

Solar Case Study

Okanogan County Electric Cooperative



1. Company Profile

Headquartered in Winthrop, Wash., Okanogan County Electric Cooperative (OCEC) serves approximately 3,100 meters. It is located on the eastern side of the northern Cascade range in Washington state, about 40 miles south of the Canadian border. An all-requirements member of the Bonneville Power Administration, Okanogan County Electric is allowed to have additional distributed generation resources. Through Bonneville, approximately 88 percent of the co-op's power requirements are generated by hydro and 10 percent by nuclear. About 41 percent of its members are residential, 43 percent seasonal, 5 percent irrigation loads and less than 10 percent commercial. The terrain is mountainous with a large snowpack in wintertime. The service territory is a remote, resort-type area with many second homes. The co-op's large number of seasonal accounts is a factor in the relatively high, fixed monthly fee of between \$35 and \$40 a month for most members. The co-op averages about 6.4 members per mile of line. OCEC is winter-peaking, and solar adds little, if any, capacity to the system.

2. Renewable Profile

The cooperative has developed two community solar projects that use Silicone Energy solar modules and inverters. Made in Washington state, the Silicone Energy equipment makes the co-op eligible for additional incentives from the state. The first project, commissioned in September 2010, is the Okanogan County Electric Cooperative Community Solar Project (OCEC CSP). It consists of 104 195-watt modules totaling 20.28 kw, that are connected to four 4,200-watt inverters. The second, the Winthrop Community Solar Project (Winthrop CSP), was commissioned in July 2011 and consists of 120 190-watt modules totaling 22.8 kilowatts that are connected to five 4,200-watt inverters.

Energy Solutions, the engineering, procurement and construction (EPC) contractor, designed, engineered, procured and managed the construction of both projects. It subcontracted with Norwil Electric, Bart and Company and Doug Hayes Excavating for installation of the systems. It used Cascade Concrete for the concrete ecology blocks, and North Valley Lumber supplied the steel pipe for the racking system. Both the EPC firm and subcontractors were local companies. Project implementation took approximately six months.

OCEC developed the community solar arrays because of the ecological inclination of the members and because of the addition of the community solar section of the Washington State Renewable Energy System cost recovery program. Energy Solutions, the local solar provider, made a presentation to the cooperative's board of directors.

3. Financing and Rate Design

The projects were self-funded. Funds for all costs of the array were raised from co-op members in advance. A mailing was sent to all members inviting them to participate. Component spec sheets and warranties were reviewed by Energy Solutions and OCEC. Installing contractors were licensed and bonded. The OCEC attorney developed a contract for participating members and funders. Sizable incentives from the state of Washington were the primary driver of the projects. The letter describing the program and the participation agreement can be found on pages 22-23.

Members can fund the array at various levels, but most committed to the \$6,000 level. The funders are paid back in two ways. First, the funders receive a production credit, based on the amount of energy produced by the array and multiplied by the average cost of wholesale power for the year. Based on the percentage of the member's funding of the total investment, the member gets that percentage of the production credit value in a check. In 2011, a typical year, the credit was \$30.45 for a funder at the \$6,000 level.

Second, the funders receive a State of Washington Incentive payment for Renewable System Cost Recovery, which is funneled back through OCEC via its excise tax. Based on production in a typical year, this amount works out to about \$1.08 per kwh produced. The funders at the \$6,000 level receive \$750 in a typical year.

This arrangement continues until 2020, at which time both payment programs end. The array and its output are then the property of OCEC. Based on both payment programs, the simple payback is less than seven years.

4. Project Development

A location at the OCEC headquarters site was selected for the first array. It has a southern-facing exposure and great visibility to the membership. The town of Winthrop agreed to host the Winthrop CSP at its water treatment plant, which also had excellent southern exposure. Energy Solutions was the turnkey provider for both projects and performed the yield projections, which turned out to be accurate. State and local governments required electrical permits for both projects. An environmental impact checklist and building permits also were required. Energy Solutions subcontracted some work to local contractors, but it provided final commissioning and acceptance testing. Array output is recorded through OCEC's advanced metering infrastructure (AMI) system. Both projects are interconnected to Okanogan's distribution system at a primary voltage of 12.47 kv.

5. Operations and Maintenance

No formal operations and maintenance procedures have been developed. Array outputs are monitored every 30 minutes by computer, and any errors or false readings automatically generate an email to designated OCEC individuals, as the cooperative performs any operations and maintenance in-house. The design and tilt of the arrays allow snow to slide off and clean the arrays during the winter months. Unscheduled maintenance issues developed as some of the solar modules and inverters were the first ones manufactured at Silicone Energy's plant in Washington. Two inverters developed irregular output and were replaced under warranty. After three years, some of the solar modules showed moisture penetration at the edge of the glass, although this did not affect the energy output. Those modules showing the defect were replaced under warranty.

Initial calculations showed that no operational issues would be anticipated, and none have been observed. No changes to the distribution system, mitigation techniques or additional technologies were required.

