BONNEVILLE ENVIRONMENTAL FOUNDATION

The Northwest Community Solar Guide

SUSTAINABLE ENERGY FOR ECONOMIC DEVELOPMENT

NORTHWEST S·E·E·D

ACKNOWLEDGEMENTS

The Northwest Community Solar Guide was developed jointly by the Bonneville Environmental Foundation and Northwest Sustainable Energy for Economic Development.

ABOUT THE BONNEVILLE ENVIRONMENTAL FOUNDATION (BEF)

Bonneville Environmental Foundation (BEF) is an entrepreneurial nonprofit that is creating a more sustainable future by investing now in clean energy and fresh water. When customers purchase BEF's independently certified carbon offsets and renewable energy certificates, they support the reduction of greenhouse gas emissions and the development of new renewable energy facilities. Additionally, their purchases support long-term watershed restoration and renewable energy education for students and communities nationwide because BEF reinvests its net revenue to fund its 10-year Model Watershed and Solar 4R Schools programs. Since its inception in Portland, Ore. in 1998, BEF has been a pioneer in helping people and companies become better stewards of the environment. For more information, see **www.b-e-f.org**.

ABOUT NORTHWEST SUSTAINABLE ENERGY FOR ECONOMIC DEVELOPMENT (NORTHWEST SEED)

Northwest SEED works to establish a clean, diverse, and affordable Northwest energy system based on efficient use of renewable resources with maximum local control and ownership of energy assets. Working collaboratively with motivated communities, Northwest SEED researches and implements clean energy solutions that provide economic benefits while creating a healthy and secure energy future. For more information, see **www.nwseed.org**.

BEF and Northwest SEED are solely responsible for errors and omissions.

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BONNEVILLE ENVIRONMENTAL FOUNDATION

NORTHWEST S·E·E·D — Sustainable Energy for Economic Development

Purpose

Citizens of the Northwest, troubled by the economic, political, and environmental consequences of traditional fossil fuel generation, increasingly seek to develop significant renewable energy projects within the region. Advances in solar technology and an increase in federal and state tax incentives have made such development more financially feasible. Despite progress on these fronts, however, the economics of solar electricity remain challenging and demand continued creativity on the part of solar supporters.

In response to the existing market and regulatory conditions, some communities have devised creative solar project models that aggregate funds from individual contributors in an attempt to lower costs and to ease the burden of solar ownership. This "Community Solar" concept has generated significant interest of late, regionally and nationally.

Despite the promise that Community Solar holds, navigating the maze of financial incentives, legal structures, and technical decisions can be daunting to anyone trying to develop such a project. Because solar incentives vary from state to state and from utility to utility, as do solar resources and electricity prices, there is no ideal Community Solar business model. This fact further complicates the organizing process for any well-intended project leader.

This guide is designed to be a resource for those hoping to construct Community Solar projects: community organizers, solar energy advocates, government officials, or utility managers. By explaining the universe of available incentives and by detailing the past efforts of other solar advocates, this guide hopes to light the path for future organizers as they seek to comprehend the incentive landscape, to devise financial models, and to garner financial and logistical support for their projects.

How To Use This Guide

This guide first provides an introduction to the concept of Community Solar, and then details five innovative project models already in operation throughout the region. The next section describes the existing state, federal, and utility policies and incentives that are presently vital to the viability of solar projects. Finally, the guide attempts to provide practical tools and tips (financial, technical, and organizational) to help communities get started on their own project.

The project examples should provide useful insight into the design of a successful Community Solar model, though projects vary in any number of ways, including size, financing mechanism, and level of utility involvement. The onus, therefore, is on the organizer to identify the project features that most suit his/her particular community, project site, and stakeholder group and to devise a unique model that offers the greatest chance of success. New and innovative projects will be profiled in future iterations of this guide.

Just as this guide cannot prescribe a particular financial model for a given community, it cannot long be a current repository of all available incentives, or even a comprehensive record of the region's community solar efforts. State, federal, and utility policy is simply too dynamic, and community project organizers are too numerous and inventive. Within a few months of publication, this original guide will likely be outdated for any number of reasons. In an effort to track the most recent developments, the guide will be updated periodically and the latest version will be available at **www.nwcommunityenergy.org/solar**. These updates will catalog new community solar projects online as they are built.

Introduction To Community Energy & Definition Of Community Solar

Renewable energy projects have several advantages over their fossil fuel generation counterparts. They produce electricity without climate-changing carbon emissions and have a lower environmental impact. Renewable energy investments lead to more stable energy prices and contribute to the nation's energy security by reducing its dependence on foreign oil. Community Energy projects, including wind, geothermal, biomass, solar and conservation efforts, involve a collective effort or pooling of resources to share in the benefits of clean energy.

The advantages of developing a clean energy project with substantial community ownership and involvement may include:

- Greater economic benefit to local communities
- Increased local awareness, involvement in, and support for clean energy
- Strengthened communities through collaborative efforts
- Optimal project siting
- Reduced cost due to economies of scale
- Lower entry cost (and risk) to any single owner

Most community-based efforts are driven by these potential benefits.

The first step in considering the development of a clean energy project for a particular community involves finding the right resource. For the majority of Northwest communities, solar energy is the most available renewable energy resource. While there are windy exceptions, such as those along the Columbia River Gorge, as well as a few communities with unique geothermal resources in Southern Oregon, solar energy's ubiquity often makes it the most appropriate technology for project development. Solar technology's modularity and compatibility with the built environment broadens opportunities even further, particularly for urban and suburban communities.

The Northwest holds a somewhat unwarranted reputation as a poor solar resource. While the Northwest certainly endures long stretches of cloudy winter and spring days, it also enjoys many lengthy, uninterrupted days of summer and fall sunshine. And while there are geographic variations in the quality of the solar resource (Southeastern Oregon is sunnier than the Puget Sound region, for instance), even the poorest solar resource in the Northwest US exceeds that of Germany- the world's leader in solar energy use.

For these reasons and more, solar-electric technology is usually the preferred mechanism for regional community energy projects.

> For the purpose of this guide, Community Solar is defined as a solar-electric system that, through a voluntary program, provides power and/or financial benefit to, or is owned by, multiple community members.

In this guide, the term "Community Solar" focuses on projects designed to ***increase access*** to solar energy and to ***reduce upfront costs*** for participants. The secondary goals met by many of the Community Solar projects explored in this guide include the following:

- Reduction in costs through economies of scale
- Optimal project-siting opportunities
- Increased public knowledge about solar energy
- Participation beyond core solar supporters
- Removal of home ownership as a barrier to participation in solar
- Generation of local jobs
- Opportunity to test new models of marketing, project financing, and service delivery

Community Solar Project Model Overview

There is no one-size-fits-all model for a Community Solar project. The size and structure of the project depend on the resources and requirements of the community. Some of the variable project elements include:

- **INSTALLED CAPACITY**: Is the initial installed capacity of the project just a few kilowatts with room for expansion, or is it a 1 MW project?
- **ELECTRICITY AND RENEWABLE ENERGY CERTIFICATE OWNERSHIP:** Who owns the energy and non-energy attributes (renewable energy certificates or RECs) associated with each kilowatt-hour generated by the project?
- **FINANCIAL INCENTIVES:** Do participants qualify for the tax credits or production incentives currently available for single-owner installations? Is participation tax deductible?
- **FINANCING:** Is the system financed privately or are public mechanisms such as Clean Renewable Energy Bonds (CREBS – discussed in detail later) used?
- **PARTICIPATION FEES:** Do participants submit one upfront payment, or do they pay over time?
- **VIRTUAL NET-METERING:** How do participants get credited for the electricity produced by the project? Do they receive a credit on their utility bill for a calculated percentage of the project's actual metered production, or a percentage of expected production, or is there another mechanism? Are the participant's paid at the retail rate or the wholesale rate?
- **ENROLLMENT:** Will the project accept additional participants after completion of construction, or do participants have just a single opportunity to enroll? Does pre-construction enrollment determine the project size, or can the project be built to meet future demand?

Some of the many possible combinations of these elements are found in the following Community Solar case studies:

- Ashland, Oregon's *Solar Pioneers II*
- Ellensburg, Washington's *Solar Community*
- Sacramento Municipal Utility District's *Solar Shares*
- St. George, Utah's *SunSmart Program*
- Solar for Sakai on Bainbridge Island, Washington

Though the next section describes each project in detail, the following chart is a quick reference outlining the various elements employed by each of these Community Solar projects.

