Solar Case Study

Southern Maryland Electric Cooperative

NRECA

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1. Company Profile

Southern Maryland Electric Cooperative (SMECO) serves approximately 160,000 meters in an area that includes south and southeast of Washington, D.C. The 1,150-square-mile service area is a mix of rural and suburban areas, most of which is within commuting distance of Washington, D.C., and Baltimore. The service territory lies entirely within the PJM control area and is bounded by water on three sides: the Chesapeake Bay to the east and south, and the Potomac River to the west. It has a clearly defined service boundary with the adjacent investor-owned utilities: Potomac Electric Power Company on one side and Baltimore Gas & Electric on the other. The area has a history of significant weather events including hurricanes, tropical storms and ice storms. Numerous areas have considerable tree canopies, and a substantial portion of SMECO's operations budget is devoted to right-of-way (ROW) maintenance.

About two thirds of SMECO's load is residential and one-third is commercial, most of which is to retail stores. The cooperative is unaffiliated with a G&T cooperative and, as such, must manage its own power supply portfolio. SMECO utilizes the services of ACES Power Marketing to assist in this task. The SMECO system is comprised of 230-kilovolt transmission, 69-kV subtransmission and 12.47-kV distribution circuits. SMECO has about 11,600 miles of distribution line and averages about 14 members per mile.

The cooperative's peak system load is bimodal in nature, with annual peaks alternately occurring in both the winter and summer seasons. Solar offers no apparent peaking capacity in winter months and little apparent peaking capacity in summer months, as system peaks occur later in the day than the peak output of the solar array. The cooperative's average system load is approximately 400 megawatts.

2. Renewable Profile

In December 2012, SMECO completed construction of a 5.5-MW solar array, located on 33 acres of a 47-acre parcel owned by SMECO that is adjacent to its engineering and operations center in Hughesville, Maryland. The capacity factor of the array is estimated to be 18.5 percent. The duration of the project, from start to finish, was just under two years. The construction and commissioning period took approximately five months.

The 23,716 MEMC 280-W DC module solar array is connected to the local electric distribution system using 11 Advanced Energy 500-kW inverters. All components were specified by the developer, Sun Edison. Total output of the array is 5.5-MW AC. This project fits into the cooperative's overall power portfolio needs both for energy and for Maryland state mandates for renewable energy. The array provides a small percentage of energy but a large percentage of solar renewable energy credits to meet a portion of SMECO's renewable portfolio standard (RPS) requirements.

3. Financing and Rate Design

First, the cooperative performed its due diligence. It met with the Rural Utility Service (RUS), National Renewable Cooperative Organization (NRCO), and legal, technical and financial consulting firms prior to issuing a request for proposal (RFP). The cooperative created a for-profit subsidiary, SMECO Solar, to take advantage of grants provided under Section 1603 of the American Recovery and Reinvestment Act (ARRA) of 2009, which substantially reduced the cost of the project. A main goal was to minimize the impact on rates, as this project is folded in as part of SMECO's power portfolio. As part of the RFP process, the cooperative, with assistance from NRCO, received bids from 18 developers for 29 potential projects throughout southern Maryland. Sun Edison was selected from this group to construct the array on SMECO property as a turnkey project. The project represents a $20 million investment. SMECO Solar qualified for a $6 million ARRA grant, for a net investment of about $14 million, or $2.55 per watt AC, which was financed through RUS using a standard Federal Financing Bank loan.

4. Project Development

The site was selected because of its suitability for the project, its visibility to the public and the fact that SMECO already owned the property. As a turnkey project, all components of the array (modules, inverters, racking), as well as engineering and design, were developed by Sun Edison and reviewed by Burns and McDonnell on behalf of the cooperative. Sun Edison utilized Vaughn Industries as the prime construction subcontractor. Actual yield to date is very closely aligned with initial projections.

Typical permitting and licensing issues were encountered, and SMECO was able to expedite the permitting process. One unique siting issue was that there were a number of old tobacco barns of historical significance on the property that needed to be moved; best practices were used during removal of the barns. Although the barns themselves could not be saved, they were documented, and plans were made to reuse the raw materials.

Final commissioning and acceptance testing were performed by Sun Edison, with review by Burns and McDonnell.

5. Operations and Maintenance

The cooperative has a five-year maintenance agreement contract with Sun Edison's subsidiary, NVT, which covers all operations and maintenance issues with the array, as well as SMECO employee training. At the end of the contract, SMECO will evaluate whether to continue to outsource this function or to bring it in-house.

A site inspection checklist was developed by Burns and McDonnell.

The array has an interconnection with SMECO's distribution system on a large feeder very close to a substation. Given the loading on this feeder, calculations showed that there would be no operational issues; there have been none to date. No mitigation techniques or special technologies were required prior to interconnection.

