3.2

Solar-Ready Building Guidelines

Local governments can encourage or require homebuilders and developers to design and build **solar-ready** homes and commercial buildings, so architects and builders can choose viable sites for solar technologies. In the past, the high initial cost of **photovoltaics** (PV), **solar water heating** (SWH), and **solar ventilation preheating** (SVP) systems has prevented them from being included in new construction. With better incentives, technological improvements, and rising conventional power prices, however, energy from solar sources is becoming more cost competitive. Solar-ready buildings are well positioned to take advantage of an environment that's more favorable to renewable energy. Buildings that are not solar ready could render solar installation technically impossible, or the added costs of making infrastructure changes could make solar applications economically prohibitive. Lack of appropriate space on buildings for solar installations has proven to be a significant barrier for many customers wishing to install solar. Planning for the eventual installation of a solar system when designing a building can significantly improve the economics of the investment. Solar-ready building modifications are low- to no-cost at the time of new construction or retrofit and often very costly later in the building's life. By understanding and accounting for solar energy system requirements during the building design phase, installation efficiency can be maximized, costs can be minimized, and system performance can be optimized.

Promoting energy efficiency standards for solar-ready buildings provides additional benefits because a more efficient building requires a smaller solar energy system than it would if the building were operating inefficiently. By encouraging energy efficiency improvements, local governments can promote smart investments in solar energy systems.

BENEFITS Creating solar-ready guidelines and promoting energy efficiency at the outset can help make future solar installations easier and more cost effective.

Implementation Tips and Options

- ☐ Encourage or require builders and developers to design solar-ready homes, buildings, and developments. A few crucial design considerations can greatly reduce the cost of a solar installation later in the building's life, but at the design stage, these changes are often cost neutral. They include the following:

- Minimize rooftop equipment or cluster equipment on the north side of the roof to maximize available open area for solar array placement.
- Optimize system performance; if the roof is sloped, use the south-facing section; keep the south-facing section obstruction-free if possible.
- Plan for the structure to be oriented to avoid shading from trees and buildings, especially during peak sunlight hours.
- Install a roof that will support the extra loads of a solar array.
- Record roof specifications on drawings; this shows solar designers that the roof was designed to support solar and can prevent a potentially costly engineering study.

☐ Improve building energy standards and policies for local government facilities to make solar energy systems more cost effective and increase local government use of clean energy by promoting the following:

- Equipment procurement policies that mandate using the most energy-efficient equipment available, such as devices that meet federal ENERGY STAR requirements
- Life-cycle cost analysis for all materials and equipment
- Green building and solar-ready design for all new buildings and major renovations
- Installing PV or SWH systems on suitable municipal facilities. See 7.0 Leading by Example with Installations on Government Properties.

Examples

Tucson, Arizona: Requiring All New Residences To Be Solar Ready

In June 2008, the mayor and Tucson City Council unanimously voted to require all new residences in Tucson be solar-ready for PV and SWH systems. The new SWH rules went into effect on March 1, 2009, followed by the new PV rules on July 1, 2009. To obtain a building permit, builders and developers of single-family homes and duplexes must include in the plans an SWH system or a stub-out for a later installation. Arizona tax code allows developers to take a state tax rebate of $75 or the actual cost of the stub-out. The PV rules specify that plans must include space for inverters and other equipment and plans for slots in the service panel to accommodate a future PV installation.

Visit www.solaramericacommunities.energy.gov for more inspiring examples from communities across the United States.

Additional References and Resources

PUBLICATIONS

Solar-Ready Buildings Planning Guide

National Renewable Energy Laboratory, December 2009

This guide identifies the important aspects of building design and construction to enable installation of solar systems after the building is constructed. It discusses important system requirements for PV, SWH, and SVP systems. Attention

to these guidelines when developing building codes or any building- or community-related regulations, as well as during building design, could significantly improve the performance and minimize the cost of solar systems.

Report: www.nrel.gov/docs/fy10osti/46078.pdf

A Step by Step Tool Kit for Local Governments to Go Solar

California Energy Commission's New Solar Homes Partnership, December 2009

This tool kit contains an array of strategies and options that local governments can use to help encourage solar developments. It also discusses approaches for promoting solar through a local green building program. Also included is a model ordinance to adopt a solar energy education program to inform local builders and developers of the benefits and incentives of integrating solar energy technologies into new residential developments.

Report: www.energy.ca.gov/2009publications/CEC-180-2009-005/CEC-180-2009-005.PDF

A Homebuilder's Guide to Going Solar

U.S. Department of Energy, December 2008

This guide assists homebuilders who are contemplating solar-ready or solar homes. It helps them decide whether to install solar energy systems on homes or to make homes solar ready, and helps quantify the benefits for home buyers.

Report: www.eere.energy.gov/solar/pdfs/44792.pdf

The owners of this home installed a triangular shaped PV array system so as not to compromise the design integrity of this historical home. (Vipin Gupta/PIX17930)