	ASHLAND	ELLENSBURG	SACRAMENTO	ST. GEORGE	SAKAI
Initial Installed Capacity	63 kW	36 kW	1 MW	100 kW	5 kW
Utility Manages	✗	✗	✗	✗	
Members own output	✗	✗	✗	✗	
Members own rights to RECs		✗			
RECs retired on members' behalf	✗		✗		
Members receive tax credit				✗	
Members receive tax deduction					✗
Project uses CREB financing	✗				
Non-members contribute financial assistance*		✗			✗
Members contribute one-time participation fee	✗	✗		✗	✗
Members contribute ongoing fee/ premium			✗		
Project uses "virtual net-metering"(based on actual production)**	✗	O		✗	
Project uses "virtual net-metering" (based on estimated production)**			✗		
Members enroll prior to construction		✗			✗
Members can enroll after construction	✗	✗	✗	✗	

✗ = This program uses/includes this mechanism, described in detail below.
O = This program uses a similar mechanism, or it is unclear if this mechanism is used, discussed below.

* *Non-member financial assistance includes any donation, grant, rebate, or other allocation of funds to the project not provided by members. Receipt of such funds may improve the financial return to members.*

** *In a typical net metering scenario, the electricity produced by the power system is deducted from the electricity consumed by the facility. The consumer only pays for the "net" electricity consumed by the facility, and therefore receives the credit for the power produced by the system at the retail rate. Here, the term "virtual net metering" indicates that each member receives credit for the power produced by the system as if a system were actually located on his or her home or business.*

Creative mechanisms designed to foster greater deployment of solar energy projects are not limited to those described in this guide. Readers may be interested in investigating the following efforts that employ some elements of community solar, but do not meet this guide's full definition:

- Berkeley FIRST- Property Tax Assessment financing program in Berkeley, CA
- Massachusetts Neighborhood Net Metering
- New Jersey Public Utilities Commission's Red Sky Project
- New York City's Solar Empowerment Zones
- Bulk purchasing groups and residential solar leasing in San Francisco, CA

CASE STUDIES

Ashland, Oregon's Solar Pioneers II

BACKGROUND: Ashland's Municipal Utility is governed by the City Council. The utility offers a PV rebate program ($2.25/W for residential and $1.00/W for commercial customers, with a maximum rebate of $10,000 per customer) and a program called Solar Pioneers I. Through Solar Pioneers I, the utility installed four PV systems, totaling 30 kW, using both public and private funds. Voluntary participants paid a green premium until the system costs were recouped. Participants of Solar Pioneers I did not receive any power, monetary benefits, or rights to claim RECs (environmental benefits associated with the power produced) from the project.

PROGRAM GOALS: Through the Solar Pioneers II program, Ashland hoped to increase access to PV while, at minimum, matching the economic return of individual PV system projects that receive existing Federal, State, and City incentives. In Oregon, such systems can already achieve 10-17 year paybacks (residential) and 5-9 year paybacks (commercial).

PROJECT FINANCING: Meeting or beating the financial return available to individual solar investors was a major challenge, as both the Federal and State incentives come in the form of tax credits, for which the City utility is not eligible. The IRS approved Ashland's request to use Clean Renewable Energy Bond (CREB) financing (bonds sold at zero or very low interest), however, and the City also took advantage of the Oregon Business Energy Tax Credit (BETC) pass-through option. Bank of America purchased the CREB bonds at 1.25% and received tax credits, accordingly. Similarly, the Bank of the Cascades signed on to be the Oregon BETC pass-through partner, purchasing the 35% tax credit (taken over 5 years) in exchange for a one-time payment to Ashland equal to 25.5% of the system cost.

Ashland paid for project installation before members purchased shares of the project. Expenses associated with unsold shares were simply absorbed by the utility ("rate-based") with the approval of the City Council.

COSTS: The installed cost of Ashland's 63 kW Community Solar project, completed in 2008, was just under $7/Watt installed. The City had to revise their Request for Proposals (RFP) process to remove standard performance bond requirements for contractors, as well as permitting fees, in order to achieve this price per watt.

SHARED-OWNERSHIP MECHANISM: Solar Pioneers II members currently include both citizens and businesses (all ratepayers). These members make upfront purchases, in ¼, ½, or full solar panel increments, and receive payment for the value of the corresponding energy produced for a term of 20 years. Members also receive the rights to the associated RECs. These RECs are actually retired by the utility on behalf of the participating members, so the members can claim the environmental attributes as their own, but cannot trade or sell them.

BILLING: A once-per-year credit, representing the monetary value (at retail rate) of power produced by each member's share of the project is applied to the electric account for twenty years. The credit can be carried forward monthly until it is used. In the event that the credit is not fully used by the end of the year, the member will be paid for the remaining balance in the form of a check separate from the utility bill. Members can request that credits be transferred to any account within Ashland's service territory. Any reimbursement for account transfers occurs between the customers.

RETURN: One panel ($825 upfront) is, at current electricity prices, projected to produce about $480 worth of savings over 20 years. This return does not meet the original program goal (a return at least equal to that achieved by individual system owners that use existing incentive programs). However, the Solar Pioneers II goals are broader than financial; the project successfully increases access to PV projects. And, even from a financial perspective, participation in the project can still serve as a hedge against rising electricity prices. As the price for electricity from the grid rises, the community solar participants' return on investment improves.

TOTAL INSTALLED COST	**$420,000**
Cost after BETC pass-through	$312,900
Participants' investment as of 11/1/08	$82,500

MARKET RESEARCH: Market research was not conducted prior to constructing the Solar Pioneers II project.

MARKETING & PARTICIPATION: The Solar Pioneers II system was installed and began producing power in July of 2008. Ashland has marketed the project through direct mailings, a billing newsletter, events, exhibits, and gift campaigns for local charities. As of November 2008, 100 panels had been sold.

CASE STUDIES

Ellensburg, Washington Community Solar

BACKGROUND: Originally conceived in 2003 by the City of Ellensburg, Washington State University Energy Extension, and the Bonneville Environmental Foundation, the Ellensburg Solar Community Project was a groundbreaking endeavor, claims to be the "1st Community Solar project in the nation," and continues to receive much national attention. Project organizers hoped to design a model that would increase the demand for solar energy by allowing community members to participate directly. After several years of program design, community organizing, and fundraising, the City of Ellensburg put the project out to bid. It began generating power in November of 2006, and has since produced more than 170,000 kilowatt-hours, averaging 58,000 kilowatt-hours, annually.

The solar project is highly visible, located on the west end of a popular community park and just yards off of Interstate 90, one of Washington's busiest highways (hosting an average of 18,000 travelers per day). Central Washington University graphic design students created a 28' x 18' sign that will soon be visible to those traveling on the interstate towards Seattle.

DETAILS ON THE INITIAL SYSTEM AND EXPANSION FOLLOW:

Phase 1 – 36kW

Phase I of the project, composed of 120, 300-watt polycrystalline solar modules, came on-line in November 2006. Seventy-three members signed up to participate at that time. In addition to receiving contributions from these investors, Ellensburg utilized a grant from the Bonneville Environmental Foundation and funds from the Bonneville Power Administration's Conservation Rate Credit (CRC) program.

Phase 2 – 21.6kW

The City of Ellensburg completed the second phase in February of 2009, adding more than 20-kW to the project. Central Washington University contributed most of the funding for this second phase, using grant money received from the State of Washington's Office of Financial Management. The City of Ellensburg also utilized funds from BPA's Conservation Rate Credit (CRC) program. Central Washington University will receive credit for the power produced by Phase 2 of the system.

Phase 3 – 24kW (proposed)

Due to the ongoing popularity of the Community Solar program, the City of Ellensburg is planning to offer a third expansion of up to 24-kW to local community members (individual and business ratepayers). The City is leading the member solicitation process, currently (summer of 2009), and has already raised $124,000 for this next Phase at the time of this writing. Ellensburg anticipates using thin-film solar technology for Phase 3, to compare its performance to that of the polycrystalline modules installed in the first two project phases. Over the next three years, the City hopes to expand the project to 165-kW.

