

Beaverton, Oregon



Photo: Elmonica Station, Beaverton, OR

Beaverton

CASE STUDY

**SOLAR
OUTREACH**



PARTNERSHIP

Beaverton, Oregon

Beaverton is a medium-sized city within the Willamette Valley in northwest Oregon. The seat of Washington County, Beaverton affords ready access to Oregon's beautiful coast, mountains, wine country, and some of the most productive agricultural land in the country. More than 93,000 people reside in Beaverton's 18.7 square miles; the city operates under the strong mayor-council form of government and employs 627 staff. Located just west of Portland, Beaverton is one of the most diverse and highly educated municipalities in the state. Home to a conglomeration of high-tech companies, it is the largest city in what is popularly referred to as "Silicon Forest."

City Profile

- Form of government: Strong mayor-council
- Total population (2013): 93,542¹
- Total geographic size (2013 census): 18.7 square miles¹
- Number of city employees: 627
- Major departments: Mayor's Office, City Attorney, Community Development, Finance, Public Works, Library, Police
- Total annual budget (2014): \$184 million²
- Type of electric utility: Private (Pacific Gas and Electric)

1. U.S. Bureau of the Census, "State and County Quick Facts," <http://quickfacts.census.gov/qfd/states/41/4105350.html>.

2. City of Beaverton 2014-2015 Adopted Budget, Page vi, <http://www.beavertonoregon.gov/DocumentCenter/View/8365>.

Despite having more than 200 cloudy days each year, Beaverton is ideal for solar. Its advances in solar photovoltaic (PV) result from community priorities for a green economy, strong city staff expertise, and advocacy supported by a progressive and pragmatic mayor. The city's tremendous gains in a short period of

time have been achieved through a highly innovative and cost-effective approach that relies on contracting and partnerships with the solar PV installation industry, aggressive marketing, and the creative assembly of multiple financing tools, as well as on leveraging political support, reducing energy costs through rebates, engaging stakeholders to take action, and being responsive to changes in the market to make city operations more sustainable.

Solar Beaverton Begins

The city of Beaverton began its [Sustainability Program](#) in 2009. With a program manager and a coordinator, the program works to make city operations, community consumption, and business practices greener through efforts that include, but are not limited to, solar programs, a green building challenge, and electric-vehicle charging stations. Once established, the program implemented a visioning process in which it hosted a series of workshops to gauge community interest in specific areas of sustainability. One of the areas that emerged was the green economy and, specifically, the potential for solar PV's role in it.

In recognition of its advances in renewable energy and sustainability, Beaverton was designated one of only twenty-two [Smarter Cities](#) by the Natural Resources Defense Council in 2010. It also received the [U.S. Mayor's Climate Protection Award](#) in 2012, and the [EPA Green Power Leadership Award](#) in 2012.

Newly elected mayor Denny Doyle responded to the community's concerns by making sustainability and solar PV a major component of his [10 Point Plan](#), which sets his top ten priorities for achieving the [Beaverton Community Vision](#); the Beaverton Community Vision outlines what the city hopes to accomplish in the future through significant stakeholder engagement. The second point within his plan discusses making measurable

strides in sustainability, “by exploring a solar power program for residents, implementing stimulus grants for energy conservation, taking a greenhouse gas inventory and putting a cohesive action plan in place.”¹ Having such direct language directly in his personal plan ties the success of solar to the mayor’s success, thereby ensuring that solar will continue to be a priority in budgetary and political decisions.

Taking action on this priority, the city began efforts to launch a pilot program to increase solar power use among residents and study the results; if the results were compelling, it planned to move on to a more robust, formal program.

Solar Beaverton Pilot

In 2010 there were fewer than ten rooftop solar PV systems in Beaverton. The city’s understanding was that the demand for rooftop solar PV was thwarted by a lack of financial feasibility and the perceived procedural difficulty of installation. The city aimed to help homeowners overcome those barriers by bringing state incentives into the local economy and streamlining a complicated permitting process.

