Solar Ready &
Solar + Storage Ready
Residential Installation Requirements

Developed by Energy Trust of Oregon

V2.4/2024

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
Purpose	Added links to Energy Trust Insider for Solar + Storage Design & Installation Requirements, and Energy Trust's solar + storage incentive requirements
1.14 - 1.19	Corrected section numbering.
1.15	Reworded for greater clarity.
1.15.1	Corrected section numbering.
1.20	Changed requirement to allow for installation of a smart main electrical panel instead of a subpanel for designated protected loads.
1.20.2.5	Recommended that circuits to be included in the protected loads subpanel to include internet router for WiFi.
1.21	Added requirement for reserved wall space for BESS on garage interior to be protected from impact per 2022 Oregon Structural Specialty Code (OSSC) 430.11.6.2 requirements.
Figure 5	Added Electrical Energy Storage System Vehicle Impact Protection graphic from 2022 OSSC.

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Purpose

Planning ahead for the installation of a solar or a solar + storage system can provide significant benefits to future homeowners. These requirements detail the minimum criteria for builders to receive solar or solar+storage ready design incentives through Energy Trust of Oregon's EPS™ New Construction program.

The purpose of this document is to ensure:

- Preliminary work done to make a home solar ready complies with Energy Trust's full Solar + Storage Design and Installation Requirements and will result in an easier and less costly installation of solar in the future. As a result, these specifications may exceed related codes.
- Preliminary work done to make a home solar + storage ready complies with Energy Trust's incentive requirements and will result in an easier and less costly installation of a solar and a battery energy storage system in the future.

As a result, these specifications may differ from those of a manufacturer or exceed applicable codes. Note that all solar + storage ready installations must be paired with an installed solar system or meet all solar ready installation requirements, and meet all solar + storage ready installation requirements.

Any variations from these installation requirements must receive prior approval from Energy Trust.

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 required to work for a contractor that is 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.

Solar Access & Solar Roof Area

1.9 The proposed future location on the roof of the solar modules (solar roof area) shall be included in the plan set or documented with a roof diagram that accurately describes the following:

1.9.1 Area reserved for the solar electric (photovoltaic, PV) array

1.9.2 Location of the pre-installed conduit

1.9.3 Setbacks from eaves or peaks, as required by Oregon Structural Specialty Code (OSSC) for firefighter access and egress pathways.

1.10 The Solar Roof Area must be located such that it can utilize 80 percent or more of the solar resource available at the site. This must be demonstrated using one of the following methods:

1.10.1 Total Solar Resource Fraction (TSRF) method: There must be no less than 80 percent TSRF at the Solar Roof Area, as verified with an approved shading analysis tool as described on the Energy Trust solar trade ally Forms and Resources webpage[1] (this method will require working with an approved Energy Trust Solar Trade Ally to calculate the TSRF).

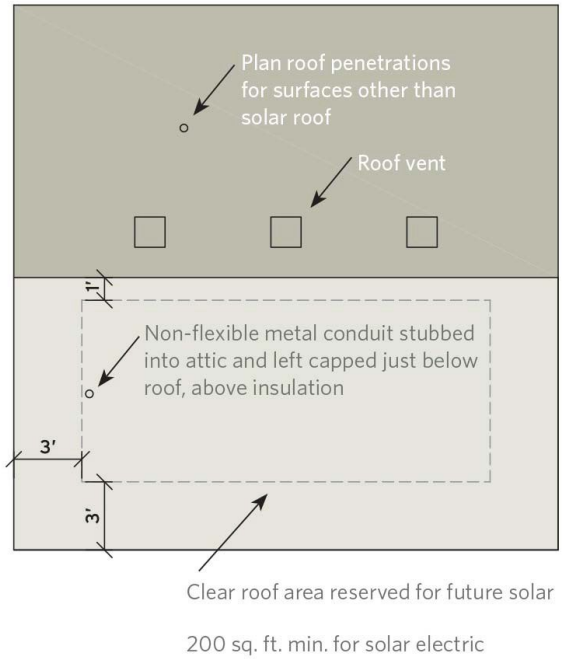
1.10.2 Prescriptive method: Solar Roof Area must have a roof pitch between 0/12 and 12/12, an orientation between east-southeast (113°) and west-southwest (248°), and be completely unshaded between the hours of 9 a.m. and 4 p.m. year-round.

1.11 The Solar Roof Area must be free from all obstructions that would interfere with the placement of panels including but not limited to chimneys, plumbing stacks, skylights, roof vents, gables, nearby overhangs, landscaping and future home construction.