FINANCING & OWNERSHIP: Ellensburg's Solar Community program allows local individuals and businesses to participate directly in the solar-electric project. Local residential and commercial utility customers were asked to partner with the City to help fund the project. In exchange for their financial support, the members receive compensation for each kilowatt-hour of electricity produced by the project (in a form of a credit on their utility bill) for a period of 20+ years. To calculate member reimbursement, Ellensburg values the power at BPA's wholesale rate.

PHASE 1 (36KW) FUNDING:	
Contributors/Customers (73)	$103,000
Bonneville Environmental Foundation	$54,000
BPA CRD funds	$128,000
Total Installed Cost	$285,000
Cost per watt	**$7.91**

PHASE 2 (21.6KW) FUNDING:	
Central WA – Grant Funding	$98,855
BPA CRD funds	$53,610
Total Installed Cost	$152,465
Cost per watt	**$7.06**

Though the City of Ellensburg owns the project, the contributing members may at any time sell, assign, or donate their "shares" (the rights to the value of the power) to any other individual or commercial utility customer. The members also own the rights to the environmental attributes (RECs) produced by the system.

Because the City of Ellensburg, a public utility, technically owns the project, the project did not qualify to receive either Washington State's Production Incentive (SB 5101) payments or the Federal Tax Credit. However, Washington State SB 6170, which passed in May of 2009, allows for individual members of a community solar project to qualify for the state production incentive program, based on the portion of their participation

in the project. As of the writing of this guide the rules have not been codified, but it appears that participants of Ellensburg's project will be eligible to receive an annual production payment of $.30 per kilowatt-hour generated, up to a maximum of $5,000 per year per member, extending through year 2020. For more information on the Washington State Renewable Energy Production Incentive, please see the following section on Policies and Incentives. The North Carolina Solar Center and the Interstate Renewable Energy Council also maintain a thorough database of available national and state incentives at **www.dsireusa.org**.

BILLING: Participating members receive on-bill crediting quarterly. The utility uses the following formula to calculate the credit:

	×		×		=	
# of kilowatt-hours produced	×	investment level *	×	BPA wholesale rate	=	$ credit

* *The investment level is the individual contribution amount divided by the total investment pool ($103,000)*

EXAMPLE:	
Customer investment	$1,500
Investment level/share	1%
BPA Wholesale Rate	5¢
Quarterly production from solar system	13,000 kWh
Quarterly credit on bill	$6.55
Annualized credit	**~$26.20**

Because the number of project members is relatively small, the City of Ellensburg's Energy Services maintains a simple spreadsheet that tracks each contributor, investment amount, and kilowatt-hours produced by the system. Ellensburg's billing department then applies the credit manually to each customer's bill on a quarterly basis. The credit appears as a dollar amount titled "Solar Credit."

Ellensburg's on-bill crediting has been described as "virtual net metering." Under the traditional net metering scenario, a utility applies the value of any excess power produced by an owner's solar system to that owner's utility bill at the retail rate. To mimic true net metering, therefore, a project would have to reimburse the members at the retail rate of power. Ultimately, an Ellensburg member may receive a financial return similar to or better than that of a net-metered system because the share price is subsidized by others' donations. Nonetheless, the term "virtual net metering" does not exactly apply in this instance.

MARKETING, EDUCATION & OUTREACH: To launch the project, City of Ellensburg Resource Management staff created a single-page overview sheet along with a marketing brochure that included a Community Solar Contribution Pledge form. A minimum initial contribution by each customer was set at $250 to ensure administrative costs were covered. Once the initial contribution has been made, contributors can increase their contribution at any time and for any amount through 2010. The utility allows the customer to contribute towards the

project, up to the point that their annual solar credit zeros out their electric bill. Ellensburg accepts contributions via check, credit card, payroll deduction, and directed contributions.

In addition to distributing marketing materials, Resource Management staff delivered several lunch and evening presentations at the City Hall. Staff also spoke at many of the community's local clubs and organizations. Regional TV and radio stations conducted interviews about the project, and community and college newspapers wrote feature stories. A large display with a digitized picture showing how the solar system would look on the site was set up in the main lobby at City Hall, accompanied by informational materials and pledge forms for customers to fill out.

Strong local support from the Utility Director, the Ellensburg Chamber of Commerce, the City Manager, and City Council was vital to the success of the Ellensburg's project. The project received unanimous approval by the council, and three of the council members even contributed money towards the project. Some of the other key financial and technical supporters of the project included the Bonneville Power Administration (BPA), the Bonneville Environmental Foundation (BEF), the Northwest Solar Center, the State Department of Ecology and Central Washington University.

The Ellensburg project organizers achieved their primary goal of enabling ratepayers to participate directly in a local solar project. The educational outcomes of the project have been equally successful, and underscore the true "community" nature of the Ellensburg project. The local university, Central Washington University (CWU), is closely allied with the project, and University students participate in myriad ways. For instance, a CWU engineering student designed the adjustable racking system to hold the solar modules. CWU's Civic Engagement Center provided senior marketing students to design the project logo and marketing materials, and an IT student developed a project web page.

The education is not limited to college students, though. As part of its commitment to the project, the Bonneville Environmental Foundation delivered renewable energy education to all K-12 schools in Ellensburg. Each school received renewable energy curriculum, a science kit, and a full day solar training session. BEF also created for each school a series of web pages that allow the students to view and download the live and historical data from the Ellensburg project, in order to complement the donated renewable energy curriculum. Finally, all participating K-12 teachers received continuing education credits from CWU, Project information, photos, and live data is available at: **www.solar4rschools.org/schools/ellensburg-community-project**

CASE STUDIES

Sacramento Municipal Utility District's (SMUD) Solar Shares Program

BACKGROUND: SMUD has long been a leader in US solar energy deployment and has crafted many programs to reduce the economic barriers to solar energy deployment. SMUD currently offers a rebate of $2.50 for each watt of installed residential solar. SMUD also uses a 3-tiered rate system for residential electricity billing in order to encourage conservation, in which higher levels of consumption are billed at higher rates. Inadvertently, however, this rate structure can penalize some net-metered customer generators who first invest in efficiency measures. Because these customers pay a lower rate for electricity, they also receive a lower credit for their net-metered power.

PROGRAM GOALS: The primary goal of SMUD's Solar Shares program is to make solar energy accessible when customer-sited generation is not an option. Solar Shares, therefore, targets renters, as well as homeowners that may have solar siting issues. With the program, SMUD also hopes to remove the rate-tier "penalty" for customer generators that invest in efficiency first (described above), and to devise an incentive program that encourages customer participation but that costs the utility less than the customer-sited solar rebate of $2.50 per watt.

FINANCING & OWNERSHIP: SMUD considered community ownership models like those attempted in Ellensburg and Ashland, but had legal concerns regarding the sale of securities. SMUD determined that it was unclear whether or not selling shares of a solar property would require SEC oversight/involvement. Thus, SMUD designed a system that allows customers to purchase output from a solar project on a monthly basis. The utility uses a monthly "virtual net-metering" model based on expected system generation.

SMUD put the 1-MW system construction, ownership, and operation out to bid, and awarded the contract to enXco. Thus, enXco actually owns the system, and provides the power generation to SMUD through a twenty-year power purchase agreement. In turn, SMUD supplies the solar power to customers enrolled in their voluntary SolarShares program. This partnership between utility and developer enables all customers to be "virtual solar owners."

Customers (households) are defined as small, medium, and large energy users based on the previous year of consumption. The category of consumption determines the price per kWh. Solar Shares customers can choose to meet 20-40% of their energy use through the program. Originally, SMUD considered letting customers choose their own level of investment, but the utility wanted a distribution of small, medium, and large consumers. With small and large customers being incentivized at different amounts, the blended incentive rate is approximately $1.50 per watt. While customers receive all the environmental benefits of buying solar power, they avoid the large upfront costs by paying over 20 years.

