

Challenges and Successes on the Path
toward a Solar-Powered Community

Solar in Action



Portland, Oregon

Includes case studies on:

- Increasing Market Demand: The Solar Now! Campaign
- Streamlining City Regulations
- Integrating Solar into City Planning and Facilities



The East Portland Community Center's 87-kW photovoltaic system was installed under a Power Purchase Agreement. *Photo from Commercial Solar Ventures, NREL/PIX 18429*

Cover photos from iStock/7629240, View of the City of Portland.

About the U.S. Department of Energy's Solar America Communities program:

The U.S. Department of Energy (DOE) designated 13 Solar America Cities in 2007 and an additional 12 cities in 2008 to develop comprehensive approaches to urban solar energy use that can serve as a model for cities around the nation. DOE recognized that cities, as centers of population and electricity loads, have an important role to play in accelerating solar energy adoption. As a result of widespread success in the 25 Solar America Cities, DOE expanded the program in 2010 by launching a national outreach effort, the Solar America Communities Outreach Partnership. As the Solar America Cities program evolved to include this new outreach effort, the program was renamed Solar America Communities to reflect DOE's commitment to supporting solar initiatives in all types of local jurisdictions, including cities and counties. Visit Solar America Communities online at www.solaramericacommunities.energy.gov.

Portland's Starting Point

Portland was designated by the U.S. Department of Energy (DOE) on June 20, 2007, as a Solar America City. Portland has worked toward, and in many ways, achieved, a reputation as one of the country's leading cities in sustainability. This is due in part to Portland being the first U.S. city to adopt a carbon dioxide reduction strategy in 1993.

Portland and the state of Oregon have spent decades establishing a policy framework focused on energy efficiency, renewable energy, and climate protection. The following policies and programs are the foundation for Portland's work on solar energy market transformation:

- 1993 Carbon Dioxide Reduction Strategy
- 1993 Business Energy Tax Credits
- 2000 City of Portland Green Building Program
- 2001 Local Action Plan on Global Warming
- 2002 Energy Trust of Oregon Solar Program
- 2006 Oregon Department of Energy Residential Energy Tax Credits
- 2009 Oregon net metering law
- 2009 Portland Economic Development Strategy
- 2009 Climate Action Plan
 - 100% of city facility energy from renewable sources by 2012
 - 10 megawatts (MW) of photovoltaic (PV) capacity installed citywide by 2012

Portland began devoting resources to solar market transformation just prior to becoming a Solar America City. In 2006, Portland City Council allocated funding to the Office of Sustainable Development (OSD) in an effort to create demand for solar energy, as part of a larger initiative focused on sustainable economic development. With these funds, OSD initiated the Solar Now! campaign. At the outset, the main purpose of Solar Now! was to create excitement and buzz around solar energy in two ways: 1) encourage high-profile civic and environmental leaders to install solar on their homes and businesses and then publicize the installations, and 2) provide education, information, and technical assistance to residents and businesses about going solar in the Pacific Northwest. OSD's intent was to raise the visibility of solar in the community.

Portland's successful application to become the Northwest's first Solar America City provided the resources necessary for OSD's fledgling solar program to expand its efforts beyond marketing, outreach, and education. The award enabled Portland to take a comprehensive approach to making solar energy a significant component of the city's energy infrastructure and built environment.

Building Partnerships and Setting Goals

Portland established the following goals as a Solar America City:

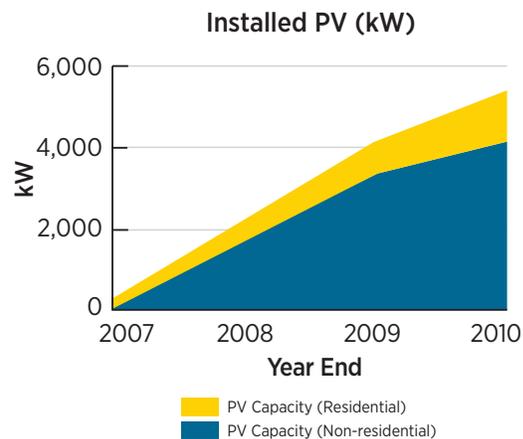
- Increase market demand among local residents and businesses
- Provide high-level policy support to enable solar market transformation
- Streamline city-level regulations and practices that affect solar adoption
- Integrate solar into city energy planning and facilities.

