Virginia residents of Bath, Allegheny, Highland, Augusta and Rockbridge counties are now served by 550KW of shared solar, through the construction of a 1750 panel community solar garden owned and maintained by BARC Electric Cooperative. The garden is fully subscribed, serving 212 local subscribers (203 residential and nine commercial customers).

Subscribers purchase “energy blocks” of 50kWh at a cost of $4.95 per block each month. Initially, subscribers pay a $0.02 premium for their energy, but with fixed rate for 20 years, savings are expected within five years. Additionally, the customers have no upfront costs associated with their subscription and a portion of their subscription goes into a special fund to pay for project expansion.

Part of the appeal of BARC’s subscription model is the flexibility, with 12-month periods that renew automatically each year. If customers wish to opt out at the end of each 12-month period, there is no penalty. Moreover, subscriptions are portable within BARC territory. Should a customer leave the BARC service territory, their subscription goes to the next person on the waiting list. Residential and commercial customers can purchase blocks representing up to 25% of their annual consumption (this cap prevents a single subscriber from consuming too much of the project).

The $1.4 million project was funded by grants from the Rural Energy for America Program (REAP) and the Appalachian Regional Commission, along with a loan from the Department of Energy’s New Clean Renewable Energy Bonds (NCREBs) program. The array was commissioned by Governor Terry McAuliffe on August 29, 20161 and future plans for the array involve expanding on the current footprint in order to make more subscriptions available to customers in the BARC service area.

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Lessons Learned

Understandable Messaging

Energy can be a daunting topic for many customers. Therefore, BARC wanted to make their messaging surrounding the community solar garden and its offerings as simple as possible. Using bold, concise visuals outlining an abbreviated version of the key messages, creating the concept of “energy blocks” as opposed to kilowatt-hour subscriptions, and crafting marketing that was easily digestible by all customers, BARC was able to successfully market community solar to their customers. Moreover, by recognizing that fixed energy costs resonated most with the audience, BARC was able to emphasize this aspect of the project in its messaging.

Continued Customer Engagement

BARC’s initial success in selling all of the subscriptions for the community solar garden was directly attributable to clear, concise, and targeted marketing. Continuing that engagement with the customers, however, is key to ensuring sustained interest and awareness in the project. BARC discovered that when it reduced its messaging efforts after its initial sell-out, subscription interest trailed-off over time, although this could have been a result of the announcement that the garden was sold out. Keeping interest high through continued messaging and engagement with current and potential subscribers is a key element to ensuring that there will be a large subscriber pool for future project expansion.

Project Visibility Helps

BARC found that an important element of gaining and keeping customer interest in a community solar project was siting the project where customers could see it. When customers see where their energy is coming from, they feel more invested in the project. It also provides an educational resource for local residents to learn about solar and how it is both generated and transmitted. Keeping energy generation local also helps customers feel connected to the generation source and the resource. Therefore, BARC decided to construct the community solar garden at their headquarters in an area highly visible to passing traffic.
A total of 17MW of shared solar now serves municipalities, water districts and school districts of Cape Cod and Martha's Vineyard through a unique community and nonprofit driven approach. Through bulk procurement and purchasing, Cape & Vineyard Electric Cooperative (CVEC) provides lower-cost financing for large scale solar PV projects without affecting a municipality's debt obligations, drives down electricity costs for the participating municipalities and school districts, and aims to stabilize electric rates for all Cape Cod and Martha's Vineyard ratepayers.

As an electric cooperative with a total of 28.5MW of solar in its portfolio, CVEC's mission is to develop and/or own renewable energy generation facilities and procure or sell long-term electric supply or other energy-related goods and services at competitive prices to member communities and their customers. Twenty members from municipalities and counties sit on the board of the Cooperative. Each municipality is a subscriber to the Cooperative, some hosting multiple arrays within their jurisdictions and some participating as offtakers for the benefits. CVEC was created to provide the municipalities of Cape Cod and Martha's Vineyard a way to work together to integrate clean, renewable energy as part of a more sustainable Cape Cod and Martha's Vineyard.

CVEC led three phases of bulk procurement from 2010-2016. They were able to reduce soft costs, as each bundled procurement required only one Request for Proposal (RFP) and one contract negotiation for multiple sites. A total of 32 installations were completed, ranging from large PV arrays covering entire capped landfills, to smaller rooftop arrays on public buildings.

