EPS New Construction
2020 Net Zero and Energy Smart Home Incentives and Requirements
OVERVIEW

In 2020, builders who are part of Energy Trust of Oregon’s EPS New Construction offering can take their new homes to the next level with two new incentive packages:

- **Net Zero Homes:** Include an installed solar PV system that can offset a home’s entire electric load.
- **Energy Smart Homes:** Include appliances and equipment that are smart grid interactive, making it possible for customers to participate in utility programs designed to lower energy usage during peak periods — now or in the future.

This EPS New Construction Net Zero and Energy Smart Home Incentives and Requirements document details the incentives, as well as the requirements and minimum criteria for a builder to receive these incentives on their EPS New Construction homes.

If you have any questions about these incentives or requirements, please contact your verifier or EPS field account manager. Alternatively, you can call 1.866.365.3526, or email eps@energytrust.org.
INCENTIVES

Net Zero Incentives
The table below shows builder incentives for the Energy Trust of Oregon EPS New Construction net zero homes.

<table>
<thead>
<tr>
<th>INCENTIVE TYPE</th>
<th>INCENTIVE AMOUNT AND DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Zero Package</td>
<td>$750 per home</td>
</tr>
<tr>
<td>EPS Whole Home</td>
<td>$1,123 to $5,223 per home (based on efficiency above a typically built home)</td>
</tr>
<tr>
<td>Early Design Assistance Meeting</td>
<td>$1,000 per home (EPS verifier and solar contractor must be present)</td>
</tr>
<tr>
<td>Energy Trust Solar</td>
<td>Incentives based on system size and are paid to the solar trade ally. Income qualified buyers may be eligible for increased incentives.</td>
</tr>
<tr>
<td>State and Federal Solar Incentives</td>
<td>Solar installation may also be eligible for an Oregon state rebate and/or a Federal Tax Credit. Solar trade allies can provide information about all incentives the Builder and Buyer may be eligible to receive.</td>
</tr>
</tbody>
</table>

Energy Smart Home Incentives
The table below shows builder incentives for the Energy Trust of Oregon EPS New Construction energy smart homes.

<table>
<thead>
<tr>
<th>INCENTIVE TYPE</th>
<th>INCENTIVE AMOUNT AND DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Smart Home Base Package</td>
<td>$200 per home</td>
</tr>
<tr>
<td>Solar + Storage Ready Add-On Package</td>
<td>$150 per home</td>
</tr>
<tr>
<td>Advanced Wiring Add-On Package</td>
<td>$150 per home</td>
</tr>
<tr>
<td>EPS Whole Home</td>
<td>$1,123 to $5,223 per home (based on efficiency above a typically built home)</td>
</tr>
</tbody>
</table>
REQUIREMENTS

Net Zero Package Requirements
The requirements below are the minimum criteria for a builder to receive net zero incentives on their EPS New Construction homes.

- Homes must be grid-connected and receive electrical service directly from Portland General Electric or Pacific Power
- Builder and verifier must host an Early Design Assistance meeting for the home or development to plan the solar orientation of the home(s) and other steps to meet net zero and EPS requirements
- Home must be an EPS home that is at least 20% above baseline
- Home must include an Energy Trust approved solar system designed and installed to offset 100% of the estimated annual electric consumption
- Homes that include natural gas are eligible to participate, but must have gas savings at least 20% above baseline

Sizing the solar system to offset the electric load
To appropriately plan the size of the solar system to offset the electric load:

The verifier:

- Creates an energy model of the home’s energy systems based on building plans to determine the estimated annual electric consumption
- Provides this estimate to the builder and solar contractor to inform the design of the solar system

The solar contractor:

- Designs a proposed system based on building plans and the energy model and uses approved Energy Trust methodology to estimate the annual generation potential
- Provides this generation estimate to the verifier, who updates the energy model to confirm that the generation will offset the electric consumption

The project team reviews estimated annual electric consumption and generation estimate details during the Early Design Assistance meeting.
Energy Smart Home – Base Requirements
The requirements below are the minimum criteria for a builder to receive energy smart home incentives on their EPS New Construction homes.