The following chart shows the Solar Shares program structure, with costs per share per customer class:

TYPICAL CUSTOMER SIZE *% participants*	SMALL, 34% *<6,000 kWh/Yr*		MEDIUM, 48% *6,000-14,000 kWh/Yr*			LARGE, 18% *>14,000 kWh/Yr*			TOTAL/ BLENDED
Expected Annual Usage *(kWh/Yr)*	4,000		9,000			18,000			
Forecase kWh Sales *(20 Yr Average)*	531,339		750,126			281,297			1,562,762
Customer Goals *(# customers)*	340-680		240-480			45-90			625-1,250
System Size *(kW)*	0.5	1	1	1.5	2	2	3	4	
SS Fixed Cost *($/mo)*	$10.75	$21.50	$26.50	$39.75	$53.00	$66.00	$99.00	$132.00	
Average Monthly Net Cost *($/mo)*	$4.07	$8.14	$9.04	$14.57	$20.39	$20.04	$30.40	$42.73	
% Usage from SolarShares	22%	43%	19%	29%	39%	19%	29%	39%	
SMUD Subsidy *($/W)* **GOAL < $2.50/W**	$2.10	$1.44	$0.58	$1.51					

Credit: Rachel Huang, Sacramento Municipal Utility District

Members pay a fixed monthly Solar Shares fee. Over the course of a year, this fee exceeds the amount SMUD customers would otherwise pay for electricity. However, the credit that Solar Shares members receive for production can exceed the fixed Solar Shares fee in any given month, depending on system performance. Small customers pay a lower premium (meaning the production credit goes further toward the fixed fee) than larger customers do, rewarding conservation.

SMUD retires associated Renewable Energy Certificates (RECs) on behalf of the customers, and cannot resell them, so that participating homes are truly solar powered.

Comment: By offering different customer categories, SMUD has added complexity to the program. Each customer receives an individual quote, a practice that makes it difficult for staff to answer prospective members' questions and to promote the program. According to the Program Manager, there is no easy answer to the common question, "how much does it cost to participate?"

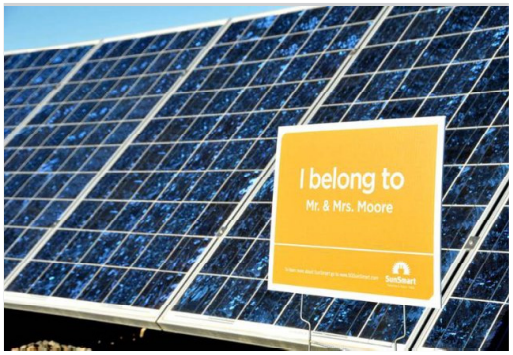
MARKET RESEARCH: SMUD conducted focus groups to gain more insight into ratepayers' interest in and understanding of the Solar Shares program. The focus groups described the concept as a solar-based green power option. SMUD concluded that not only were people interested in joining the Solar Shares program, but that they would also continue to purchase SMUD's other green power offering, Greenergy.

The Solar Shares array is located approximately 40 minutes from downtown Sacramento. It is within SMUD's service territory, but is not readily accessible to SMUD customers. Thus, the Program Manager believes that messaging is key to connecting participants to the project. SMUD does not emphasize the "localness" of the project but instead touts the benefits of solar power and the "virtual" ownership model.

MARKETING AND PARTICIPATION: SMUD made a conscientious effort not to market Solar Shares to existing Greenergy customers, even though the focus group participants indicated that they would be inclined to participate in both programs. This attempt to avoid merely transferring clean energy customers from one program to another created a marketing challenge, as many of the "lowest hanging fruit" had already been picked. SMUD did a "media blitz" at the program's launch and acquired most of their customers at that time. To make Solar Shares members feel more connected to the project, SMUD distributes to each customer a window cling that announces participation in the program. As of November 2008, SMUD had acquired 444 Solar Shares customers, and had "sold" approximately 70% of the system.

CASE STUDIES

St. George, Utah SunSmart Program



BACKGROUND: The City of St. George Energy Services Department, a municipal utility, and Dixie Escalante Electric, an electric cooperative serving Southern Utah, collaborate to offer the SunSmart program to their customers. Additionally, both utilities offer some version of green power and net metering to their customers. St. George Power customers have access to the Clean Green program, which supports City green power projects. Residents can participate with a monthly fee on their electric bill starting at $2.95. St. George also offers a $2 per watt rebate for individual net-metered PV installations (with a cap of $6000 for residential and $20,000 for commercial systems). Dixie Escalante offers the Greenway program to their customers, which supports renewable energy projects for a monthly fee beginning at $6.

PROGRAM GOALS: These St. George utilities jointly launched the SunSmart Program to increase the use of renewable energy, to develop a local power source to mitigate peak demand spikes, and to promote sustainability for the growing community. Solar was an obvious choice, as the area enjoys about 310 days of sun per year. The utilities plan to install twenty, 100-kW projects.

FINANCING AND OWNERSHIP: The utilities plan to construct the project in phases so that member funds from the first phase will provide the capital to build the second phase, and so on. When the last phase is complete, the utilities will recoup the funds spent for the first phase capital. The first phase of the installation is 100 kW, and began generating power in January of 2009. Both utilities provided the required initial capital from their general funds, and hope to recoup this investment as members sign up to participate.

Each share of the SunSmart project represents 1 kW of solar and is priced at $6,000. Half units are also available, and there is a limit of four units per resident. This pricing scheme is designed to cover both the cost of the equipment and the installation.

A unique benefit of this project is that St. George residents who purchase shares qualify for the State's Renewable Energy Systems Tax Credit of 25%. In March 2008, the Utah Legislature modified the state tax credit to

expand eligibility to those who own solar panels as part of a system on municipally owned property. On a related note, owners of PV shares in any community model are not currently eligible to take advantage of the Federal Tax Credits. The Federal Residential Renewable Energy Tax Credit requires that the PV system be located on the taxpayer's dwelling, and the Federal Business Energy Tax Credit requires that the owner take legal title and control over the equipment.

After purchasing units from the SunSmart Solar Farm, members receive monthly kilowatt-hour credits on their utility bills based on the amount of energy produced by the system. A major benefit of this "virtual net-metering" model is that the power produced on behalf of each member is valued at the retail rate, while members still benefit from the economies of scale and convenience offered by a centralized Community Solar project. Moreover, should electric rates increase in the future, the value of the energy credit will also increase. The utilities guarantee a minimum output of 800kWhs per kW unit per year. However, the purchase agreement also assigns all RECs (environmental attributes) to the City/Utility.

MARKET RESEARCH: Though community participation in St. George's green power program was quite limited in 2007, the City believed there would be significant interest in local renewable energy projects after witnessing significant public outcry over a proposed nearby coal-fired generator. St. George hired a marketing firm in 2008 to confirm the public interest and to determine the best way to market the SunSmart facility. The feedback from the focus group indicated that the community was, in fact, interested in locally produced renewable energy, but that citizens did not appreciate the capital costs involved. They expected that power from a renewable energy facility should be inexpensive, regardless of resource.

MARKETING AND PARTICIPATION: As of May 2009, the utilities had sold 26% of the 100kW system to 24 subscribers. The utilities hope that 500 residents will participate, and believe that this target is achievable once the system is operating, visible, and better explained to potential customers. The project has a website: http://**www.sgsunsmart.com/index.htm** and a brochure. The project construction has garnered attention by the press, and project organizers are planning additional publicity.

It should be noted that marketing messages include the claim that participants reduce their carbon footprint, yet the utilities claim ownership of all RECs associated with the power and do not commit to retiring these RECs on behalf of participants. The dangers of misleading project participants and double counting the RECs are real and should be addressed by project organizers.

CASE STUDIES

Solar for Sakai on Bainbridge Island, Washington

BACKGROUND: Community Solar on Bainbridge Island is a grassroots effort. Bainbridge residents Joe and Tammy Deets are engaged citizens with a passion for community building and reducing their climate impact. As they investigated solar's potential to supply the Island's energy needs, Joe and Tammy realized that many residents on Bainbridge Island lack the optimal site for investing in PV. Thus, they devised a plan to aggregate citizen investments and install a single Community Solar system on a public building. This community ownership concept, however, did not benefit from the Washington State Production Incentive at that time (2008), as this incentive program required single ownership of a PV system at a single meter (Washington SB 6170, passed in May 2009 and effective July 1, 2009, enables Community Solar projects to qualify for the incentive). As such, the proposed Bainbridge Community Solar project would not provide investors with a financial return on par with that of a privately owned project. The Deets developed an alternative approach, and formed a private, non-profit organization called Community Energy Solutions. Through this organization, they are able to raise funds for solar energy projects that do not provide power to private investors, but do provide other values to the community.

The Sakai Intermediate School on Bainbridge Island is the first entity to partner with Community Energy Solutions to host a PV project. Early on, the parties agreed to install a10-kilowatt system, a system large enough to make a material economic difference to the school, affordable from a fundraising standpoint, and whose electricity production would not exceed the Washington State Production Incentive cap. Organizers installed phase one of the project, 5.1 kW, on the school's gymnasium roof in late 2008, and they hope to install an additional 5.1 kW in 2009, depending on the level of community participation.

