Solar Case Study

San Miguel Power Association

NRECA

A Touchstone Energy® Cooperative

1. Company Profile

San Miguel Power Association (SMPA) is an all-requirements member of Tri-State Generation and Transmission Cooperative. SMPA serves 13,500 members in the southwestern corner of Colorado. The eastern part of its service territory is ski and tourist country with mountainous terrain, while the western part is primarily broad valleys and plateaus. Membership is about 81 percent residential and 18.5 percent commercial. SMPA serves about seven members per mile of line. Some members are very "ecologically conscientious," while others are very bottom-line-driven.

As part of Tri-State, SMPA is allowed 5 percent ownership of local generation. Due to the size of the association's solar array and the addition of several smaller hydro projects, the co-op has reached this limit.

2. Renewable Profile

SMPA's solar array, located in Paradox Valley, Colo., has a nameplate capacity of 1.1 megawatt DC. In 2013, the unit maintained a 20 percent capacity factor. Siting, permitting and installation of the array took approximately one year and was completed Dec. 13, 2012. The array consists of 4,784 Hanwha Solar One modules of 235 watts each. Power conversion is accomplished with an AE Solar Energy PowerStation 1000 NX with two AE 500 NX inverters. Racking was ground-mounted on driven piles. The site covers more than 6 acres of a 9.27-acre parcel of land.

3. Financing and Rate Design

SMPA evaluated two business models for its community solar project: third-party ownership and full ownership. After a request for proposal (RFP) was issued and responses evaluated, a third-party ownership model was chosen. SMPA management recommended Clean Energy Collective (CEC) to the board based on CEC's experience with community solar. The board selected CEC to sponsor the project for the benefit of its members while limiting financial risk to the cooperative.

CEC has about 35 community solar projects across the country, 11 of which are with electric cooperatives. CEC is technically the owner of the Paradox Valley array and assumes all financial responsibility and risk. Co-op members who want to participate can purchase a panel of the array and receive a share of the output as a monetary credit on their monthly bill. Members can purchase one or several panels at a cost of between $695 and $750 per panel, depending on the application of the solar rebates in effect at the time. Monthly credits are calculated as the member's percentage of interest in the array multiplied by the metered output less 5 percent, which is escrowed for future operation and maintenance. This amount of kwh is credited at 11.615 cents per kwh and increases at 1 percent per year. Please see the example on page 17.

The gross cost of the installed array is about $5.54 per watt, including both hard and soft costs.

4. Project Development

SMPA had already been looking at the Paradox Valley site prior to the RFP process and assisted CEC by recommending the site and sharing in a small portion of the siting groundwork. All other development issues, including site development criteria, engineering, procurement and construction up to and including final commissioning, were CEC's responsibility.

SMPA wanted to build as large an array as feasible and allowable under its power supply contract. However, SMPA did not want to build a facility that would cause excess power flow back onto Tri-State's system. One MW was appropriate because its production would not exceed the native load. The size of the array was also determined using a combination of engineering, economics and siting.

CEC engaged Martifer Solar as its primary contractor and Sunsense Solar as the designer. The site is predicted to produce 1,731 megawatt hours annually, although actual production topped 2,000 MWh during the first year. The array is interconnected to a three-phase feeder on the SMPA distribution system. Internally developed engineering calculations showed that, based on feeder loading, no interconnection issues would develop on either the distribution or transmission systems, and none have. SMPA system coordination and protective schemes were studied prior to facility construction. Changes to the system scheme had to be implemented to accommodate the reverse power flow in two substations. Security fencing around the array was a requirement of NEC (National Electric Code) as well as a necessity given both the array's remote location and the fact that it sits in an open livestock range.

5. Operations and Maintenance

CEC is responsible for the array's operations and maintenance. It has a standalone LLC that operates like a trust to ensure funding for operations and maintenance over a 50-year period. This is funded by 5 percent of the sales price of the panels and the dollar value of the array's kilowatt-hour output.

