPS verifier must affix label. Contact Energy Trust New Homes for labels at eps@energytrust.org.

Figure 1. Example outlet placement height in relation to finished floor. Leave 3 feet above, 2 feet to either side and 2 feet in front of the outlet unobstructed to allow for the future installation of wall-mounted EVSE.

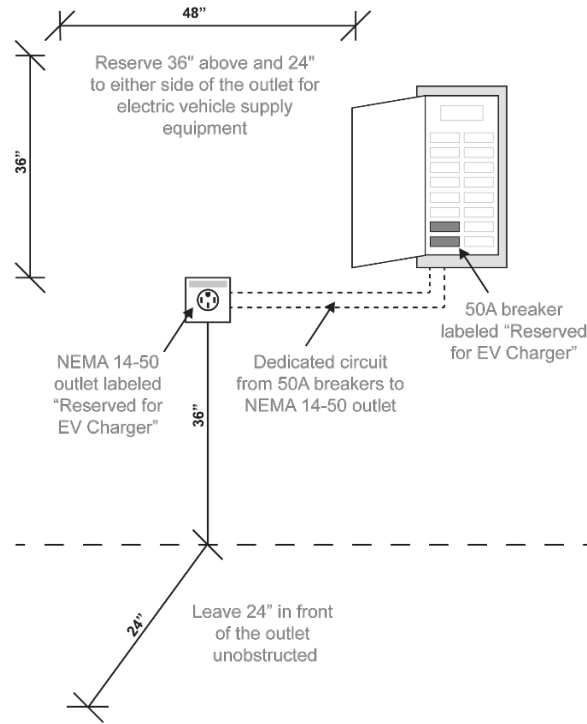
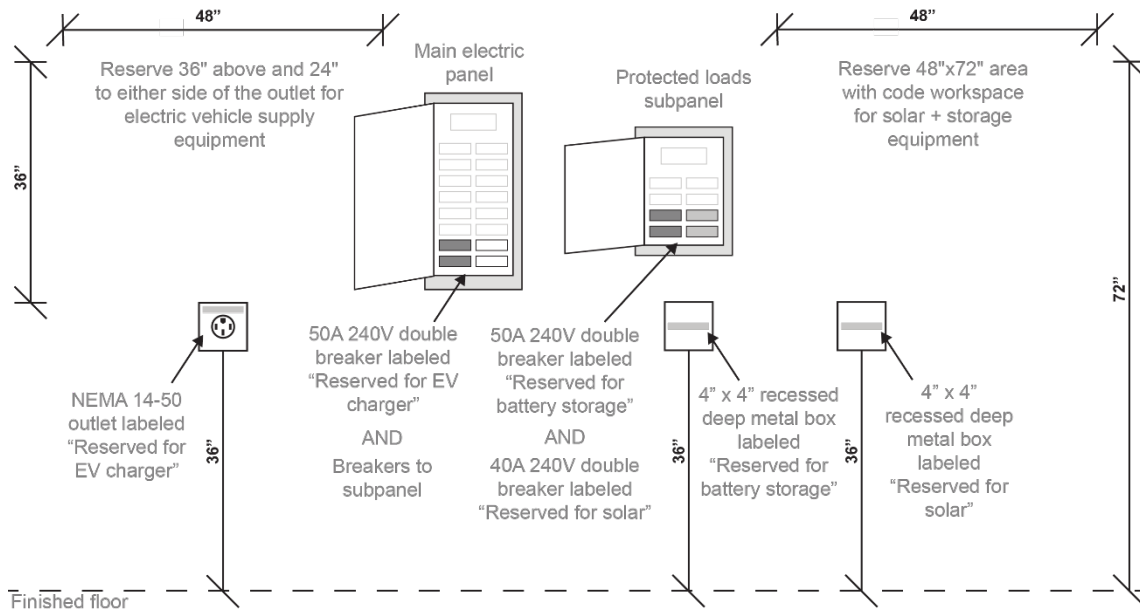


Figure 2. EV Ready and Solar + Storage Ready⁴ Best Practices



⁴ Energy Trust of Oregon Solar Ready & Solar + Storage Ready Residential Installation Requirements available at: <https://insider.energytrust.org/programs/eps-new-construction/solar-storage-ready/#resources>

Electric Vehicle Charger Installed Electrical

Homebuilders may be eligible for the EV Ready incentive by installing a qualifying EVSE at the time of construction. The equipment selected and installation shall meet the following requirements to be eligible:

- 1.18 Follow all applicable codes, standards, and regulations.
- 1.19 Select a Level 2 EVSE to be installed at the time of construction from one of the following lists:
 - 1.19.1 Listed as “Network Protocol Capable” on the ENERGY STAR Certified Electric Vehicle Chargers List⁵.
 - 1.19.2 Listed on Portland General Electric’s qualified product list⁶ for the Residential EV Charging Pilot Program rebate – if home receives electrical service from PGE.
 - 1.19.3 Listed on Pacific Power’s qualified product list⁷ for the Residential EV Charging Pilot Program rebate – if home receives electrical service from Pacific Power.
- 1.20 Install a dedicated branch circuit that meets manufacturers requirements. The breaker protecting that circuit shall be located at the opposite end of the panel busbar from the main service feeder⁸.
- 1.21 For interior installations, Level 2 EVSE installed at the time of construction shall be hardwired.
- 1.22 For exterior installations, Level 2 EVSE installed at the time of construction shall be hardwired.
- 1.23 Locate the installed EVSE, such that a connection can be made between the EVSE and any location within the adjacent parking area assuming a maximum 24-foot EVSE cord, as shown in Figure 3.

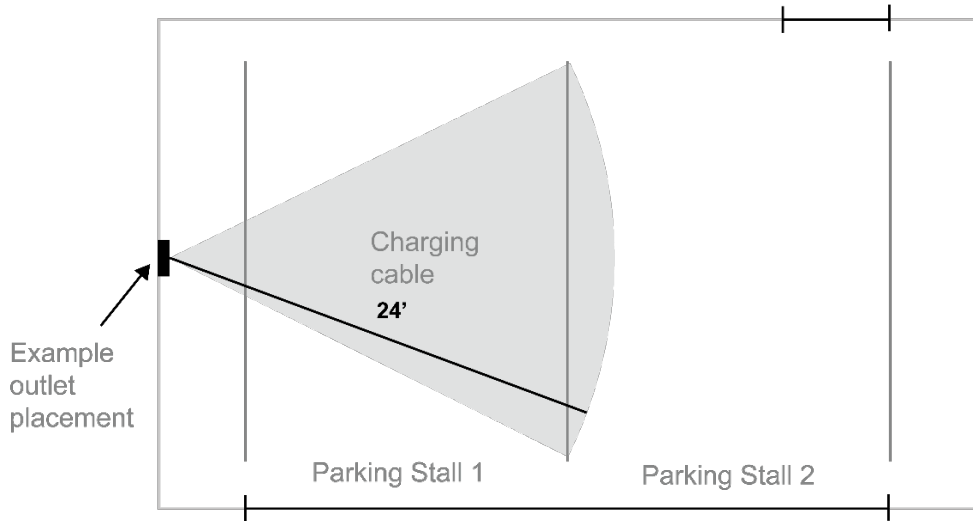
⁵ <https://www.energystar.gov/productfinder/product/certified-evse/>

⁶ <https://portlandgeneral.com/energy-choices/electric-vehicles-charging/charging-your-ev/ev-charging-pilot-program-home>

⁷ <https://www.pacificpower.net/savings-energy-choices/electric-vehicles/home-charger-rebates.html>

⁸ To accommodate the potential for future vehicle-to-grid or vehicle-to-home charging.

Figure 3. Example outlet placement in relation to adjacent parking stall. A standard 24-foot charging cable should be able to extend from the EV Ready Outlet and reach any location within the adjacent parking stall.



NOTE: This overview only reflects some key Energy Trust of Oregon electric vehicle (EV) ready residential installation requirements. All requirements must be followed to qualify for Energy Trust EV ready incentives.

- Dedicated 50A Breaker
 - Located at the opposite end of the panel busbar from the main service feeder
 - Labeled “Reserved for EV Charger”

- Dedicated branch circuit from 50A breaker to NEMA 14-50 outlet

- INDOOR or OUTDOOR
 - Indoor NEMA 14-50 Outlet**
 - Branch circuit terminates at a NEMA 14-50 outlet
 - Installed in a 4”x4” recessed deep metal box
 - Mounted 36” above the finished floor
 - Labeled “Reserved for EV Charger”
 - ... or ...
 - Outdoor NEMA 14-50 Outlet**
 - Branch circuit terminates at an outdoor rated NEMA 14-50 outlet, listed for the environment
 - Mounted 36” above the ground
 - Labeled “Reserved for EV Charger”

- NEMA 14-50 outlet located adjacent to the parking stall (in garage or beside driveway)

- Reserved 36”x48” area above the outlet left unobstructed for the future installation of wall-mounted EV charger

- Reserved 24” area directly in front of the outlet left unobstructed to ease use of EV charger

- Clearly posted label on or near the electrical panel stating that “This home is EV Ready”