- Home must be grid-connected and receive electrical service directly from Portland General Electric or Pacific Power
- Home must be an EPS home
- Homes must also meet the following requirements, as applicable

Solar installed, Energy Trust Solar Ready, or not capable to be Energy Trust Solar Ready
The home must meet Energy Trust Solar Ready requirements (refer to Appendix B) or have an Energy Trust approved solar system installed at the time of construction.

With prior approval, builders can still qualify for the Energy Smart Home base package if:

- The home is not capable to be Energy Trust Solar Ready due to shading from existing permanent barriers, whether natural or man-made, external to the dwelling (including but not limited to trees, hills and adjacent structures)
- AND Energy Trust is provided with site photos and/or diagrams that clearly demonstrate the home is not capable to be Energy Trust Solar Ready due to shading from existing permanent barriers external to the dwelling

NOTE: Roof penetrations, roof slopes, building siting and roof orientations that could be corrected in the design phase do not constitute a valid reason and thus will exempt builders from these solar requirements.

Electric vehicle charger installed or Energy Trust Electric Vehicle Ready
The home must meet Energy Trust Electric Vehicle (EV) Ready Residential Installation Requirements (refer to Appendix A) or have an ENERGY STAR Level 2 Electric Vehicle Supply Equipment (EVSE) that is listed as “Connected Functionality Capable” on the ENERGY STAR EVSE Qualified Product List installed at the time of construction.

Smart Thermostats
If the home has central electric space conditioning equipment:

- Home must include one of the following smart thermostats:
  - ecobee 3 (excluding ecobee3 lite)
  - ecobee 4
  - ecobee Smart Thermostat with Voice Control
  - Nest Learning Thermostats
  - Nest Thermostat E

- Thermostat must be:
  - Compatible with the heating and cooling system as deemed by the manufacturer
  - Wired with a common wire for power rather than batteries
**Electric Water Heaters**

If the home will have a heat pump water heater or an electric resistance water heater, it must:

- Include a thermostatic mixing valve output set to initial water heater setpoint (such as the manufacturer’s factory setting or recommendation), as shown in *Figure 3*
- Either include a CTA-2045 port for future utility connectivity, OR feature integrated wi-fi connectivity
- Heat Pump Water Heaters must be listed as Tier 3 or higher on NEEA’s most recent Advanced Water Heater Specification Qualified Products List

*Figure 3.* The mixing valve blends hot water with cold water to ensure a safe, pre-set outlet temperature to the homes water fixtures. This device allows a water heater to store water at higher temperatures, in support of demand response programs, than would otherwise be possible.
Energy Smart Home – Add-On Requirements

The requirements below are the minimum criteria, in addition to energy smart home base requirements (as detailed above) for a builder to receive one or both energy smart home add-on incentives on their EPS New Construction homes.

Solar + Storage Ready Requirements

Refer to Appendix B: Solar + Storage Ready Requirements, for minimum solar + storage ready criteria for a builder to receive this energy smart home add-on incentive on their EPS New Construction homes.

*NOTE: Homes that receive an exemption from Solar Ready or Solar Installed requirements are not eligible for this incentive.*

Advanced Wiring Requirements

The home must qualify for energy smart home base incentive and must include:

- Cat5E or Cat6 ethernet cables from HVAC, water heater, electric vehicle charging station, inverter, battery, and smart thermostat (if present) to a central location such as a mechanical room or near the telecom/cable/internet service provider demarcation point
- Neutral wire to all wall switches
- Extra deep junction boxes (>3 inches) at switches and outlets
- Extra deep 2X4 junction box behind the smart thermostat (if present)

*NOTE: Storage Ready requirements and incentives are independent of Advanced Wiring requirements and incentives.*
APPENDICES