Thus, just one year after beginning the sustainability program, the city launched the [Solar Beaverton Pilot](#), which established a goal of seeing fifty homes install rooftop solar PV systems. This program also aimed to stimulate the city’s permitting department’s activity, which was in a lull and losing revenue because of the economic downturn of the Great Recession. The city closely monitored the success of the pilot so it could make informed decisions about moving forward with a formal program.

To address the financial hurdle, the Solar Beaverton Pilot sought to “[lower] the cost of solar panels through bulk purchasing and taking advantage of available tax credits,” but without the substantial administrative effort it often requires.² This would be accomplished by entering into a no-cost agreement with [Solar City](#), a well-known local leader in the solar PV industry, to provide guaranteed fixed prices at below-market rates as well as permitting assistance and technical guidance to homeowners. In so doing, the city and contractor would effectively address real and perceived barriers of both cost and procedural difficulty. In exchange, the contractor would receive exclusive promotional support from the city. While the approach did not require direct financial investment from the city, it did require overall project management by Sustainability Officer Cindy Dolezel, whose responsibilities included coordination

with solar vendors and communication among city departments and city leadership.

During the pilot phase, the city received over 400 inquiries and equipped fifty homes (the pilot’s target) with rooftop solar PV systems providing 150 kilowatt-hours (kWh) of solar PV power.³ Its efforts not only proved that there was substantial demand for more financially viable rooftop solar PV, but also set a precedent that compelling outcomes could be achieved through the efficient use of city financial and staff resources.

In addition to the fixed price agreement, Solar City provided technical assistance to manage the permit applications for the homeowner. In this two-pronged approach, the city and contractor effectively killed two birds with one stone and addressed real and perceived barriers of cost and procedural difficulty respectively.

The city also took advantage of the educational opportunities offered by Solar City and continues to host a [website](#) managed by Solar City that displays the energy produced from the first fifty solar PV rooftop systems. As shown on that website, these systems put out 141,430 kWh of renewable solar energy in 2013 alone; since installation they have offset 773,222 pounds of carbon dioxide (CO₂), the equivalent of 368.4 mature trees.

Solar Beaverton Evolves from Pilot to Program

Having achieved its goal of fifty solar PV installations, the pilot was deemed a success and the city decided that sufficient demand for rooftop solar PV existed to proceed with [Solar Beaverton](#), a formal residential solar program.

To secure the services of a solar installation company at a fixed price, the city issued a [request for proposals](#) (RFP) in 2011. While the requirements of the RFP were not so prescriptive as to define a specific guaranteed price for solar PV installation, the request did refer to other programs that cited costs at less than \$6 per watt (W). In addition to requiring contractors to provide a “better than market” pricing structure, certifications, and experience standard to the solar PV industry, the RFP asked that proposals describe each team’s approach to sustainability practices and identify local and neighborhood-based service providers, such as subcontractors, employees, consultants, and volunteer organizations.

The winner of the RFP was LiveLight Energy, a local

solar PV installation firm, though Solar City continues to be a strong supporter of the City's solar PV efforts. In exchange for LiveLight Energy's installation of solar PV systems throughout the city at below-market rates, Beaverton promised exclusive promotion through its general media channels, its sustainability office, and its website; social media campaigns through Facebook; and active mayoral support. Taking it one step further, the city hosted community workshops with LiveLight specifically to raise the community's awareness of solar PV's viability and to promote Solar Beaverton. This media support drove resident referrals to the program and eliminated the need for LiveLight to invest in marketing. The city also provided a project manager, who managed the overall activity of Solar Beaverton, including coordination between the LiveLight and homeowner applicants, provision of workshops and educational material, and promotion of the program.