As a nonprofit cooperative, CVEC was unable to take advantage of tax incentives, so it was crucial to work with third parties to utilize the federal tax credit. A third party installs, owns, operates, and maintains the arrays through a Power Purchase Agreement (PPA). The towns that own the land on which the arrays are installed are the beneficiaries of the net metering credits and pay a fixed dollar/kWh rate to the vendor.
Anticipate Shifting Incentives

Massachusetts and federal incentives are shifting, providing a source of difficulty for collaborative procurements by nonprofit organizations. With the SREC cap met in Massachusetts, there is uncertainty about future financing incentives and viability of projects. A major incentive for third party developers to partner with a nonprofit organization is that they receive the SRECs. Because of these shifting incentives, opportunities have fallen through for the Cooperative. Anticipating these shifts to the degree possible will help to make financing collaborative procurement projects more feasible in the long run.

Set Expectations for Maintenance and Performance

With numerous towns involved in many arrays, it is key to have a common understanding of the ongoing maintenance required. Installers, developers, the participating municipalities, and the Coop should have a common understanding of maintenance required and the level of energy production expected. Many of the towns are eager to harness as many kWhs as possible, which calls for the highest efficiency from the systems, but it does not serve the contractor's bottom line to make frequent expensive repairs to only modestly improve performance. Developing a common expectation of energy production, which types of repairs warrant a visit by a contractor, and an understanding of the maintenance required could lead to better relationships.

Working with Multiple Jurisdictions

On the Cape & Islands, town meetings and regular changes in elected town officials are the norm. With each new opportunity, CVEC staff spend countless hours educating the new governing boards. It is hoped that, as the Cooperative continues to return to participating towns with similar opportunities and contracts, governing bodies will streamline their processes and avoid multiple costly legal reviews.

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Residents of Taos, New Mexico are now served by 100kW of shared solar. Through a community solar array and a third party power purchase agreement (PPA), Kit Carson Electric Cooperative provides solar to residents of multiple income levels. The solar array is a parking canopy at a local charter school, a visible and functional space to showcase both the community and the cooperative's commitment to renewable energy.

In 2012, Kit Carson formed a community committee of 55 people and six board members from various income levels, backgrounds, housing types and interests. This included opponents and proponents of solar to determine which kind of energy system to build next, based on the greatest interest and benefit to the community. The committee chose community solar as their preferred energy source due to the large amounts of members it could serve at a relatively low cost. The committee also served as a vehicle to address obstacles to deploying the community solar array; for example, if one group had concerns about the aesthetics of the array, a committee member who had graphic design experience would draft a design to address those concerns.

To build the system, the first of its kind for the cooperative, Kit Carson worked with a third party developer, Clean Energy Collective (CEC). CEC owned the system and Kit Carson purchased the electricity through a 20-year PPA and helped to market the sales of the panels. As part of the arrangement, CEC was required to offer financing for participants, including those that could not pay upfront. The total cost to construct the raised canopy carport array was $350,000. Members were able to purchase one of the 420 panels for $845 to offset their electricity bills each month. Through virtual net metering, panel owners were credited for the portion of energy the panel contributed to the grid.

Together with Kit Carson, the committee selected a local charter school to serve as the host site. Working with a charter school was a key marketing strategy as it facilitated outreach to students of families of various backgrounds.

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Work Directly with the Community

One ingredient to the success of this project was the level of community engagement enabled by the community committee. By directly engaging their constituency, the cooperative better understood what the community valued, which led to a collaborative effort and a project that had community support. The committee had broad representation and provided a forum for candid discussion across the community. This process empowered customers to be part of the project development and have a deciding voice on their energy supply.

Reduce Project Costs to Enable Low-Income Participation

This community solar project included both the carport and solar panels, which drove up the project cost. As a result, the cost to participate was higher and the project didn't attract as many low and moderate income customers as first envisioned. Going forward, the cooperative will develop ground-mounted arrays to drive costs down, and with advancing technology and increasingly competitive solar prices, they anticipate the ability to further reduce the cost for customers.

Community Solar for Resilience

Kit Carson is interested in deploying solar as a strategy to support community resilience. At a regional scale, distributed generation creates a more resilient system that is less reliant on large, centralized power plants. At a given site, solar can be supplemented with battery technology to provide backup power to critical facilities during outages. Within the town of Taos, Kit Carson is considering the installation of a 1MW solar array with battery backup at a sewer plant and hopes to add a community shared solar provision on this project. After one year of operation and payment to the developer, Kit Carson hopes to turn this solar+storage array into a community solar project and have subscribers purchase the power.

Lessons Learned

Since the array was built in 2012, the system was fully subscribed and there is now enough interest to develop another 2MW of community solar. This project was a first for New Mexico and has become a model for other energy cooperatives in the state. The New Mexico Public Regulation Committee is also looking at the rules to enable replication by other types of utilities in the state.