1.12 To allow for Oregon Structural Specialty Code (OSSC) requirements for firefighter roof access pathways, the designated Solar Roof Area must be set back at least 3 feet from roof edges and 1 foot from ridges and roof valleys. When installed, the actual system may be located within this setback if allowed by code.

1.13 A minimum of 200 square feet of obstruction-free roof space must be reserved for the Solar Roof Area, taking into consideration real dimensions of solar modules.

Figure 1. Sample Solar Roof Area Best Practices



[1] https://insider.energytrust.org/programs/solar/forms-and-resources/ For more information, talk to your solar trade ally or contact Energy Trust's New Homes solar support at eps@energytrust.org.

Solar Ready Electric

1.14 A 36-by-36-inch area of wall space with code workspace clearance as near the electrical panel as possible must be reserved for the future mounting of solar equipment (e.g. an inverter, combiner panel and disconnect). If the reserved area is located on the exterior of the house, this area must be protected from sun exposure.

1.15 A ¾-inch or larger nonflexible metal conduit must be installed from an accessible attic/roof area at the Solar Roof Area to the space reserved for the inverter near the electrical panel. Each end of this conduit must be terminated in a 4-by-4-inch recessed deep metal box with a metal cover clearly labeled "Reserved for solar."[2] The 4-by-4-inch recessed deep metal box near the electrical panel must be mounted 36 inches off the finished floor. Conduit must include a pull string.

1.15.1 Alternate: In buildings where a single nonflexible metal conduit is impractical due to site limitations, two (2) #10 copper 3-wire metal clad (MC) cables must be installed from an accessible attic/roof area at the Solar Roof Area to the space reserved for the inverter near the electrical panel as described above. A minimum of 6 inches of free conductor shall be available in each 4-inch box.

1.16 All cables, conduit, and electrical boxes must be labeled[3], secured and supported according to code requirements and in accordance with their performance ratings. Conduit should have three or fewer 90 degree turns from the beginning to the termination.

1.17 Electrical panel that will be powered by solar must be sized to accommodate a minimum 40-amp solar feed and room must be reserved for a 40-amp double pole breaker on the opposite end of the panel busbar from the main service feeder for the future solar feed[4]. The reserved breaker space[4] must be clearly labeled "Reserved for solar." [2]

1.18 A sign or label must be clearly posted on or near the electrical panel stating "This Home is solar ready."[2]

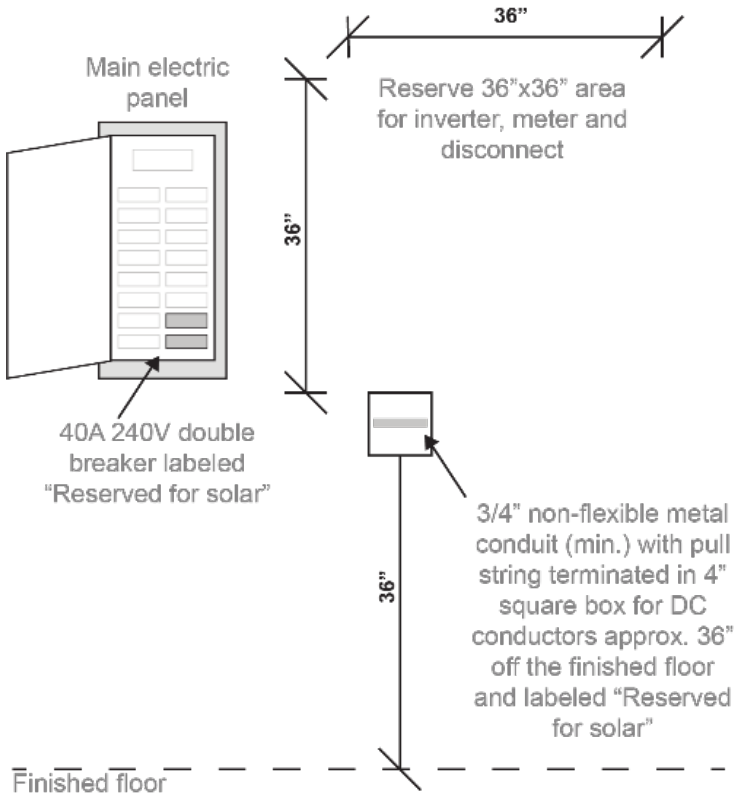
1.19 All structural and electrical accommodations shall be documented on the building plans.

[2] Energy Trust New Homes program will provide program-specific labels. EPS verifier must affix labels. Contact Energy Trust New Homes for labels at eps@energytrust.org.