PROGRAM GOALS: Community Energy Solutions wants to promote the use of renewable energy on Bainbridge Island by organizing solar projects funded by private citizens' tax-deductible contributions. The company has educational goals, as well, as exemplified by the hands-on educational opportunities afforded the Sakai School and the surrounding community.

PROJECT COST AND FINANCING: Solar for Sakai was anchored by grant funds of approximately $25,000 from Puget Sound Energy's (PSE) Solar4R Schools program, which is administered by the Bonneville Environmental Foundation (BEF). Working on behalf of PSE, BEF managed the design and construction of the first kilowatt, delivered renewable energy curriculum, web-based data monitoring, teacher training, and an interactive kiosk. BEF also ensured that the system would be easily expandable when Community Energy Solutions received additional contributions. Subsequently, Community Energy Solutions raised an additional $30,000 through private tax-deductible contributions to fund the additional 4.1 kW installed in phase one. Community Energy Solutions anticipates that phase two will cost about $50,000.

OWNERSHIP: The Sakai Middle School owns the PV system and all of the resulting power and environmental attributes. Though the local contributing citizens do not receive any payment for the energy produced from the system, they do qualify for a tax deduction as the contribution was made to a non-profit entity.

BILLING: Sakai Middle School, as a single owner on a single property, qualifies for both net metering and the Washington State Production Incentives paid through PSE. Because PSE and the Bainbridge community (via Community Energy Solutions) contributed the required capital for the project, the school agreed to apply all savings and revenue from the PV generation to additional energy conservation efforts.

MARKETING & PARTICIPATION: Community Energy Solutions, in collaboration with the Bainbridge Island School District, led the marketing, fundraising, and overall management of the project. The initial financial contribution by Puget Sound Energy created excitement about the system and spurred expansion activities. Community Energy Solutions raised additional funds for the project through grassroots efforts. The organization generated interest by posting project information on its website, attending community events, leveraging the interest of local public officials, and engaging the Sakai School community.

Introduction

The following sections introduce some of the state and federal policies and incentives that may help move Community Solar projects forward. Many of these incentives pertain to certain project ownership models (e.g. public versus private) or to different project scales (e.g. 5 kW versus 50 kW). These incentives can also interact in complicated ways, and project organizers should seek further information before including these incentives in a project plan. In addition to investigating the available state and federal incentives, project developers should inquire about individual utility incentive programs for solar project development. Utility assistance could take the form of a grant or a rebate, or an in-kind contribution such as engineering support or reduced-cost installation labor. The Database of State Incentives for Renewables and Efficiency, found at **www.dsireusa.org**, is a fantastic resource for those investigating local, state, and federal incentive programs.

A quick description of important terms related to policy and incentive investigation follows below:

- **RENEWABLE ENERGY CERTIFICATES (AKA RECS, CARBON OFFSETS, OR GREEN TAGS):** A renewable energy facility produces two distinct "products." The first is electricity. The second is the package of environmental benefits resulting from not generating the same electricity -- and emissions -- from a conventional gas or coal-fired power plant. The renewable electricity displaces the dirtier power that would otherwise have been generated and delivered to the power pool. These environmental benefits can be separated from the electrical power and packaged into a REC. The REC then represents the collective environmental benefits of avoided CO2.

  The electricity generated by the renewable project is sold as generic power, separately from the REC. No environmental claims can be made for this power because the REC now represents the entire package of environmental benefits associated with these specific megawatt hours. The distinction between the two products is protected by enforceable contractual agreements.

- **NET METERING:** Most small-scale renewable energy systems use net metering to account for the value of the electricity produced. The utility meter subtracts the energy produced by the system from the total energy used by the structure with which it is connected. Because the system owner has to purchase fewer kilowatt- hours from the utility, the electricity produced from the renewable energy system is valued at the retail price of power. Since utilities typically buy their energy at a lower price (wholesale) than they sell it (retail), it is often preferable for a PV system owner to enter into a net metering agreement, rather than selling the electricity to a utility directly, in the form of a Power Purchase Agreement (PPA).

- **TAX APPETITE:** For-profit businesses, of course, usually attempt to earn profits, which are typically taxable. Businesses can reduce the amount of taxes owed by using tax credits. For a tax credit to have any value to a business, though, the business must actually owe taxes. Businesses that can use tax credits

to reduce the amount they owe in taxes have a "tax appetite." Public and non-profit organizations are often tax-exempt and therefore cannot utilize tax incentives. Because many of the federal and state incentives for renewable energy come in the form of tax credits, a lack of tax appetite can be problematic for some organizations hoping to benefit from them.

- **POWER PURCHASE AGREEMENT (PPA):** If the electricity from a solar project is not used on-site or net-metered, the project owner needs an agreement with a utility to purchase that electricity. The details, such as the rates paid for electricity and the time period during which it will be purchased, are laid out in a Power Purchase Agreement.

- **SECURITIES**: A security is an investment instrument issued by a corporation, government, or other organization that offers evidence of debt or equity. Any transaction that involves an investment of money in an enterprise, with an expectation of profits to be earned through the efforts of someone other than the investor, is a transaction involving a security.

  Community Solar projects aim to create new ownership models that can monetize financial incentives, capitalize on favorable government and utility policies, and expand ownership opportunities. When devising a creative business model, though, the project organizer should give careful consideration to whether or not the model involves securities, and, if so, what securities compliance will entail.

Securities Compliance

Any entity, no matter how small or large, that attempts to raise capital by issuing securities (i.e. offering or selling stock, membership units, partnership interests or other types of interests) may only do so by registering the offering with the Securities Exchange Commission (SEC) or by complying with the provisions of one of the specifically-defined exemptions from the registration requirements. Registration can be a time-consuming and expensive process that requires filing a formal registration statement with the SEC. As such, registration is not a process particularly well suited for community-scale projects, and is generally undesirable in this context. In order to reduce the risk of SEC oversight, a Community Solar project organizer should seek legal consultation on the ownership and participation structure.

While many exemptions from registration are possible, many smaller-scale projects tend to offer private placements of securities to investors under exemption provisions known as Regulation D. Under Rule 506 of Regulation D, a company can raise an unlimited amount of investment capital from an unlimited number of investors, provided that all of the investors are "accredited investors" as defined in the rules promulgated by the SEC. An "accredited investor" is an individual (or entity owned exclusively by individuals) that meets one of the following criteria:

1. **has a net worth (assets minus liabilities), individually or jointly with spouse, of at least $1,000,000**
2. **has an individual income in excess of $200,000 or joint income with spouse in excess of $300,000 in each of the two preceding years and reasonably expects to reach the same income level in the current year**
3. **is an executive officer or director of the issuing company.**

An accredited investor can also be an entity with total assets in excess of $5 million not formed for the purpose of acquiring the securities offered.

Under Regulation D, there is a prohibition on general solicitation, which means that the offering should not be made to the general public, but instead only to individuals or entities with which the issuer has an existing business relationship. One sometimes hears reference to a company that can sell to up to thirty-five unaccredited investors under Regulation D. While this true, as a practical matter the ability to make such an offering is severely limited. If the company offers or sells shares to even a single unaccredited investor, it triggers additional, far-more-detailed information requirements (such as a formal private placement memorandum), which can substantially increase the complexity and cost of the transaction.

If an offering does not meet the requirements of Rule 506, there may still be alternative ways to offer securities under Regulation D or other exemptions, but these methods also tend to be substantially more expensive and complicated (much like registering the offering).

An issuer also should keep in mind that it will need to comply with the securities laws of all states where the securities are being offered or issued. Most states' securities laws have parallels to the federal requirements, but many states require additional filings, even if their exemptions are similar in substance to the federal exemptions.

A full review of state and federal securities requirements related to small offerings is beyond the scope of this guide. Therefore, whenever offering securities, the project team should consult with experienced securities counsel.

