



Solar Ready & Solar + Storage Ready Residential Installation Requirements

Developed by Energy Trust of Oregon

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Purpose

Planning ahead for the installation of a solar electric system or a solar + storage system can provide significant benefits to future homeowners. This Solar Ready & Solar + Storage Ready Residential Installation Requirements document details the requirements and minimum criteria for solar electric and battery energy storage system components installed by builders through Energy Trust of Oregon's EPSTM New Construction program.

The purpose of the Solar Ready installation requirements is to ensure preliminary work done to make a home solar ready is in compliance with Energy Trust's full solar installation requirements and will result in an easier and less costly installation of solar in the future. As a result, these specifications may differ from those of a manufacturer or exceed applicable codes.

The purpose of the solar + storage ready installation requirements is to ensure that preliminary work done to make a home solar + storage ready is in compliance 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.

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

General

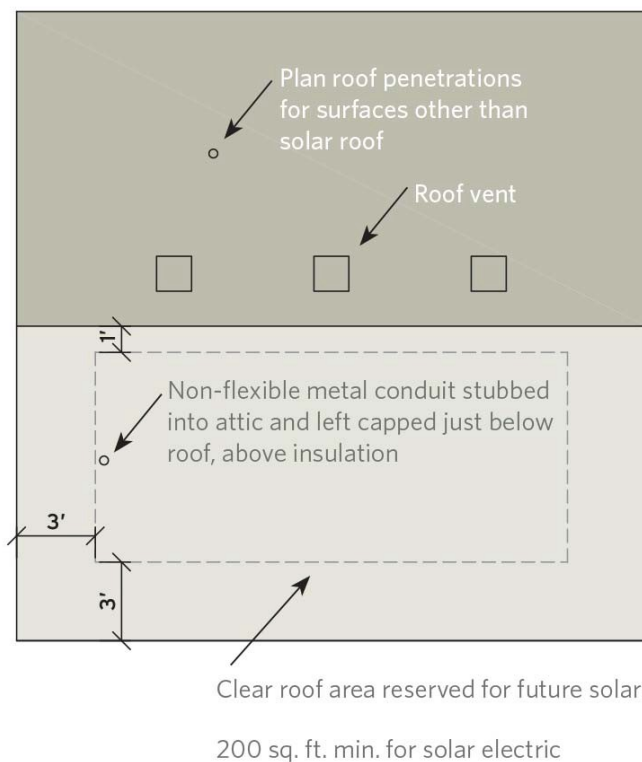
- 1.1 Installation site must be grid-connected and installed on real property in Oregon that receives electrical service directly from Portland General Electric or Pacific Power.
- 1.2 The installation must be of industry standard and workmanlike quality.
- 1.3 Equipment installers must be licensed according 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) must be included in the plan set or documented with a roof diagram that accurately describes the following:
 - Area reserved for the solar electric (photovoltaic, PV) array
 - Location of the pre-installed conduit
 - Setbacks from eaves or peaks, as required by Oregon Residential Specialty Code

- 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:
- 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 webpage¹](#) (this method will require working with an approved Energy Trust Solar Trade Ally to calculate the TSRF).
 - 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 local 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, contact Energy Trust's New Homes solar support at eps@energytrust.org.

Solar Electric

- 1.13 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.
- 1.14 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 mounted 36 inches off the finished floor with a metal cover clearly labeled "Reserved for solar."² 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.
- 1.15 All cables, conduit, and electrical boxes must be labeled, 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. Conduit must include a pull string.
- 1.16 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 from the main service feeder for the future solar feed³. The reserved breaker space⁴ must be clearly labeled "Reserved for solar."⁵
- 1.17 A sign or label must be clearly posted on or near the electrical panel stating "This Home is solar ready."⁶
- 1.18 All structural and electrical accommodations shall be documented on the building plans.

² Energy Trust New Homes program will provide label. Subcontractor installer must affix label. Contact Energy Trust New Homes for labels at eps@energytrust.org.

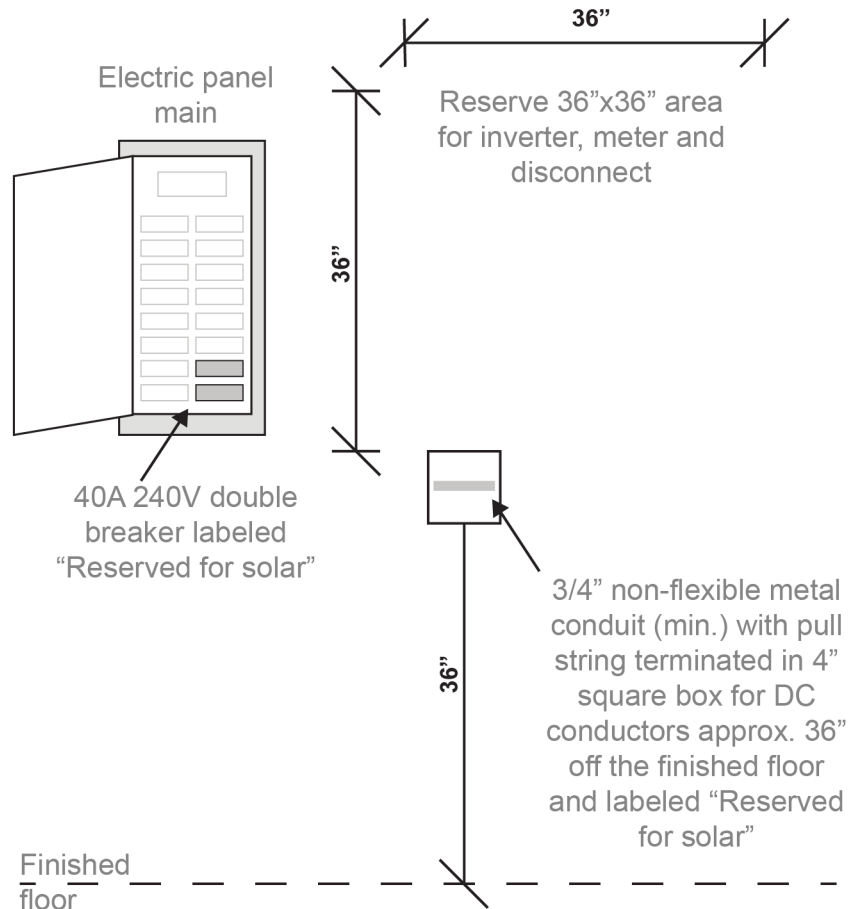
³ For solar + storage ready designs the reserved space for a 40amp breaker is located in the protected loads subpanel.

