

# Solar Ready Construction

*A Discussion Paper for Energy Aware Communities*

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**Brief:** Solar Ready Homes are houses built with certain measures in place that allow for quicker and easier installation of a solar photovoltaic (PV) or solar hot water system at a later date. With just a few relatively simple improvements designed in and constructed, future installation of such systems will require little, if any, structural modifications to the home.

## Problem

Most local governments have not taken specific action to address solar ready construction in their plans or codes. As interest in rooftop solar PV and solar hot water systems continue to grow, it may be in each jurisdiction's interest to consider impacts and benefits of solar energy systems and to make provisions for them.

Most local government codes do not restrict solar ready construction – but there are opportunities to support, encourage, and keep track of homes that are built solar ready. In the future, there may be a statewide code that encourages or requires certain improvements be made so that new construction is “solar ready”.

## Introduction

Solar Ready Construction is gaining popularity in the United States, even

being required in new construction in some cities. In the Pacific Northwest it is generally a new concept and an option that some builders are beginning to offer. It can be offered as an option, or built into all or a portion of the homes in a subdivision.

*“The solar ready design features, if considered early in the design process, are typically low or no cost.”* (Solar Ready: An Overview of Implementation Practices, National Renewable Energy Laboratory, US Dept. of Energy)

## What is Included in Solar Ready Construction?

Solar Ready Construction generally includes the following:

- ✓ A designated space on the south and/or west facing side(s) of the roof free from obstructions (equipment, vents, ducts, skylights, etc.)
- ✓ Avoid shading from trees, buildings, chimneys, etc. on the portion of the roof designated for future solar panels/components.
- ✓ Ensure the roof is capable of carrying the future additional load of the solar equipment (generally can assume dead load of not more than 5 pounds per square foot for future solar PV or solar hot water system).

- ✓ Ensure there is adequate space in the electrical panel for the future connection (keep space available for the PV circuit breaker).
- ✓ Run electrical conduit from the solar collector location to the electrical panel and other electrical components. A capped roof penetration sleeve provided adjacent to the reserved roof area can accommodate future solar PV system conduit.
- ✓ Dedicated wall space for a future inverter, net meter, and disconnect should be allocated within three feet of the electrical service panel. If on an exterior wall this must be protected from sun exposure.
- ✓ All cables, conduits, and electrical boxes should be labeled, secured, and supported according to code requirements and in accordance with their performance ratings.

## Implementation Considerations

For local governments, perhaps the greatest role in supporting Solar Ready Construction is developing a way to inspect, approve, and track which homes have been built to this standard. Many local governments do not keep copies of house plans for very long after the final inspection. Some sort of tracking system would be needed to verify the necessary infrastructure is in place and the home is solar ready.

Documentation will streamline permitting of any future systems, saving the jurisdiction and property owner time.

Ideally, local governments that choose to support solar ready construction should identify what their requirements are in the municipal or county code, then track which homes are built to that standard.

Other opportunities for a local government to support Solar Ready Construction include outreach with local area builders, trade organizations, and related interested organizations to share information and promote solar ready construction.



Photo Source:  
<http://goldsealnews.wordpress.com/2012/01/16/what-does-it-mean-to-be-solar-ready/>

## Costs

Any increase in costs associated with the additional requirements will depend on what is installed to make the home solar ready. Some jurisdictions have specific requirements that include installation of conduit from the roof to close proximity to the electrical panel. Other jurisdictions only require adequate area being designated on the south or west side of the roof, with “extra” room in the electrical panel being designated for the future solar PV system. However, these

improvements are low in cost when they are planned for and designed into the house plans. Estimates on the increase in construction costs range from approximately \$280<sup>1</sup>-1,500.<sup>2</sup> Jurisdictions should work closely with interested local area builders to determine what should be required for a home to be considered solar ready, what the additional costs will be, and how to potentially mitigate any cost increases (e.g. streamlined permit review, etc.).

Upon meeting certain criteria, The Energy Trust of Oregon offers incentives to builders to reduce the installation cost of verified infrastructure for solar ready water heating and/or solar ready electric systems. A builder can install both technologies for a maximum incentive of \$400 per home.



Photo Source: Builder Specifications for Solar Ready Homes – Are You Ready?

<sup>1</sup> Builder Specifications for Solar Ready Homes: Are you Ready?

<sup>2</sup> Solar Ready: An Overview of Implementation Practices, NREL.

## Solar Ready Construction Code Examples

*Carbondale, Colorado* – Ordinance No. 12, Series of 2007; See Municipal Code Chapter 15.30, specifically Section 6 – Solar Energy and Section 9 – On-Site Renewable Energy and Exterior Energy Requirements.

Examples noted in the American Planning Association's [Solar Ready Homes](#):

- *Chula Vista, California* – Municipal Code. See Title 15, Buildings and Construction; Chapter 15.24, Electrical Code and Regulations; Section 15.24.065, Photovoltaic Pre-Wiring Requirements. Chapter 15.28 Plumbing Code; Section 15.28.015, Solar Water Heater Pre-Plumbing.
- *Henderson, Nevada - Development Code*. Chapter 19.7, Development and Design Standards; Section 19.7.12, Sustainability; Table 19.7.12-1, Menu of Site and Building Design Options for Sustainability, part 1.9: Solar-Ready Design.
- *Oro Valley, Arizona* - Ordinance No. (O)09-11: An Ordinance of the Mayor and Council of the Town of Oro Valley, Amending Chapter 6, Article 6-1-7, “Residential Code” otherwise known as the “2006 International Residential Code” to Add a “Residential Solar Ordinance” Requiring Installation of Solar Ready Measures in Residential Construction.
- *Rancho Palos Verdes, California* - Municipal Code. Title 15, Buildings and Construction; Chapter 15.04,

Building Code; Section 15.04.070, Renewable Energy Systems.

- *Tucson, Arizona* - Ordinance No. 10549: Relating to Buildings and Construction: Requiring New Single Family and Duplex Residential Dwelling Units to Provide for Future Installation of Solar Energy Devices; “Residential Plan Review: Solar Ready Ordinance”; Ordinance No. 10605: Relating to Buildings and Construction: Amending the International Residential Code 2006...by Adding Local Amendments to Chapter 23, Section M2301, Solar Energy Systems.

[A Homebuilder’s Guide to Going Solar](#) (US Dept. of Energy)

[Solar Powering Your Community: A Guide for Local Governments](#), Chapter 3.2 – Solar Ready Building Guidelines

[Planning and Zoning for Solar Energy](#), American Planning Association

[Solar Ready Commercial Design and Construction Requirements](#), Energy Trust of Oregon

[California: New Roofs Must be Solar Ready from 2014](#), PV Magazine, June 2012

## **Additional Resources**

[Solar Ready Buildings Planning Guide](#), National Renewable Energy Laboratory

[Solar Ready: An Overview of Implementation Practices](#), National Renewable Energy Laboratory

Energy Trust of Oregon, Incentives for Solar Ready Homes:  
<http://energytrust.org/trade-ally/programs/solar/incentives/solar-ready>

[Solar Ready Residential Installation Requirements](#), Energy Trust of Oregon

[Builder Specifications for Solar Ready Homes – Are you Ready?](#) Solar Ready, Canada.

[California 2010 Green Building Standards Code](#)