6. Telemetry

The cooperative operates Aclara's two-way automated communications system (TWACS) and advanced meter reading (AMR) system. A standard TWACS meter was installed at each array and reports the output for monitoring and energy production to the OCEC's website, which members can view.

7. Administrative Impacts

No additional staffing or personnel were required, but some additional member services work was required. The board approved the community solar projects with the understanding that no construction or management costs would be paid by OCEC, except in instances of additional insurance costs or necessary legal costs to implement the project. The board was also involved in reviewing the project announcement and funding solicitations mailed to the members.

8. Renewable Policy Development

Washington state law requires Okanogan to provide net metering to its members. Further, OCEC is required to offer net metering to at least 0.5 percent of its load, based on its 1996 peak demand. OCEC has met the minimum and plans to continue to make net metering available. Because of OCEC's relatively high monthly charge of between \$35 and \$40 for most members, solar is not economical in many instances without incentives.

9. Member Interest in Solar

Given the area, OCEC knew its members were interested in renewable energy, solar in particular. Of the 3,100 meters in its system, the cooperative has about 30 net metering accounts as of 2014, mostly solar. Due to high member interest in solar, OCEC quickly sold out both arrays prior to construction. OCEC first mailed a letter to each member describing the first array, its costs and the Washington state cost recovery program. It is worth noting that the first project was funded in 14 days with a waiting list. Eight months later, those members were accommodated in the second array. Through the use of the local news media, the second array was quickly fully funded, again prior to construction.

10. Business Options

Because of the Washington renewable energy cost recovery program, the cooperative did not investigate other methods of ownership of the array or other models. Due to state program constraints, OCEC is maxed out for participating in the state program.

11. Lessons Learned

OCEC believes that the projects have been valuable from a public relations perspective, in part by helping OCEC to engage its members. The model it chose both limited the risk to OCEC and maximized the value to participating members. Not only was this a good deal for the members from an environmental perspective, but because of state incentives, it also did not shift costs to members who did not participate. Evaluating the project in retrospect, OCEC does not believe that it would have done anything differently.

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Program Details and Participation Agreement



August 13, 2012

Potential OCEC Community Solar Funders,

We have received 16 inquiries from members who are interested in purchasing the available shares in the OCEC Community Solar Project. As stated previously, we will enter all of the names in the drawing for \$8,050.63 investment, unless requested not to. There will be one winner of the drawing. The remainder of the names will be put into the drawing for the \$4,830.36 investment. One winner will be drawn for that investor option.

The original share amounts were \$6,000.00 and \$10,000.00. Each of the funders has been paid back amounts reducing the investment levels to the \$4,830.36 and \$8,050.63 respectively. The percent ownership of the solar system remains at the original share level.

How the program works.

The solar array came on line in September of 2010. The solar project was funded by OCEC members at \$200,000.00. There are 31 member-funders at different investment levels;

1. \$5,000.00 1-funder
2. \$6,000.00 25 – funders
3. \$7,000.00 1 – funder
4. \$9,000.00 2 – funders
5. \$10,000.00 2 – funders

The funders are paid back in two ways. The first is calculated from the amount of energy generated times the average cost of wholesale electricity purchased by OCEC for the calendar year. In 2011, the average cost of this electricity was .03395 cents per kWh. After the end of a calendar year when this annual average is determined, the funder will receive a check for this amount times the share of the kWh produced by the project based on the percent of the funder's contribution to the total project cost. The kWh production for 2011 was 29,900 kWh. The total amount \$1,015.11. (29900 kWh x .03395 cents/kWh = \$1,015.11) was divided up as follows:

1. Funder level 1 - \$25.38
2. Funder level 2 - \$30.45
3. Funder level 3 - \$35.53
4. Funder level 4 - \$45.68
5. Funder level 5 - \$50.76

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The other way funders are repaid is through the State of Washington Renewable energy system cost recovery program. The State of Washington foregoes excise taxes that OCEC would ordinarily pay in the amount due to the funders under the program. These funds are instead used to make the cost recovery payments. The Washington Department of Revenue incentive payments may not exceed \$25,000.00 annually for community solar projects owned by an electric utility company. Under the program the OCEC pays funders twice a year at \$1.08 per kWh for the percent of the cost of the community solar system funded. For the 2011 program year (July 1, 2011 through June 30, 2012) the member-funders received as follows:

1. Funder level 1 - \$625.01
2. Funder level 2 - \$750.00
3. Funder level 3 - \$875.00
4. Funder level 4 - \$1,125.00
5. Funder level 5 - \$1,250.00

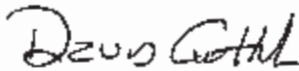
As stated in the contract this program will end June 30, 2020. At that date there will be no further payments and OCEC will retain full ownership.

We have attached a contract for your review. More information is available on the Washington State website, access wa.gov and search WAC 458-20-273 for the Renewable energy system cost recovery.

Please confirm your interest by filling out the enclosed drawing application.

Thank you again for your interest.

Please contact me if you have any questions.



David Gottula
General Manager