Federal

Modified Accelerated Cost-Recovery System (MACRS) and Bonus Depreciation

The federal government allows businesses to depreciate a clean energy system at an accelerated rate. Depreciating the asset more in the early years simply means that the business is recognizing more expenses, and lowering taxable income and actual taxes in those early years. A key tenet of finance is that a dollar today is worth more than a dollar tomorrow. Thus, accelerated depreciation results in a greater rate of return on the entire investment. For solar projects, the assets are depreciated over five years, rather than over the expected life of the system. In 2009, like in 2008, there is also a bonus depreciation that allows projects placed into service in 2008 and 2009 to deduct 50 percent of the adjusted basis of the property in the first 2 years. According to the Database of State Incentives for Renewable Energy (DSIRE):

> "The federal Economic Stimulus Act of 2008, enacted in February 2008, included a 50% bonus depreciation (26 USC § 168(k)) provision for eligible renewable-energy systems acquired and placed in service in 2008. This provision was extended (retroactively to the entire 2009 tax year) under the same terms by The American Recovery and Reinvestment Act of 2009 enacted in February 2009. To qualify for bonus depreciation, a project must satisfy these criteria:
>
> - the property must have a recovery period of 20 years or less under normal federal tax depreciation rules;
> - the original use of the property must commence with the taxpayer claiming the deduction;
> - the property generally must have been acquired during 2008 or 2009; and
> - the property must have been placed in service during 2008 or 2009 (or, in certain limited cases, in 2010).
>
> If property meets these requirements, the owner is entitled to deduct 50% of the adjusted basis of the property in 2008 and 2009. The remaining 50% of the adjusted basis of the property is depreciated over the ordinary depreciation schedule. The bonus depreciation rules do not override the depreciation limit applicable to projects qualifying for the federal business energy tax credit. Before calculating depreciation for such a project, including any bonus depreciation, the adjusted basis of the project must be reduced by one-half of the amount of the energy credit for which the project qualifies."

Business Energy Investment Tax Credit (ITC)

The ITC allows commercial, industrial, and utility investors to take a tax credit worth 30% of the expenditures related to a solar energy system. This tax credit can be used to offset regular tax and alternative minimum tax (AMT). The American Recovery and Reinvestment Act of 2009 adds in the option of taking the tax credit as a grant from the Treasury Department rather than as a tax credit. The ITC is currently available to all systems installed before the end of 2016 with no maximum credit limit currently stated.

Clean Renewable Energy Bonds

Clean renewable energy bonds (CREBs) can be used by government entities and electric cooperatives to finance solar installations and other renewable energy projects. The advantage of CREBs is that they are issued, theoretically, with a 0% interest rate. The borrower pays back only the principal of the bond, and the bondholder receives federal tax credits in lieu of the traditional bond interest. In practice, bond issuers typically must issue the bonds at a discount (but not 0%) or make supplemental interest payments in order to find a buyer. In essence, a clean energy bond provides issuers with interest-free loans for financing qualified energy projects. CREBs do not require any corporate contribution and do not limit which parties can invest in the securities.

The Energy Improvement and Extension Act of 2008 allocated $800 million in new CREBs. In February 2009, the American Recovery and Reinvestment Act of 2009 allocated an additional $1.6 billion for new CREBs, for a total new CREB allocation of $2.4 billion. The DSIRE site contains additional useful details on the use of these bonds.

POLICIES AND INCENTIVES

Northwest

Northwest Solar Cooperative

Established in 2002 by Cascade Solar Consulting and the Bonneville Environmental Foundation, the Northwest Solar Coop purchases RECs created by small, grid-tied PV systems throughout the Northwest. The Coop is now managed by Solar Oregon, which continues to purchase RECs on a limited basis. The terms, including price per REC and contract length, vary according to market influences, and currently applicants are being accepted through a waiting list process. Participants provide production meter readings each month and can expect a payment at the end of the first quarter of the following year. Information is available at: **http://nwsolarcoop.org/**

Washington

Renewable Energy Production Incentive

In May 2005, Washington enacted Senate Bill 5101, establishing production incentives for customer-generated solar electricity. The incentive rate paid includes multipliers for systems with components manufactured in Washington State. As a result, payments can range from $.15 to $.54 per kilowatt-hour produced, with a maximum annual payment of $2,000 (increased to $5,000 in 2009) per producer. Ownership of the renewable-energy credits (RECs) associated with generation remains with the customer-generator and does not transfer to the state or utility.

In 2009, the passage of Washington SB 6170 extended the production incentive program to Community Solar projects. Community solar projects are defined as solar energy systems owned by local individuals, households, nonprofit organizations, or non-utility businesses that are placed on local government property; or utility-owned systems funded voluntarily by ratepayers in exchange for a payment or utility credit for electricity produced.

The incentive payments for community solar participants, starting with a higher base rate and using the same multipliers as mentioned above for Washington-made equipment components, range from $.30 to $1.08 per kilowatt-hour. Each participant in the community solar project can apply to receive this incentive and may receive up to $5,000 per year.

As of September 2009, rulemaking for this incentive was underway. Please check with the WA Department of Revenue for the current status of the rule and procedures in place.

Sales and Use Tax Exemption

Equipment used to generate solar electricity and the labor and services required to install these systems are exempt from sales tax in Washington State. This exemption ends after June 30, 2011. From July 1, 2011 to June 30, 2013, the exemption will be reduced from 100% of the sales and use tax to 75% of the sales and use tax. Purchasers of systems larger than 10 kW must claim the exemption in the form of a remittance.

Net Metering

Washington State requires that utilities allow solar installations up to 100 kW to be net-metered against energy used on-site by the customer. If the system generates more energy than the owner uses in a given month, creating so-called Net Excess Generation (NEG) in the process, the credit is rolled over to the next month. However, on April 30th of each year, the utility claims any outstanding excess generation without charge.

Oregon

Business Energy Tax Credit

Oregon's Business Energy Tax Credit (BETC) provides a tax credit worth 50% of the costs associated with purchasing equipment for and installing a renewable energy system. This credit is taken over the first 5 years of the project at 10% per year. The Oregon Department of Energy also offers a pass through option under which project owners with little or no tax appetite can pass the tax credit on to another business with a tax appetite. The business then provides the project owner with a lump sum payment for the tax credit. For more information about the Oregon BETC see the Oregon Department of Energy's website at: **http://egov.oregon.gov/ENERGY/CONS/BUS/BETC.shtml** .

Energy Trust Open Solicitation

The open solicitation program of the Energy Trust seeks to build markets for renewable energy technologies. This program will help to fund innovative projects that are either located in Pacific Power or Portland General Electric service territories or will sell their power to these utilities. Projects using established technologies in accepted ways are not eligible for this program. Funding amount varies.

Energy Trust Solar Electric Buy-Down Program

The Energy Trust of Oregon provides a monetary incentive to customers installing solar electric systems in Pacific Power and Portland General Electric service territory. If this incentive is used, the RECs belong to the system owner for the first 5 years of the project, but then transfer to the Energy Trust for the next 15 years. The DSIRE database reports the incentive levels as follows:

COMMERCIAL, INDUSTRIAL

- **PACIFIC POWER CUSTOMERS:** $1.50/W-DC for systems up to 30 kW; $0.90/W-DC - $1.50/W-DC for systems sized 30-200 kW ($180,000 maximum incentive).
- **PGE CUSTOMERS:** $1.75/W-DC for systems up to 30 kW; $1.15/W-DC - $1.75/W-DC for systems sized 30-200 kW ($230,000 maximum incentive); and $0.80/W-DC for larger and multi-site systems up to 800 kW ($640,000 maximum incentive).

NON-PROFIT, GOVERNMENT

- **PACIFIC POWER CUSTOMERS:** $1.75/W-DC for systems up to 30 kW; $1.15/W-DC - $1.75/W-DC for systems sized 30-200 kW ($230,000 maximum incentive).
- **PGE CUSTOMERS:** $2.00/W-DC for systems up to 30 kW; $1.40/W-DC - $2.00/W-DC for systems sized 30-200 kW; and $1.00/W for larger and multi-site projects up to 800 kW ($800,000 maximum incentive).

Persons taking advantage of this program must use Energy Trust approved contractors. After Energy Trust approves the system installation, it pays the incentive to the contractor and the contractor reduces the price to the customer, accordingly.

Solar Energy Systems on Public Buildings

As of January 2008, any public building project in Oregon with a contract price over $1,000,000 must use at least 1.5% of the project budget for a solar energy project. If the building is unsuitable for a solar project, 1.5% of the budget will go to a future project on another building.