Although the site is fenced, there have been a couple of instances of vandalism using rocks.

6. Telemetry

Array output is posted to a Sun Edison Client Connect website using its proprietary programs. The website is linked to the cooperative's SMECO Solar website so members can view the array output in real time. Array monitoring is provided by Sun Edison as part of the five-year contract.

7. Administrative Impacts

The addition of the array added some work to all departments. Additional legal and accounting work was needed to develop the for-profit subsidiary, SMECO Solar, and to fulfill annual reporting and tax requirements. Because the array was not marketed to the membership, most outreach efforts consisted of maximizing the project's public relations value to the membership and the community at large. As part of this effort, a companion website for the subsidiary was developed (www.smecosolar.com). The cooperative also utilized press releases and articles in the monthly newsletter, *Cooperative Review*, to keep members informed about SMECO Solar.

Recognizing its achievement with the SMECO Solar array, SMECO was named 2014 Electric Cooperative Utility of the Year by the Solar Electric Power Association (SEPA).

In 2014, SMECO held a series of open house meetings that were well-attended by members who wanted to learn more about solar generation. The open house meetings, which were held in response to recent national solar developer marketing campaigns geared toward rooftop solar installations, have strained cooperative engineering and administrative resources. As a result, the cooperative is currently evaluating staffing and organizational changes to better address the increased workload as interest in rooftop solar continues to grow.

8. Renewable Policy Development

The cooperative has had distributed generation (DG) policies and procedures in place for quite a while. The state of Maryland has adopted a renewable portfolio standard that gradually increases over time to require the cooperative to achieve 20 percent renewable energy in its power supply portfolio by the year 2022. The cooperative is also required to achieve 2 percent of its renewable energy total using solar sited within the state. Any utility that does not achieve these minimum percentages is subject to a financial penalty payable to the state.

SMECO's board reviewed and approved both this project and Rockfish Solar, which is currently under development. As a cooperative responsible for its generation portfolio, the board has a risk oversight committee that reviews power supply risk. SMECO plans to integrate additional renewables into its future portfolio planning through long-term wind and solar power purchase agreements (PPAs) or additional solar ownership, depending on the economics at the time.

NRCO recently completed a study for SMECO that reviewed both community and rooftop solar with an eye toward implementing changes to its DG policies. SMECO offers true net metering per state requirements, compensating members who put energy back on the grid on an annual basis at the energy-only rate for their net production.

9. Member Interest in Solar

Member feedback as a result of this project has been very positive. Given SMECO's Chesapeake Bay location, there is continuing sensitivity to environmental issues, and this project has been a net plus in this regard. Currently, the cooperative has 662 members with some form of DG, primarily solar. Another 332 applications for DG are pending. SMECO foresees a high penetration of rooftop solar in its future, particularly as a couple of national rooftop solar firms are marketing actively in the area to members and nonmembers alike. The combination of saving money on energy with no money down while also going green has earned a lot of attention.

Because of the positive experience with this project and the state of Maryland's renewable portfolio standard requirements, SMECO is proceeding with the larger 10-MW Rockfish Solar project. It is structured differently than the first in that it will be owned by the developer; SMECO will purchase the entire output of the Rockfish project under a PPA with the developer.

10. Business Options

SMECO reviewed various business models and evaluated them at each decision point considering two primary concerns: meeting the RPS requirements and the impact on members' rates. Although the two solar projects are different, they share the common denominators of meeting both the RPS and the lowest cost requirements.

At the time of each RFP, SMECO selected the lowest-cost, all-rolled-in, life-of-project option. For the SMECO Solar project, that lowest-cost approach was direct ownership, primarily due to the ARRA funding. For the Rockfish Solar project, it was a PPA. Both options give SMECO rights to the full output, including energy, capacity and solar RECs. Going forward, SMECO plans to investigate community and rooftop solar options to meet member demand.

11. Lessons Learned

Overall, SMECO has had a positive experience with owning the first solar project, though in hindsight, it might have looked more closely at a third-party PPA. Letting a third party own and operate the project would have eliminated a few headaches along the way. It will have firsthand experience with both approaches once the Rockfish Solar project is operational. SMECO found that using consultants to assist in the process was extremely valuable. Also, NRCO was especially helpful. SMECO strongly recommends using an RFP process with competitive bids, as it has found that there are a lot of players out there anxious to make a proposal, with some making multiple proposals.

SMECO foresees additional DG fitting into its power portfolio, driven by both the RPS and member interest. It continues to see higher penetration of solar DG driven by rooftop solar developers, an option the cooperative is currently investigating.

Because of the recent proliferation of solar in its service territory, SMECO will be studying future rate design alternatives for both the power supply side and the DG side to cover its fixed costs. This also means SMECO must continue to learn, educate and evolve as the industry and technologies develop.

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