It was clear that the city's limited resources would go furthest if leveraged by partnering with organizations that shared its solar market transformation goals. OSD reached out to three organizations:

- Energy Trust of Oregon, the state's public purpose fund administrator that provides cash incentives for solar installations

Installed Capacity

Portland



Installed PV capacity increase from December 31, 2007, to December 31, 2010

- Solar Oregon, a nonprofit dedicated to solar education and outreach (and Oregon's American Solar Energy Society chapter)
- Oregon Department of Energy, which provides tax credits for solar installations.

Thus, the Solar Now! campaign was born. The four participating organizations decided that Solar Now! would serve as a coordinated and centralized resource for Portland residents and businesses seeking information, resources, and financial assistance to install solar. While the campaign was in its initial stages, the city applied to become a Solar America



Portland, Oregon, has long been one of the country's leading cities in sustainability. *Photo from Travel Portland, Brent Bradley, NREL/PIX 18430*



Portland leveraged partnerships with several organizations to extend its Solar America Cities efforts. *Photo from City of Portland, NREL/PIX 18432*

City. Upon designation as a Solar America City, Portland became positioned to fully carry out the program's goals outlined above.

Since then, Portland has also engaged with the Oregon Solar Energy Industries Association (OSEIA) on resolving permitting issues as well as with the city's two investor-owned electric utilities, Portland General Electric and Pacific Power.

Portland's Solar America City partnership focused its activities on educating residential and business communities, addressing permitting issues and other regulatory barriers within the city, providing policy support to city officials, and increasing the rate of solar installations on the city's own facilities.

Key activities that the city partners identified to meet their overall solar goals were:

- Develop a solar education curriculum and hold regular workshops for both residents and businesses on the benefits, technologies, and financial resources available to install solar energy.
- Work with Portland's Bureau of Development Services in partnership with OSEIA to create a solar permitting process and accompanying guidelines.
- Improve city regulations and building codes to help streamline the installation of solar systems through a variety of both permitting and zoning changes.
- Identify first- and second-tier city facilities for solar installations. Conduct load, solar resource, and site analysis on identified facilities.

Portland created Solar Now!, a one-stop resource for residents and businesses.

Accomplishments and Highlights

The city's primary accomplishments in solar market transformation can be attributed to three particular efforts.

First, the Solar Now! campaign is a robust educational and outreach campaign, educating thousands of Oregonians on the benefits of solar energy and providing individuals and businesses with the technical assistance they need to navigate the installation process.

Second, the city has created a streamlined permitting process that includes electronic submittal, low fees, and a bundled permit system.

And finally, the city has successfully installed both solar electric and thermal systems on several city-owned facilities, demonstrating to the community that solar technologies are reliable and work well in Portland.

Case Studies: Successes and Challenges

Increasing Market Demand: The Solar Now! Campaign

Portland, along with its partners, successfully created and implemented the Solar Now! education and outreach campaign. The campaign created a one-stop resource for Portland residents and businesses seeking information about and assistance with solar installations.

The four program partners had each played a distinct role in the existing solar market previously. However, by collaborating in Solar Now!, the partners were able to leverage finances as well as skills, resulting in a harmonized campaign that has become well-recognized by the public.

The campaign worked to inform the public on the benefits of solar through a robust education and marketing effort. This effort included participation in educational workshops, community events, home shows,

and expos, as well as a paid advertising campaign. A Solar Now! brochure was created and widely distributed. The brochure details the benefits of solar; costs, tax credits and incentives; and how and where to go to select a contractor. In

addition, the campaign created a central Website at www.solarnoworegon.org and a 1-800 call center.

The campaign promoted several key marketing messages: 1) Portland is sunny enough for solar, 2) Solar is good energy for Oregonians, 3) Be an energy leader, and 4) Will you be a part of Oregon's energy future? These, as well as the underlying message that the Solar Now! campaign makes going solar easy by connecting Oregonians with the resources they need, have all helped grow Oregon's solar market.