Net Metering

Non-residential customers of public utilities in Oregon may net meter a renewable energy system of up to 25 kW. Non-residential customers of Pacific Power and Portland General Electric may net meter systems up to 2 MW. Net Excess Generation (NEG) is calculated annually. For customers of Pacific Power and PGE, any NEG is credited to the utility and sold at the avoided cost rate to participants in low-income assistance programs. For customers of public utilities NEG may be credited to the customer, granted to participants in low-income assistance programs, or dedicated to "other use."

Montana

Alternative Energy Tax Credit

Commercial customers investing more than $5000 in a renewable energy project are eligible for a tax credit of up to 35% against any income generated by the investment. If the tax credit exceeds the amount of tax due that year, the credit can be extended and applied over the next seven years. This tax credit cannot be combined with any other state energy or investment tax credit or the property tax exemption.

Net Metering

Utility customers in Montana my net meter a renewable energy system up to 50 kW. Net Excess Generation (NEG) rolls over to the following month, but any NEG remaining at the end of the customer's year is granted to the utility.

Idaho

Net Metering

Idaho utility customers may net meter renewable energy generation facilities as follows:

- **ROCKY MOUNTAIN POWER:** 25 kW max for residential and small commercial customers, 100 kW max for all other customers
- **IDAHO POWER:** 25 kW max for residential and small commercial customers, 100 kW max for large commercial and agricultural customers
- **AVISTA UTILITIES:** 25 kW max for all customers

FINANCIAL ANALYSIS AND COMPARISON

How does participating in a community solar project compare financially to investing in a project, individually, on a home or business? There is no simple answer to that question. The business model and availability of incentives will determine the unique answer for each community project.

In Ashland, Oregon, solar incentives for individual homeowners are so generous that the economies of scale achieved through a Community Solar model are insufficient to offer an equally advantageous return. On the other hand, in Washington State, where Community Solar projects can benefit from economies of scale and may receive more generous production payments than do typical residential or commercial projects, the former may be a better investment. Consider the following (hypothetical) financial analyses from the perspective of an individual system owner versus that of a member in a Community Solar system:

Scenario 1:

An individual in Washington installs a 2 kW PV system on her own home.

Assumptions:

BASELINE COST OF PV: $9/Watt

PRODUCTION: 1,250 kWhs annually per kW installed

ELECTRICITY OFFSET AT: $.07/kWh in first year, with 4% inflation annually

WASHINGTON STATE PRODUCTION INCENTIVE: $.15 per kWh through year 2020

FEDERAL INCOME TAX CREDIT: 30% of installed cost of system

REC SALES: $.02 per kWh for 3 years via the Northwest Solar Cooperative

FIGURE 1		2009	2010	2011	2021	2020	2021	2033
YEAR:	0	1	2	3	4	12	13	25
Initial Outlay	$18,000							
Federal Tax Credit		$5,400						
Production Incentive		$375	$375	$375	$375	$375		
Electricity Savings		$175	$182	$189	$197	$269	$280	$449
Green Tag Value		$50	$50	$50				
Yearly cost/ Income	($18,000)	$6,000	$607	$617	$572	$645	$280	$449
Cumulative Cash Flow	($18,000)	($12,000)	($11,393)	($10,779)	($10,207)	($5,319)	($5,039)	($659)

DISCOUNT RATE: 4%

INTERNAL RATE OF RETURN (IRR): 0%

SIMPLE PAYBACK PERIOD: > 25 years

Scenario 2:

An individual in Washington contributes 2% of a 100 kW Community Solar project. (equivalent to a 2 kW system)

Assumptions

BASELINE COST OF PV: $6/Watt

PRODUCTION: 1250 kWhs annually per kW installed

ELECTRICITY OFFSET AT: $.07/kWh in first year, with 4% inflation annually

WA STATE PRODUCTION INCENTIVE FOR COMMUNITY SOLAR: $.30 per kWh through year 2020

FEDERAL INCOME TAX CREDIT: Not eligible

REC SALES: RECs retired on participant's behalf (participants in community projects do not typically have the right to sell RECs)

FIGURE 2		2009	2010	2020	2021	2022	2023	2033
YEAR:	0	1	2	12	13	14	15	25
Initial Outlay	$12,000							
Production Incentive		$750	$750	$750				
Electricity Savings		$175	$182	$269	$280	$292	$303	$449
Yearly cost/ Income	($12,000)	$925	$932	$1,020	$280	$292	$303	$449
Cumulative Cash Flow	($12,000)	($11,075)	($10.143)	($369)	($89)	$202	$506	$4,291

DISCOUNT RATE: 4%

INTERNAL RATE OF RETURN (IRR): 3%

SIMPLE PAYBACK PERIOD: > 14 years

In many cases, grants and other sources of funds not available to individual system owners may be available to lower the upfront cost of a community solar project. These donations can leverage member contributions, improving the return to individuals. The rate at which Community Solar members are reimbursed for the electricity generated can also have great impact on the return. Projects that benefit from net metering will see their financial outlook improve as the price of traditional electricity rises.

When evaluating the available financial incentives, it is important to understand the differing impacts of upfront savings and long-term revenue, and to realize that there may be tradeoffs. For instance, some programs that provide initial rebates on the installed cost (such as a program offered by the Energy Trust of Oregon) can stipulate REC ownership, eliminating a potentially long-term revenue option.

While a strong understanding of the financial picture is vital, Community Solar organizers and members should remember that there are many other ways to measure a project's merit. Community projects can make contributing to renewable energy development much easier for most citizens. Similarly, a Community Solar project offers a public education and awareness opportunity orders of magnitude greater than that afforded by individual projects.

GETTING STARTED

Community Organizing

When determining what type of project will be most successful locally, it is crucial that organizers gauge the level of community support, and ask how and how much community members want to invest. Following are some questions organizers should consider to help guide the project planning process:

- What level of understanding is there about solar energy in the community?
- Are community members interested in using solar energy?
- Are community members interested in owning solar power systems?
- What do community members value most about solar energy? Why are they interested in purchasing solar energy, or why not?
- What barriers do people face to individual solar power use?
- Do community members distinguish between solar energy and other green power products?
- How much money are people willing to invest in solar energy (in terms of upfront payment, monthly premium, or premium in percent of energy costs)?
- Is there a payback expectation? If so, how long?
- If solar energy is not produced on individual homes, where should it be located so that participants still feel connected to it?
- How important are location and access to the system?
- Is there is an existing green power program? If so, at what level do community members participate? Would members choose to participate in both programs? Which program would they prefer?

Some communities may find their questions best answered through focus groups organized by professional marketers. While this method is often accurate and informative, it can be expensive. Other communities may find that conducting their own surveys or thoroughly reviewing existing green energy program data is sufficient to determine the best way to approach Community Solar. All studies should solicit input from potential participants with various backgrounds including, young adults, elderly, home and condo owners, renters and developers, as well as residents from various geographic areas of the city or town.

These questions should also help organizers determine the best approach for raising capital for the project – probably the most important step to making a project happen. As demonstrated by the various projects highlighted in this guide, there is no right or wrong approach. Fundraising methods are unique to the community. While some organizers may access upfront capital that can be recouped over time by collecting funds from individual members, others may need to secure funds from community participants prior to putting a project in the ground.

Regardless of which methods organizers employ, it is essential that the finished project model account for financial and legal limitations and also consider consumer desires and expectations. It is important to be

upfront and honest about the benefits and costs of such systems when gathering financial support. Focusing on the uniqueness of the project, as well as the environmental and educational benefits, can go a long way. In Ellensburg, the city was able to market the project effectively by noting its significance as the first project of its kind in the U.S., and explaining how the project made solar more available to residents that otherwise might not be able to participate in solar development. In Bainbridge, participants made tax-deductible contributions, but did not receive any subsequent cash inflows. Nonetheless, the project's unique tie to students in the community was a sufficient benefit to recruit contributors. Community pride seems to be a very potent fund raising tool.

In order to gain traction for the project, it can be helpful to identify organizations and individuals that are closely connected to the community to help champion the project. Beyond lending general encouragement to the project, some community members may be able to support the project by providing initial financial contributions, or in-kind donations such as installation labor, or advertising assistance. The greater the local collaboration, the more the project will reflect the community's interests. Below is a chart that can help organizers identify local project advocates and assets, increasing the likelihood of project success.