The array has not experienced any major maintenance issues, although components in the inverters were replaced under warranty in year two of operation. Given the southwestern desert location, CEC is investigating the need to clean the array annually for maximum output. No operational energy issues such as islanding or reverse power flow have occurred. No mitigation techniques, technologies or special metering have been required.

Real-time production data from the array is collected by CEC's proprietary Remote Meter software and posted to CEC's public website. The cooperative website provides links to this data so that members can access information. Data that the cooperative uses to credit members' accounts for kilowatt hours produced by the array is also generated by the Remote Meter software.

6. Administrative Impacts

No additional staffing was required, though additional front-end work with ATS, the cooperative's billing provider, was required to correctly bill the accounts of those who participated in this project, which totaled approximately 70 participants at the project's inception. This was largely due to the need to credit the accounts for the production of the array by integrating a crediting file, which is created by CEC monthly and then downloaded into the ATS software. Since implementation, no major issues have arisen, although monthly monitoring by SMPA is necessary.

Member service personnel spent considerable time answering members' questions, the most common one being the economics of participation. As marketing and sales of the array panels were the responsibility of CEC, it handled most of the inquiries and sales questions. Marketing pieces were developed jointly by SMPA and CEC. A website for the array, www.smpasolar.com, was developed.

7. Renewable Policy Development

Colorado has a mandated net metering state law at 10 kw or less for residential and 25 kw or less for commercial. SMPA has had distributed generation (DG) installations in place that predate state programs. The co-op has voluntarily developed renewable incentives for local renewable resource development. These are currently at $0.75 per watt of installed capacity up to a limit of 3 kw for residential members and 10 kw for commercial members. Purchasers of the array units are eligible to receive these incentives.

SMPA sees a greater penetration of DG in its future as equipment prices fall and reliability and access to DG increases. Further utility use of smart grid technology will allow DG to expand to greater utilization. SMPA works toward a rate-neutral strategy for DG development so that, in general, the costs of DG do not place upward pressure on the rate base. In one case the co-op has reduced wholesale power costs by obtaining an "offset" contract under Tri-State policies.

8. Member Interest in Solar

As a point of reference, SMPA currently has 178 members with net-metered DG systems, 170 of which are solar. When SMPA embarked on this project, it was largely based on the results of a member survey that made it clear they wanted options for local renewable energy. The decision to consider community solar as a means of supporting member interest was driven by the board of directors. Currently, SMPA has sold out the array with 214 members participating. Two large purchases account for about 50 percent of the array. The town of Telluride purchased panels for all of its low-income housing units (about 95 kw), and the Telluride school district purchased panels to offset the energy usage of a large addition to an existing building (about 500 kw). Member feedback has been very positive, even with members who are not participating. Some members want solar, but their property is not conducive to panels. Others want solar but do not want to be burdened with installation or maintenance issues. Members are pleased that nonsubscribers are not subsidizing subscribers and that the program is not affecting the cost of electricity for nonsubscribers. SMPA is currently experiencing pent-up demand for another community project. Recently, two municipalities enacted Renewable Energy Mitigation Programs (REMP) that apply to new construction, additions and remodels, which in part is driving this demand. SMPA is also exploring a community hydro project and a low-income community solar project sponsored by the cooperative to benefit low-income members.