The campaign educated thousands of Portlanders on the value of solar energy and elevated the Solar Now! brand. The campaign hosted 59 workshops, reaching more than 3,300 Portlanders, and informed thousands more at tabling events. In addition, the commercial arm of the campaign reached an additional 200 businesses. In an effort to raise awareness, Solar Now! assisted and publicized installations at high-profile locations that included the homes of City Commissioner Dan Saltzman and State Legislator Jackie Dingfelder. Commercial projects were installed at the Lucky Lab Brewpub, the Natural Capital Center (the home of the Office of Sustainable Development), and the East Portland Community Center. The campaign led to a 240% increase in installations between 2006 and 2009, resulting in a total of 497 installed systems as of 2009.

Streamlining City Regulations

Portland worked with Energy Trust, solar installers, OSEIA, and city staff to develop and implement improvements to city permitting processes. Prior to OSD's engagement on this issue, Portland had no consistency or clarity in the solar

Residential rooftop PV installations, as shown on this Portland-area home, increased during the Solar Now! campaign. *Photo from Energy Trust of Oregon, NREL/PIX 18431*



Portland's Columbia Ground Water Pump Station features a 270-kilowatt ground-mounted PV system. *Photo from Portland Water Bureau, NREL/PIX 18450*

permitting process. Some contractors were pulling electrical and plumbing permits for their solar energy installations, but very few received building permits. Building officials wanted to develop a combined permit so that building permits and other relevant trade permits could be issued together.

In late 2008, the city's Bureau of Development Services (BDS) put into place a prescriptive residential permitting system. This allowed simple, conforming residential installations to receive combined permits without engineering documents. Once the process was finalized, BDS published program guides to help educate installers and its own staff about the new permitting process and requirements. The program guides can be viewed at www.portlandonline.com/bds/index.cfm?c=36855. In addition, BDS also updated its database to more systematically track solar energy installations.

At the request of OSD, BDS also agreed to reduce solar permitting fees for both residential and commercial systems. The new fee structures included the following components:

- Residential—Flat permit fee of about \$100 for solar PV or solar hot water systems.
- Commercial—Valuation-based fee structure, which exempts the cost of modules and inverters from the fee equation.

In addition, staff members were trained in solar permit intake and system inspection. The solar energy installations were more systematically tracked in the database.

In early 2009, the city further simplified the permitting process by instituting a pilot for email-based permit submission for residential solar installations. This system allows contractors to submit multiple permits at once via email, and then receive notification when they are ready to be picked up, usually within a couple of days. As of June 2010, more than 80% of residential permits were submitted utilizing this system.

In late 2009, as part of a regular zoning code clean-up process, Portland embarked on zoning code changes that created exemptions and clear guidelines for installations of solar energy systems in historic districts and other areas that are subject to design review. These amendments provided a set of design standards for historic districts to follow as an alternative to costly and lengthy design reviews. It also exempted systems in certain zones from having to go through a design review and clarified allowed land use guidelines for larger ground-mounted systems.

Integrating Solar into City Planning and Facilities

A key component of Portland's climate goals includes the development of solar energy systems on public facilities. Since many of the incentives available for solar are based on taxable liability, the city primarily looked to develop third-party ownership structures. These efforts yielded some successful installations, though others were unable to be completed due to changes in the economic landscape and incentives.

Using technical assistance funding from DOE, Portland was able to conduct 21 site surveys to evaluate solar resource and prioritize potential sites. Working with facility managers, local union contractors, and a third-party provider, two pilot systems were installed under a third-party ownership model with a buy-out option:

- An 87-kilowatt (kW) PV system plus solar hot water at the East Portland Community Center
- A 270-kW ground-mounted PV system at the Columbia Ground Water Pump Station.

Under separate efforts, Portland installed a 12-kW PV array on the Water Bureau Meter Repair Shop. This system is under direct ownership of the city and meets about 10% of the shop's annual electricity needs. It was installed in 2009 as part of major U.S. Green Building Leadership in Energy and Environmental Design gold-level LEED renovation of the building.

Portland also developed and released a request for proposal (RFP) in late 2008 to provide a long-term power purchase agreement (PPA) for more than 800 kW of PV on city facilities. A contractor was selected but no contract was

finalized due to macro financial issues related to the 2008 banking crisis and a major shift in Oregon business tax credits. A proposed RFP to provide solar hot water systems under a PPA structure was not released due to similar financial issues. Factors outside the control of the city were largely responsible for the failure of these installations to move forward.