CATEGORY	CONTACT	OPPORTUNITIES/ OBSTACLES	CONTRIBUTION
Schools			
Universities and Community Colleges			
Energy-related businesses			
Environmentally friendly businesses			
Utility company			
Environmental Organizations			
Community Organizing Groups			
Economic Development Organizations			
Neighborhood Associations			
City Council			
City or State Agencies			
Homeowner or Condo Associations			
Chamber of Commerce			
Engineers/Builders/ Electricians			
Marketers/Designers			
Planners			
Lawyers			

GETTING STARTED

Solar Energy Project Development

A successful Community Solar project depends on the design of a feasible business model. In order to get there, community groups will need a solid understanding of the following elements:

1. **Successful models of existing Community Solar projects.**
2. **The financial opportunities available to the community group or project.**
3. **The community's unique barriers and opportunities.**
4. **What community members want, and in what they are willing to participate.**

With an understanding of the opportunities presented in the previous sections of this guide, the next step is to select those items that are most viable in a specific community. But with so many factors to consider in developing a successful project model, it can be difficult to know where to start.

As with many construction projects, a Community Solar project can be broken down into phases including: the development phase, the construction phase, and the operations and maintenance phase.

Project Development Phase

Investigate feasibility by identifying a good site with quality solar access, preparing a financial plan, identifying partners and supporters, confirming the absence of major obstacles, and gauging community and utility receptivity to a project. Tasks associated with project conception and feasibility include:

- Site assessment
- Investigation into ownership and participant structure
- Investigation of interconnection opportunities
- Financing and grant research and application development
- Fatal flaws review

With feasibility determined, a community project will move to project design. This is where the details take shape. A project timeline and financial analysis are important steps, though they can be refined later as more information is known. Financial analyses may help determine the most beneficial project structure at this point. Answers to the following questions should clarify project design.

Financial/Ownership Structure Questions

- Who will own the project?
- What is the anticipated installed cost of the project?
- What sources of capital financing are available?
- What incentives is the owner eligible to receive?
- What revenues will be generated by the project?
- How many participants are needed?
- Who will be the beneficiaries of the revenues generated?
- What incentives are the participants eligible to receive?
- Who will be the recipients of the power and non-power attributes generated?
- What financial (or other) return will participants achieve for their contribution?
- Who will manage project accounting, and how will benefits be dispersed?
- What roles will various partners and participants play in project development?
- Who will provide operations and maintenance?

Technical Questions

- What size will the project be?
- What is the expected production estimate?
- How much space will the project require?
- Is the project location confirmed?
- How will the project be interconnected to the utility grid?
- What are the equipment design specifications?
- How and by whom will equipment be selected, purchased, and installed?
- What permits need to be obtained?
- What will long-term operations and maintenance require?

Construction & Operations and Maintenance Phases

While this guide is not a technical manual, it is critical for organizers of Community Solar projects to be knowledgeable about what it takes (beyond program design) to install a solar array.

SPECIFIC DETAILS INCLUDE:

- **COMPONENTS OF A PV SYSTEM:** Fluency in solar energy means understanding the roles and types of PV modules, inverters, meters, switches, mounting structures, and, potentially, tracking systems.
- **SITING A PV SYSTEM:** At minimum it is important to understand the importance of proper orientation and solar access. Proper siting includes a site analysis for any potential shading, as well as determining optimal tilt of the modules, location of inverters and other system components, wiring distances, foundation or structural support, and security or public access requirements.
- **MAINTENANCE:** Maintenance, though fairly simple for PV systems, is one of a few issues relevant to long-term management of a Community Solar system. Modules may need to be cleaned, but more importantly meters and inverters need to be watched to make sure that the full system is operating to the expected capacity.
- **INTERCONNECTION:** Any system that is producing electricity for a structure that is connected to the electric grid, must also be connected to the grid. This connection to the grid is called interconnection. An array of solar panels connects to the grid through an inverter system that matches the electricity coming from the panels to the electricity in the grid. The utility needs to be involved in the interconnection process to ensure that the electricity is accounted for and that there is no danger to anyone working on the electrical grid.
- **IDENTIFYING PROFESSIONALS:** Choosing a solar professional is an important decision. In recent years it has become increasingly easy to locate and contact those in the field. Tools available to help identify local professionals include www.findsolar.com, the Oregon Solar Energy Industry Association, and the national Solar Energy Industry Association.

For community-scale projects, it is common to issue a request for proposals (RFP). The RFP can be fairly broad, allowing professionals to pitch their recommended system design and specifications; or fairly specific, in order to compare bids on pre-determined project specifications. After identifying solar professionals, or receiving proposals in response to an RFP, it is important to evaluate them as you would evaluate other types of dealers and contractors.

Professional credentials are one indication of a PV dealer's knowledge and qualifications. The North American Board of Certified Energy Practitioners (NABCEP) offers a well-respected voluntary certification program for PV installers.

- **PERMITTING:** The permitting process for a Community Solar project will depend on the location, size, and type of project. The project will require an electrical permit. A building permit is often necessary, especially if the PV array is a stand-alone structure. The best course of action is to check with the local planning department during project design as the permit requirements may influence the design of the project.

- **PRODUCTION ESTIMATES AND FINANCIAL PRO FORMA:** In order to obtain financing for a project, a financial pro forma must be created that models the proposed system's costs, revenue (from the production estimates), and the interaction of incentives and financing. This document will reveal the financial viability of the project, and is a necessary component of any project proposal.

RESOURCES

This guide to Community Solar covers a broad array of topics, but does not go into detail on each of them. Communities interested in implementing a project will need a more thorough understanding of many of these topics. The resources listed in this section can provide much of that information.

Project Planning and Funding Resources

The Bonneville Environmental Foundations supports the development of renewable energy and watershed restoration and empowers people to shrink their carbon footprint. B-E-F's Project Management Group assists with the funding and construction of solar installations in communities throughout the Northwest.
http://www.b-e-f.org

Northwest Sustainable Energy for Economic Development provides technical assistance to communities seeking guidance with community-scale clean energy project implementation. Managed by Northwest SEED, the Northwest Community Energy Website provides in-depth information on developing community-scale renewable energy projects in the Pacific Northwest. The site includes information specific to solar, wind, geothermal, and biomass, and is intended to serve land-owners, advocates, community leaders, utility companies, and project developers.
http://www.nwcommunityenergy.org

The American Solar Energy Society (ASES) is a nonprofit organization dedicated to increasing the use of solar energy, energy efficiency, and other sustainable technologies in the U.S. This website is a good source for information about solar technology and professionals.
http://www.ases.org/

The Database of State Incentives for Renewables and Efficiency is a comprehensive source of information on state, local, utility, and federal incentives that promote renewable energy and energy efficiency.
http://www.dsireusa.org

The Office of Energy Efficiency and Renewable Energy (EERE) works to strengthen the United States' energy security, environmental quality, and economic vitality in public-private partnerships.
http://www.eere.energy.gov/

USDA Rural Development provides funding for the development and commercialization of renewable energy technologies in rural communities.
http://www.rurdev.usda.gov/rd/energy/

The mission of the Oregon Department of Energy is to ensure Oregon has an adequate supply of reliable and affordable energy and is safe from nuclear contamination, by helping Oregonians save energy, develop clean energy resources, promote renewable energy, and clean up nuclear waste.
http://www.oregon.gov/ENERGY/

The Washington State Department of Commerce is the lead agency charged with enhancing and promoting sustainable communities and economic vitality in WA State.
http://www.commerce.wa.gov/

The Washington State Energy Extension seeks to advance environmental and economic well being by providing unmatched energy services, products, education and information based on world-class research.
http://www.energy.wsu.edu/

Energy Trust of Oregon is a public-purpose organization dedicated to energy efficiency and renewable energy generation. Energy Trust helps Oregonians save energy, increase the comfort of their homes and businesses, and move toward energy self-reliance.
http://www.energytrust.org

Project Examples

SMUD Solar Shares Program:
http://www.smud.org/en/community-environment/solar/Pages/solarshares.aspx

Ellensburg Community Solar:
http://www.solar4rschools.org/schools/ellensburg-community-project

Solar for Sakai:

http://www.cenergysolutions.org/SolarForSakai.html

http://www.solar4rschools.org/schools/sakai

St. George SunSmart:

http://www.sgsunsmart.com/index.htm

City of Ashland's Solar Pioneers II:

http://www.ashland.or.us/Page.asp?NavID=10994