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

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Figure 2. Solar Ready Best Practices for Photovoltaic Systems



Solar + Storage Electric

- 1.20 A subpanel for designated protected loads shall be installed as part of construction and must be 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 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."⁷
- 1.21 In addition to the reserved breaker space for storage and solar, the protected loads subpanel will include at a minimum the following circuits:

⁷ Energy Trust New Homes program will provide label. Subcontractor installer must affix label. Contact Energy Trust New Homes for labels at eps@energytrust.org.

- Lighting circuits for the primary living area
 - Outlet circuits for the primary living area
 - Lighting circuits for the kitchen
 - Outlet circuits for the kitchen including the circuit intended for the refrigerator
 - Do not include dedicated circuits on the subpanel for electric range, cooktop, dishwasher, garbage disposal, and/or microwave
- 1.22 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 located on the exterior of the house, this area must be protected from sun exposure.
- 1.23 A 1-inch or larger flexible 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.”⁸
- 1.24 A sign or label must be clearly posted on or near the protected loads subpanel indicating “This home is Solar + Storage Ready.”⁹
- 1.25 All structural and electrical accommodations shall be documented on the building drawings.

Referenced Standards

- 1.1 Inverters: UL 1741 SA
- 1.2 Energy Storage Systems: UL 9540
- 1.3 Signage: ANSI 535

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Figure 3: Solar + Storage Ready Best Practices

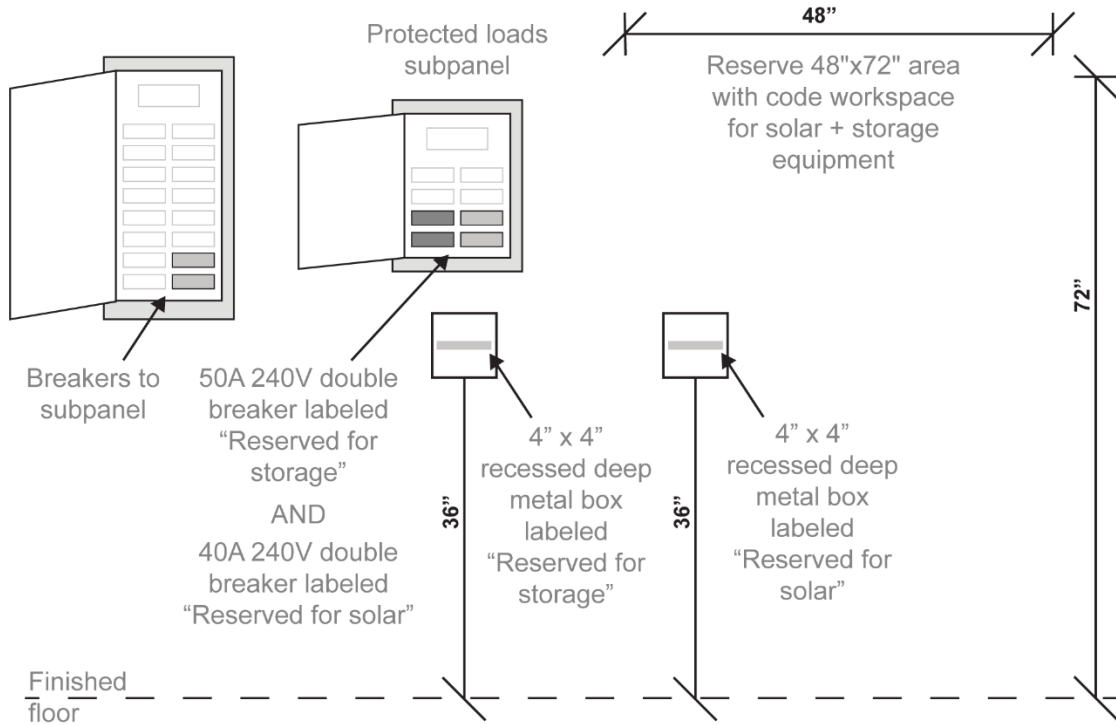


Figure 4: EV Ready for Solar + Storage Ready Best Practices

