



Solar Ready Commercial Design and Construction Requirements

Developed by Energy Trust of Oregon

Purpose

Since solar equipment costs have decreased dramatically over the past few years and incentives are making solar pencil out for businesses like never before, an increasing number of new construction and major renovation project owners are pursuing solar installations. Thus, project teams should design and construct buildings so that it is easy and affordable to incorporate solar either at construction completion or in the near future. Given the lifespan of a commercial building and the double-digit growth in solar adoption in the U.S., it is very likely that a building constructed today will eventually include a solar energy system. To help new buildings prepare for the future, Energy Trust of Oregon is offering incentives and technical assistance through the Solar Ready Initiative.

This Solar Ready Commercial Design and Construction Requirements (“Requirements”) document details and minimum criteria to make such buildings “solar ready.” As a result, these specifications may differ from those of a manufacturer or exceed applicable codes. Any variations from these Requirements must receive prior approval from Energy Trust.

Revisions

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

February & October 2015, V2 & V3 Revisions

Revision	Section	Revision
V2	All	Removed references to plumbing and solar water heating
V2	1.2	Clarified enrollment requirement
V2	1.3	Added maximum system size eligible for incentives
V2	1.7	Clarified TSRF requirement
V2	1.8	Added requirement for permanent fall protection mounting points on pitched roofs
V2	1.14	Added reference to additional requirements for non-rooftop systems
V3	1.3	Changed Solar Roof Area requirement to be contiguous and a specific ft ² size

General Installation

- 1.1 Installation site shall be grid-connected and located on real property in Oregon that receives electrical service directly from Portland General Electric or Pacific Power.
- 1.2 In order to qualify for Solar Feasibility and/or Solar Ready Incentives, the “Solar Roof Area” must be located on the roof of a building that is currently enrolled in the Energy Trust New Buildings program. Non-rooftop locations may be included in the design and construction with prior Energy Trust approval.
- 1.3 The Solar Roof Area must be at least 1,500 ft², un-shaded, contiguous, and free of obstructions.

Roof appurtenances such as HVAC equipment, vent stacks, plumbing stacks, ventilators, penthouses, communications systems/antennae, pipe runs and ductwork should be located on the north side of the roof to minimize shading and maximize the contiguously available area for solar.
- 1.4 Roof material shall be durable and warranted for a minimum of 20 years.
- 1.5 Building roof structure shall be designed to accommodate an additional 3.5 psf dead load for the solar electric system(s). Design calculations shall be performed to verify that structure will withstand solar system-related wind and seismic forces per Code. Solar loads shall be clearly identified within the structural calculations.
- 1.6 Solar Roof Area shall be documented on a roof plan that references:
 - Area reserved for the solar equipment;
 - Location of a chase or conduit to accommodate future solar wiring;
 - Major roof appurtenances.
- 1.7 All points within the Solar Roof Area must have a total solar resource fraction (TSRF) of 75 percent or greater. Solar resource considerations in the design phase should include roof slope and orientation, future landscaping plans and existing vegetation or structures that may shade the Solar Roof Area.
- 1.8 For all pitched roofs greater than 2:12 on which solar will be mounted, installation of permanent fall protection anchor points appropriate for the roofing material shall be installed.
- 1.9 All building penetrations shall be sealed and fire resistance maintained. To prevent intrusion by insects or vermin, all penetrations to building shell shall be permanently sealed with appropriate water and pest-proof materials. Any penetrations through fire-rated assemblies shall not reduce the fire resistance required by local codes and standards.

- 1.10 A designated and documented area of wall and floor space, including Code-compliant clearances, shall be reserved in the electrical room, or other adjacent area to an electrical panel, for the future placement of inverter(s), meter(s) and switchgear. The size of these areas shall be based on the inverter/equipment dimensions typical for the system size.
- 1.11 An easily accessible chase or conduit shall be installed to allow for wire runs from the Solar Roof Area to a point of electrical interconnection. If conduit is used, it should be electrical metallic tubing (EMT). Heavy-weight flexible steel conduit or hospital grade metal clad cable can be substituted for EMT where allowed by the Oregon Electrical Specialty Code. The conduit shall also be sized appropriately for the wire sizes required for the proposed system capacity and configuration.
- 1.12 A point of electrical interconnection shall be identified and sized to accommodate, per Code, a solar electric system rated at 12 watts per square foot of Solar Roof Area. A sign or label shall be clearly posted on or near the solar interconnection point indicating that the building is "Solar Ready."
- If appropriate for the form of interconnection, additional breaker positions should be reserved and labeled "Reserved for Solar Feed."*
- 1.13 The main building (or designated other) electrical panel shall be identified as the solar interconnection point, and shall be installed, sized to accommodate 20% above calculated panel loads, and with adequate additional breaker positions to accommodate the sized system, per Code. The reserved breaker space shall be labeled "Reserved for Solar Feed."
- 1.14 If approval has been granted to utilize Solar Feasibility and/or Solar Ready funds for non-rooftop locations, those sites may be required to comply with additional requirements.
- On a case by case basis, Energy Trust may provide authorization to include the costs of including a non-rooftop solar electric system with the design for a roof mounted one. Approval must be requested and granted before commencing any design work, and there may be different or additional technical requirements for that installation.*