[3] The electrical subcontractor is required to affix all labels required by the National Electrical Code (NEC).

[4] For solar + storage ready designs the reserved space for a 40amp breaker is located in the protected loads subpanel.

Figure 2. Example Solar Ready Equipment Spacing Requirements



Solar + Storage Electric

Solar + storage ready installations must be paired with an installed solar system or meet all solar ready installation requirements, and meet all solar + storage ready installation requirements.

1.20 Home must be configured to support a solar + storage system and provide the occupants with energy resilience in one of the following two ways:

1.20.1 Install a (e.g. Span) to support load shedding and management of protected loads

1.20.2 Install a subpanel for designated protected loads that is sized to accommodate the loads being served plus the inverter and the Battery Energy Storage System (BESS). The protected loads subpanel must be fed from a breaker located on the opposite end from the main service feeder on the main electrical panel. The protected loads subpanel must include reserved breaker space on the opposite end from the main service feeder for a 40-amp double pole breaker as described in the solar electric requirements above and must also include reserved breaker space for a 50-amp double pole breaker for the future energy storage system. The reserved breaker spaces on the subpanel must be clearly labeled “Reserved for Storage” and “Reserved for Solar.”[5]

In addition to the reserved breaker space for storage and solar, the protected loads subpanel will include, at a minimum, the following circuits:

1.20.2.1 Lighting circuits for the primary living area

1.20.2.2 Outlet circuits for the primary living area, including circuits for home communication where the WiFi router will be placed, if known.

1.20.2.3 Lighting circuits for the kitchen

1.20.2.4 Outlet circuits for the kitchen including the circuit intended for the refrigerator

1.20.2.5 Do <u>not</u> include on the subpanel any dedicated circuits for electric range, cooktop, dishwasher, garbage disposal, and/or microwave

1.21 A 48-by-72-inch area of wall space located next to the protected loads subpanel must be reserved for the future mounting of solar equipment, battery energy storage system (BESS) equipment and controls. If reserved wall space is located on garage interior, they must be protected from impact per OSSC 430.11.6.2 requirements (see Figure 5). If located on the exterior of the house, this area must be protected from sun exposure.

1.22 A 1-inch or larger flexible or nonflexible metal conduit must be installed from the bottom of the protected loads subpanel and the conduit must be terminated in a 4-by-4-inch recessed deep metal box with a metal cover clearly labeled “Reserved for storage.”[5]

1.23 A sign or label must be clearly posted on or near the protected loads subpanel indicating “This home is Solar + Storage Ready.”[5]

1.24 All structural and electrical accommodations shall be documented on the building drawings.

[5] 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 3: Example Solar + Storage Ready Equipment Spacing Requirements