As a result of these efforts, the city saw a sharp rise in the demand for residential solar installations. Although Solar Beaverton did not provide direct financial tools, such as rebates or financing mechanisms, the agreement with LiveLight ensured that homeowners would have help completing all applications and forms related to the state of Oregon's tax credits. Moreover,

Scaling up Renewable Energy production through Renewable Portfolio Standards

FAs reported by Oregon.gov, Oregon's Renewable Portfolio Standard (RPS) operates on a graduated basis for utilities such as Portland General Electric (PGE), requiring them to procure increasing amounts of energy from renewable sources over time:

- 5 percent in 2011
- 15 percent by 2015
- 20 percent by 2020
- 25 percent in 2025¹

Through the Solar Capacity Standard, the Oregon RPS sets specific standards for investor-owned utilities such as PGE to develop solar PV capacity. PGE's goal set under this standard in 2009 was 10.9 megawatts by 2020, which it had already met as of January 2014.²

1. "A Renewable Portfolio Standard (RPS) for Oregon," http://www.oregon.gov/energy/RENEW/Pages/RPS_home.aspx.

2. "Solar Capacity Standard," <http://www.oregon.gov/energy/RENEW/RPS/Pages/RPS-Solar-Capacity-Standard.aspx>.

as federal incentives were passed on to the contractor, LiveLight was able to continue making a profit and guarantee an even lower price for rooftop solar PV equipment and installation. The state credit, which was given at the rate of \$3/W with a ceiling of \$6,000 over four years and was limited to no more than 50 percent of the cost of a system of at least 200 W, was applied to the homeowner's state income taxes after the system was installed and an application was filed.⁴ The credit was offered as part of the requirements of Beaverton's utility, Portland General Electric (PGE), under the Oregon Renewable Portfolio Standard (RPS).

Solar Beaverton started in 2011 with a goal of generating 250 new residential rooftop solar PV installations; by January 2012, it had exceeded its own expectations with 258 systems on Beaverton residential rooftops. Although the program ended in 2013, it had proved market readiness for rooftop solar PV. Reasons for not continuing the program were driven by market prices for solar PV equipment decreasing, effectively closing the gap between financial feasibility for rooftop solar PV and installation costs offered through the private market.

Preparing for Increases in Permit Applications

Beaverton realized that a successful solar PV program would result in an increase in permit applications, which, when combined with what was then a shrinking permit staff, could result in delays in permit approvals. With the potential for such delays to undermine the efficacy and popularity of the program, the city revised its permit and inspection process. Its preemptive approach was warranted. Within two months of the start of the pilot program, the city saw a 1,000 percent increase in solar permit applications over all the years prior to the program's inception.⁵ By the end of the whole program, the final result was a greater than 2,500 percent increase in permits over the number issued when it began.⁶

The city prepared the permit staff for an increased workload by explaining the program and the anticipated influx of applications so they could structure their workload accordingly. Further, it shortened the permit application to only one page, making it far more straightforward for an installer or homeowner. A three-tier permit fee was also established to be predictable and reasonable: the fee was \$115 for less than or equal to five Kilo Volt Amperes (kVA), \$185 for between five and fifteen kVA, and \$255 for projects over fifteen kVA.⁷

To make inspections move as quickly as possible, the city created a [prescriptive installment affidavit](#) form

for the solar contractor, enabling them to complete the inspection independently and allowing for seamless progression from installation to onsite inspection.

Evolving with Market Changes

The city of Beaverton is justly proud of its achievements through Solar Beaverton. As discussed previously, at the time of the Solar Beaverton pilot and program, the city perceived the cost of solar PV equipment (e.g., panels and inverters) as a major obstacle for homeowners. During the program's operation, however, the market price for that equipment decreased, making rooftop solar PV more financially feasible through market forces and reducing the need for a fixed-price contract. With the impetus for the fixed-price contract removed, the city ended the program in 2013 and turned its attention and staff time to making public operations more sustainable through renewable energy projects. As the following examples show, the shift to public facilities demonstrates the city's responsiveness to how changes in the market provided more viable pricing for rooftop solar and continues to support the Beaverton Community Vision.