These appendices detail the requirements and minimum criteria for a builder to receive related energy smart home incentives on their EPS New Construction homes.
Appendix A

Electric Vehicle (EV)  
Ready Residential  
Installation Requirements  
v.1.1 5/20
Electric Vehicle (EV) Ready Residential Installation Requirements

Developed by Energy Trust of Oregon
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Purpose

Residential electric vehicles (EVs) charge using electric vehicle supply equipment (EVSE) commonly known as EV chargers. Most EV drivers do 80% of their charging at home due to convenience and low energy costs\(^1\). 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 that can easily charge long-range vehicles while parked overnight, allowing homeowners more flexibility to choose when they charge. Homeowners can power their EVSEs either by a plug (e.g., NEMA 14-50) or hardwire.

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

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 work for a contractor licensed according to the Oregon Construction and Contractors Board.

1.4 All installed system components must be new.

1.5 All components must be mounted securely.

1.6 Equipment must not be modified such that it voids the listing or manufacturer warranty.

EV Ready Electrical

Homebuilders who wish to provide an EV ready dwelling shall:

1.7 Follow all applicable codes, standards, and regulations.

1.8 Install one 208 / 240 volt, 50 ampere dedicated branch circuit to the garage to accommodate a future Level 2 EVSE. The breaker protecting that circuit shall be located

at the opposite end of the panel busbar from the main service feeder to accommodate the potential for future vehicle-to-grid charging. The breaker must be clearly labeled “Reserved for EV”\(^2\) as shown in Figure 1.

1.9 Serve no other circuits with the EVSE breaker.

1.10 The branch circuit must terminate at a NEMA 14-50 EV charger outlet that is installed in a 4-by-4-inch recessed deep metal box that is mounted 36 inches above the finished floor. The box must be clearly labeled “Reserved for EV,” \(^2\) as shown in Figure 1.

1.11 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, as shown in Figure 1.

1.12 Locate the outlet on any interior garage wall such that a connection can be made between the location of the outlet and any location within the adjacent parking stall assuming a maximum 24-foot EVSE cord, as shown in Figure 2.

1.13 Document all structural and electrical accommodations on the building plans.

1.14 Clearly post label on or near the electrical panel stating that “This home is EV Ready.”\(^2\)

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\(^2\) Energy Trust New Homes program will provide label. Subcontractor installer must affix label. Contact Energy Trust New Homes for labels at eps@energytrust.org.
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. 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.
Appendix B

Solar Ready & Solar +
Storage Ready Residential
Installation Requirements
v.1.1 5/20
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 EPS™ 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 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 and 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 Energy Trust sun chart or approved shading analysis tool as described on the Energy Trust solar trade ally Forms and Resources webpage\(^1\).

- 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.

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\(^1\) [https://insider.energytrust.org/programs/solar/forms-and-resources/](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”.

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 feed. The reserved breaker space must be clearly labeled “Reserved for solar.”

1.17 A sign or label must be clearly posted on or near the electrical panel stating “This Home is solar ready.”

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

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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.
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.”

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:

- 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.”

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

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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4 Energy Trust New Homes program will provide label. Subcontractor installer must affix label. Contact Energy Trust New Homes for labels at eps@energytrust.org.
Figure 4: EV Ready and Solar + Storage Ready Best Practices

- Reserve 36" above and 24" to either side of the outlet for electric vehicle supply equipment.
- Electric panel main.
- Protected loads subpanel.
- Reserve 48"x72" area with code workspace for solar + storage equipment.
- NEMA 14-50 outlet labeled "Reserved for EV" AND Breakers to subpanel.
- 50A 240V double breaker labeled "Reserved for EV" AND Breakers to subpanel.
- 50A 240V double breaker labeled "Reserved for storage" AND 40A 240V double breaker labeled "Reserved for solar".
- 4" x 4" recessed deep metal box labeled "Reserved for storage".
- 4" x 4" recessed deep metal box labeled "Reserved for solar".