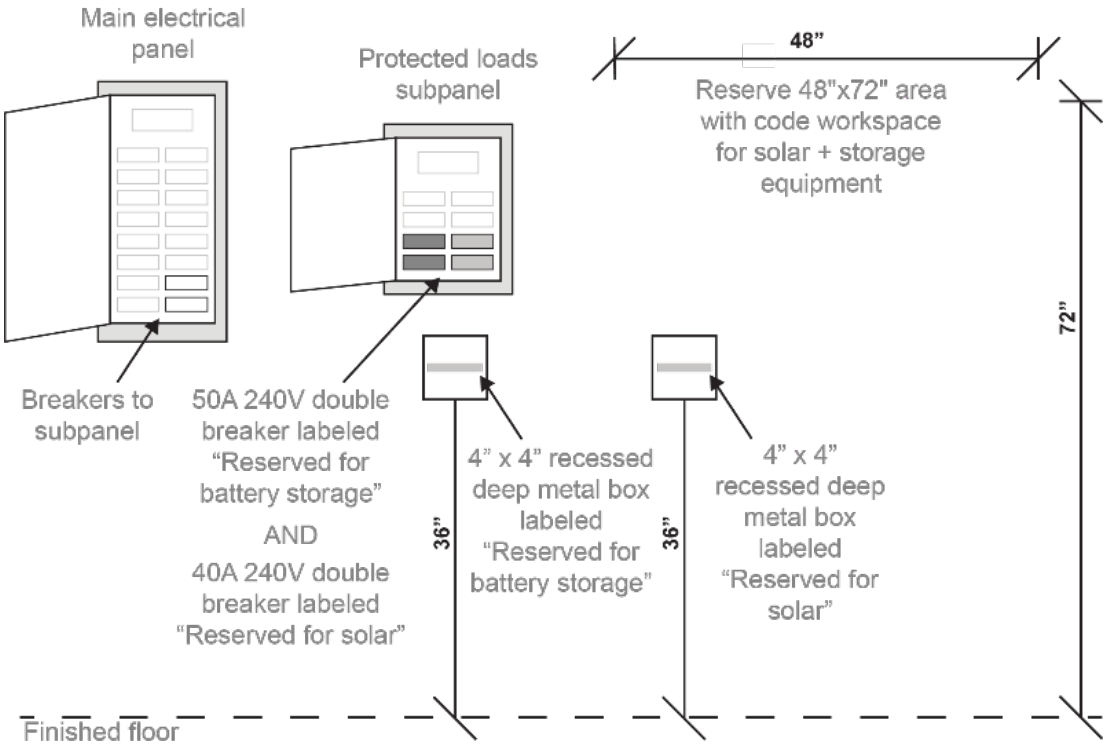
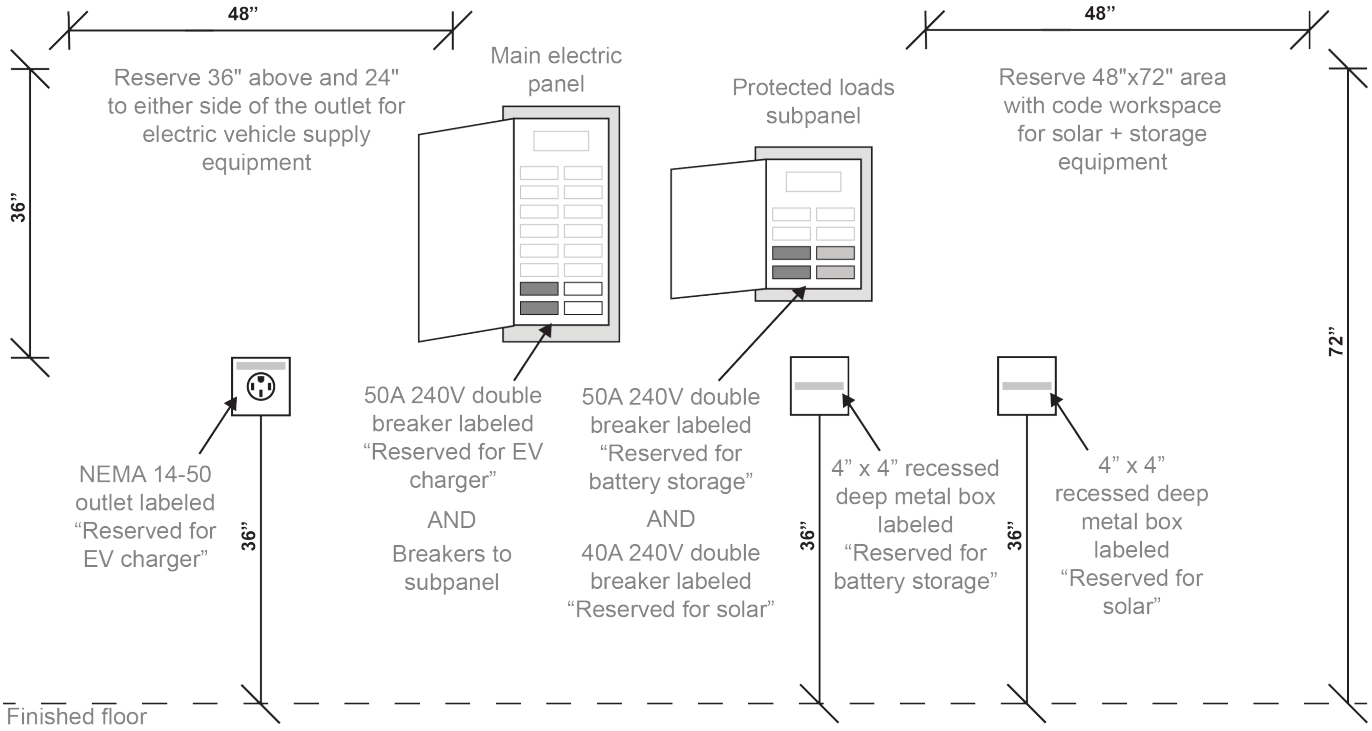