Solar on Sexton Mountain

[Sexton Mountain](#) is a 15-million-gallon drinking-water reservoir serving approximately 69,000 residents. It is an underground concrete vault topped with grass. In 2013, the water pumps used 1,005,400 kWh of electricity; each year it costs about \$106,000 in electricity to pump water to surrounding residents.

In the fall of 2013, the city solicited proposals from renewable energy vendors to install a 433 kW solar array on top of the reservoir. The structure of the deal

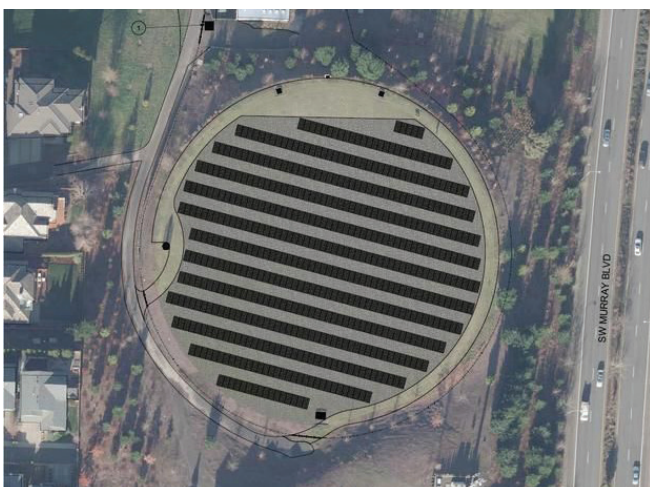
proposed that the vendor operate the system for the first twenty years, at which point the city would have the option to purchase the system at fair market value, extend the agreement, or have the system removed. The installation, as envisioned, is estimated to save the city about \$95,000 per year for the first twenty years and then \$66,000 per year in the fifteen years thereafter.

Environmental benefits are anticipated to be significant: the reduction of 1,373,460 pounds of CO₂; 2,276 pounds of nitrogen oxide; 3,339 pounds of sulfur dioxide; and 176 pounds of particulate matter per year.

When the deal is finalized, which is anticipated in 2014, it will be facilitated through a power purchase agreement (PPA) among the city, the vendor, and the utility, PGE. Under the PPA, the city will lease the land to the vendor and PGE will issue credits to the city for the power supplied to the electrical grid from the project. The city will then pay the vendor for the electricity at a rate below the PGE rate. Energy Trust of Oregon awarded the city \$355,420.80 to help it cover legal and consulting fees to enter into the PPA.

Beaverton Library

Even before the Solar Beaverton Pilot program got under way, patrons of the Beaverton Library read under light generated by renewable solar PV panels on the facility's rooftop. Installed in March 2012, the 17.6 kW system generates over 19,000 kWh of power, reducing the facility's CO₂ emissions by 29,000 pounds per year. Thirty-two trusses were manufactured locally to support eighty PV modules. As of March 2013, the array is estimated to have generated 62,886 kWh of electricity, resulting in a 38-ton CO₂ reduction; real-time electrical output and output overtime are provided [online](#) by the



Solar panels on Sexton Mountain.



Beaverton Library with panels on roof.



'Hot House' gazebo with panels on top.

city of Beaverton and the array's sponsor, Mr. Solar.

The sustainability of the Beaverton Library does not stop on its rooftop. It extends into the library parking lot, where five solar panels sit atop a gazebo popularly referred to as the "Hot House." Donated in 2011 by LiveLight Energy and [SolarWorld](#), the Hot House provides power to three electric-vehicle charging stations. It also serves as a place for community members to find renewable energy and sustainability information and educational material at the farmer's market, which is also held in the parking lot.

Lessons Learned

Beaverton's leadership in finding ways to grow solar PV's role in its energy future has provided several lessons learned that guide their future efforts. These can also be used to help guide the solar PV efforts of other municipalities.