Top Takeaways

- Collaboration is the key to the success of the city's solar program. Solar Now! partners, OSEIA, the BDS, and other city bureaus who championed solar were critical to growing both the residential and commercial markets as well as increasing installations on public facilities.
- Creating fixed permit fees, streamlining submittals, and removing zoning barriers are important components to developing a contractor-friendly solar climate.
- Financing on public facilities can be a difficult process dependent on outside factors. Access to investors, utility interconnection issues, structural assessment, roof life, building owner, and facility management buy-in play major roles in getting projects done.
- While there was significant growth in the market, up-front costs for residential customers remain a barrier even with attractive tax credits and incentives.

Portland's climate goals include installing solar energy systems on public facilities.

Next Steps

Funding from the American Recovery and Reinvestment Act of 2009 (ARRA) will help Portland execute a neighborhood-focused initiative that addresses the remaining barriers to solar market growth. The Neighborhood Solar Initiative aims to achieve an additional 600 kW of installed PV capacity in the residential sector by the end of 2011 and bring the total installed residential capacity in Portland to 1 MW. Early results indicate Portland will meet this goal and is poised to reach an additional 2 MW of installed capacity with ARRA funding. As part of the Solar America Cities Special Projects funding, Portland will focus on the following activities:

- Bring the Solar Now! outreach campaign statewide: Portland is working with its partners to incorporate additional Oregon communities in the Solar Now! network. New partners will receive training on developing educational and outreach programs of their own at a Solar Now! University Conference held in rural Oregon. Participating communities also will receive digital toolkits that provide the resources and materials needed to run their own programs.
- Support neighborhood-based volume solar purchasing: Portland will support four Portland neighborhoods in coordinating volume purchases of solar equipment by facilitating group discounts and community-led sales and marketing. This will bring down the installed costs and increase the rate of installation by facilitating volume purchasing, community-led sales and marketing, and job grouping.
- Initiate residential third-party utility-bill financing for PV and solar hot water: Portland will work to include the residential solar PPA ownership structure for PV and



This 12-kW PV array is the largest system entirely owned by the City of Portland. *Photo from City of Portland, NREL/PIX 18048*

the thermal tariff for solar hot water into the marketing, outreach, and service delivery operations of Clean Energy Works Portland (a green jobs partnership between the City of Portland and Green for All, a national

organization). This will include an on-bill repayment option for both types of third-party owned systems (the utility incurs the upfront cost and the customer repays the investment through a charge on their utility bill).

- Initiate neighborhood-scale distributed energy systems: Portland will pursue integrating the use of solar PV and hot water technologies into distributed energy systems, creating EcoDistricts that provide energy for a combination of residential, commercial, and industrial needs.

Additional Resources

- Oregon Residential Energy Tax Credits: www.oregon.gov/ENERGY/CONS/RES/RETC.shtml
- Oregon Business Energy Tax Credits: www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml
- Energy Trust of Oregon Incentives page: <http://energytrust.org/residential/incentives/solar-electric/solarelectric/>
- Oregon's Volumetric Incentive Rate Pilot: www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OR134F&re=1&ee=1
- Clean Energy Works: www.cleanenergyworksoregon.org
- City of Portland Residential Solar Permitting Guidelines: www.portlandonline.com/bds/index.cfm?c=36814&a=193776
- Solar Now! Website: www.solarnoworegon.org
- City of Portland's Solar Website: www.portlandonline.com/bps/solar
- Bureau of Development Services Program Guide: www.portlandonline.com/bds/index.cfm?c=36855

For more city information, contact:

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For more information on going solar in your community, visit *Solar Powering Your Community: A Guide for Local Governments* at http://solaramericacommunities.energy.gov/resources/guide_for_local_governments/

For more information on individual cities' solar activities, visit www.solaramericacommunities.energy.gov/solaramericacities/action_areas/

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Clockwise from top left: Photovoltaic system in Philadelphia Center City district (photo from Mercury Solar Solutions); rooftop solar electric system at sunset (photo from SunPower, NREL/PIX 15279); Premier Homes development with building-integrated PV roofing, near Sacramento (photo from Premier Homes, NREL/PIX 15610); PV on Calvin L. Rampton Salt Palace Convention Center in Salt Lake City (photo from Utah Clean Energy); PV on the Denver Museum of Nature and Science (photo from Denver Museum of Nature & Science); and solar parking structure system at the Cal Expo in Sacramento, California (photo from Kyocera Solar, NREL/PIX 09435)

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