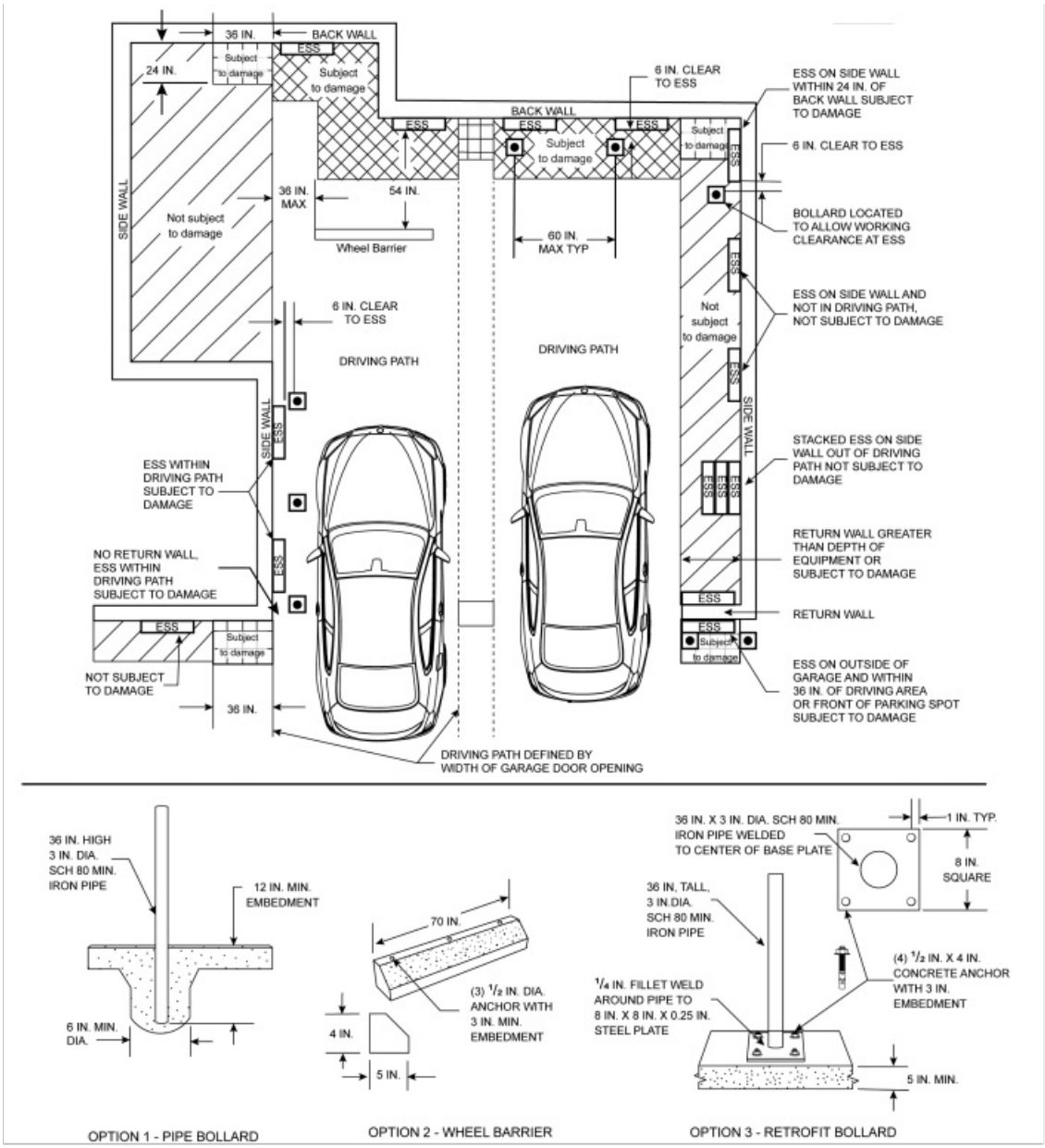
Figure 4: EV Ready[6] and Solar + Storage Ready Equipment Spacing Requirements



[6] Energy Trust of Oregon Electric Vehicle (EV) Ready Residential Installation Requirements available at: https://insider.energytrust.org/programs/eps-new-construction/ev-ready/#resources

Figure 5: Electrical Energy Storage System Vehicle Impact Protection[7]

NOTE: The following figure and its related requirements are reproduced from the 2022 OSSC. Please refer to the latest version of the OSSC for the latest version of these requirements.



[7] 2022 Oregon Structural Specialty Code Figure 430.11.6.2 ESS Vehicle Impact Protection requirements available at: [2022 OREGON STRUCTURAL SPECIALTY CODE WITH AMENDMENTS EFFECTIVE OCT. 2023 | ICC DIGITAL CODES (iccsafe.org)]