- **Everything counts.** To keep renewable energy and sustainable living at the forefront of the public's mind, the city used a local utility grant to install 1 kW of solar panels on the roof of the city's Activities Center. Doing so has also helped the public associate sustainability and renewable energy with the city as a whole.
- **Be prepared for growth.** The pilot phase showed that the rush of work resulting from the city's leadership may overwhelm just one contractor, depending on its size. With a hefty goal of 220 homes for the program, LiveLight Energy hired additional staff to handle the increased communication and permitting processes.

- **Leverage the power of elected leaders.** Having the support of the mayor or another elected official is invaluable. Having sustainability and solar power included in the mayor's 10-point plan helped ensure that Mayor Doyle's success was at least partially dependent on successful solar PV.
- **Learn from others and let others learn from you.** Solar Beaverton was designed based on the city's belief that making the process easy for residents would increase demand in rooftop solar PV and that effective programs could help ease the cost of those installations. Beaverton's experience proved this belief to be true. The decision to use an RFP for a guaranteed price and standards rather than to initiate a bulk-purchasing program was shaped by lessons learned by Solarize Portland, a tiered bulk-purchasing program in neighboring Portland. Beaverton evaluated Solarize Portland's operational needs and determined that it was not interested in the discount approaches; knowing that its program would not be initiated from a grassroots movement, Beaverton stepped in with a city-led program to bring the state incentives into the city's economy and to stimulate green technology. The citizens showed the demand was there, and Beaverton responded by doing the bulk of the work to set standards. As a result, Beaverton can point to a cost-effective approach that yields compelling environmental and economic benefits. Having benefited from the lessons and tools developed through other approaches, Beaverton makes its documents and processes widely available on its [website](#) so others can benefit in return. These materials include the guaranteed price RFP, the [winning proposal and contract](#), workshop presentations on [solar basics](#) and [financial information](#), and additional resources.

Contacts

Cindy Dolezel: City sustainability manager, cdolezel@beavertonoregon.gov, (503) 526-5545

Keith Knowles: Solar City, kknowles@solarcity.com (971) 400-0712

Endnotes

1. "Mayor Denny Doyle's 10 Point Plan: #2 Sustainability," <http://www.beavertonoregon.gov/index.aspx?nid=248>.
2. A bulk-purchasing program typically offers residents and businesses an economy of scale for purchasing the

hardware (solar panels, inverters, etc.) in bulk, thereby reducing the cost of each unit as the number of units climbs.

3. “2010 Solar Beaverton Pilot,” <http://www.beavertonoregon.gov/index.aspx?NID=1041>.
4. “Solar Electric Systems (Photovoltaic): Application for Purchased Systems, Oregon Department of Energy,” ODOE CF-020 (July 2011), 1, <http://www.oregon.gov/energy/CONS/RES/tax/docs/SolarPV.pdf>.
5. “2010 Solar Beaverton Pilot.”
6. Interview with Cindy Dolezel, sustainability manager, September 9, 2013.
7. “Permit Fee Schedule,” Document B70-1108 (rev. July 2014), 8, <http://www.beavertonoregon.gov/Document-Center/Home/View/598>.

Author

CIII Associates

SunShot Solar Outreach Partnership Case Studies are based upon work supported by the U.S. Department of Energy under Award Number DE-EE0003526. The U.S. Department of Energy (DOE) SunShot Initiative is a collaborative national effort to dramatically reduce the cost of solar energy before the end of the decade. The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. DOE program providing outreach, training, and technical assistance to local governments to help them address key barriers to installing solar energy systems in their communities. The International City/County Management Association (ICMA), American Planning Association (APA), and National Association of Regional Councils (NARC), along with ICLEI-Local Governments for Sustainability and its partners, were competitively selected by the U.S. DOE to conduct outreach to local governments across the United States, enabling them to replicate successful solar practices and quickly expand local adoption of solar energy. For more information visit the SolarOPs website (solaroutreach.org).

Disclaimer: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.



**SOLAR
OUTREACH**



ICMA

Leaders at the Core of Better Communities