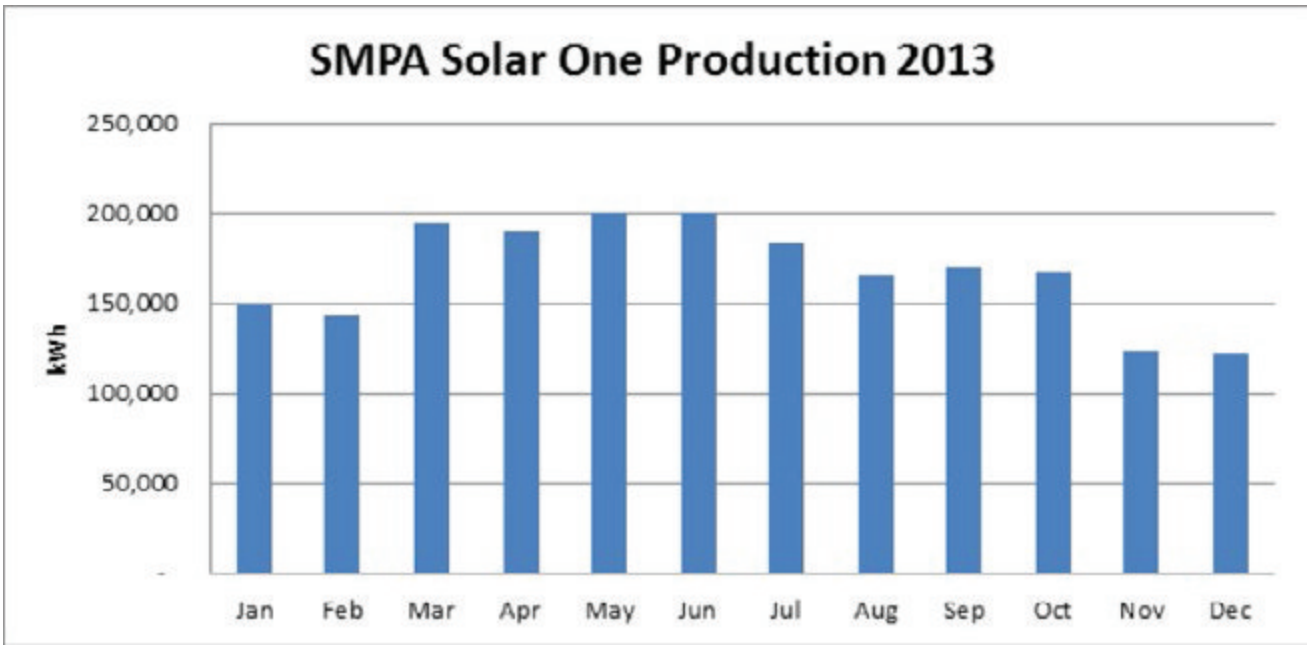
9. Lessons Learned

Loss of control was the first lesson learned. The agreement with CEC called for branding the project as the San Miguel Solar Garden. As CEC grew and staff turned over, SMPA ran into some issues with being left out of marketing and branding activities and ads. Closer monitoring and communication with CEC in the marketing activities would have been appropriate. At times, confusion existed among the membership regarding this third party selling electricity and marketing to members. This was important to SMPA, as it wanted it to be clear that no other entities would be selling electricity to its membership without its agreement. Better monitoring and communication with CEC in this regard would have helped. SMPA may have chosen to have better control over the sales, marketing and branding of its community solar array. Going forward, SMPA will analyze all business options available to it as market conditions, the state of technology and societal attitudes toward solar evolve.

SMPA chose to build the larger array anticipating more member demand and participation. There was not much response to pre sales notices, although the region is highly supportive of local renewable resources. The array did sell out in the projected three-year period, primarily achieved through large purchases. Another option, given the rapid decline in solar photovoltaic module costs, would have been to build the array in stages, which might have ultimately resulted in lower panel prices for the members. In the future, SMPA will evaluate this option as well.

What would SMPA tell a cooperative starting from scratch? Perform the upfront work to understand the demand for the product, why you are offering it and how it will benefit the membership and the cooperative at large. It should be a win-win for all. Otherwise, it might not be a good fit for your co-op.

Calculation of a Monthly Credit



Sally Smith buys 10 panels. Her portion of the total 4,784-panel array is .0020903.

September's total output from the array was 163,245 kwh. Sally's portion of this (163,245 x.002093) is 341 kwh, less the 5 percent escrow for operation and maintenance, leaving 324 kwh to credit.

Thus, the credit applied for September is 324 x .11615 = $37.63

For additional information, contact:

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