Committee members also helped tap into diverse networks to help reach a wider range of potential customer for the community solar array.
Michigan Community Solar

Project Makes Solar Ownership Possible for More Customers in Lansing and East Lansing

In late 2016, East Lansing expects to have its first community solar project. The project is a **300kW system at Burcham Park, a 24-acre park and former landfill**. The system will feature 1,000 solar panels (300 watts each), producing a total of **385,000 kilowatt-hours of power each year** and is expected to be operational in fall 2016. Participants can lease one or more panels for 25 years at a one-time cost of **$399 per panel**. In return, they get a credit on each month's energy utility bill for the amount of power created by the panel(s) they lease. Panels are expected to pay for themselves within 12 years.

The Lansing Board of Water & Light (BWL) is a municipal utility that provides drinking water, electricity, steam and related services to the greater Lansing area. The utility began investigating community solar because they saw that customers were very interested in supporting solar and realized that not everyone wanted or could have solar panels on their roofs. By installing the community solar park, they were still able to offer these customers the chance to “go solar.”

To advance the project, the utility partnered with Michigan Energy Options (MEO), a nonprofit organization they had worked with for years on energy efficiency programming. MEO has served as the project manager – helping coordinate all aspects of planning and implementation, including outreach, community education, and partner coordination. The utility selected Patriot Solar Group to design, construct and operate the facility, including marketing and administration. They then entered into a Power Purchase Agreement with Patriot Solar.

Following the Burcham Park Project, the partners have plans for a second community solar project at the Water Treatment Plant in Lansing.

For more information contact:
micommunitysolar.org
michiganenergyoptions.org/communities
“Our tagline has been ‘simple, affordable, local,” explains John Kinch of MEO. That message is resonating with residents and has attracted the attention of other communities in Michigan. MEO is now helping to replicate the project with other municipal utilities and communities.

Lessons Learned

Know your customers
At the outset of the project, a community solar survey was sent out to city residents. This survey provided important information and insights that not only helped shape the projects, but also proved invaluable as partners championed the project with other agencies and elected officials. The survey included questions about how well residents understood community solar and gauged their interest. It helped the planners understand how residents felt about the financial, social and environmental benefits of the project. Most importantly, the survey revealed that 90% of the respondents wanted a community solar project in East Lansing. This has been an important piece of data as partners have met with decision-makers, including the city council and city manager.

Thoughtful siting and other site improvements increase support
While the Burcham site was a former municipal landfill, it is now a park and residents have expressed some concerns about the aesthetics of the solar installation. The panels will use approximately one acre in the southwest corner of the park. To be sensitive to the community members’ concern, the designers have used landscaping to ensure that the panels are largely screened from public view. The project has also dedicated funds to generally improve the park – in addition to the landscaping, the project will install public art and park amenities.

Minimize risk with pre-registration
To ensure that there was sufficient interest in the projects, construction for each project won’t start until 80% of the project is leased. Within a week of the Burcham Park project announcement in October, 2015, 100 solar panels were already spoken for, and in 10 months that number had increased to 700. Customers pre-registered through the MI Community Solar website and were not asked to deposit any money until the project was within a month of operation. Given the level of interest in pre-registration, the partners are confident that 80% of the project will be subscribed very quickly after they begin accepting deposits.

Offer flexible lease terms
While the program does require a 25-year lease, BWL has designed flexible terms, in recognition that many people will move in that time period. If a customer breaks their lease, the rights to the solar panels can be transferred to a third party – this could be a new resident at the address, a different customer within the BWL service area, or even an organization to which the lessee would like to donate the power credit. MEO will help to facilitate these ownership transfers. For customers that do lease for 25 years, they will have the option to extend their Power Purchase Agreement for an additional five years.

Local review process improvements
The project has required numerous local permits and review processes. To navigate this complex process, the partners created a flowchart to show the various approvals. Given that this project was the first of its kind, the process was anticipated to be cumbersome. The partners will use this experience, however, as an educational opportunity and will be providing feedback to the city about ways they can improve and streamline the permitting requirements in order to make it easier and less costly for future community solar projects.

However, Kinch also noted that each project will inevitably have a unique set of conditions and issues that will arise. A key lesson learned for him was that these projects can’t be planned with a linear approach. “There are a lot of critical paths that have to move on parallel tracks,” he said. “If you can’t push ahead on legal, financial, marketing, and development in parallel, it will never get done.”
In Minnesota, an innovative program is expanding energy options for low-income households by combining funding from the Low Income Home Energy Assistance Program for weatherization and the Minnesota Renewable Energy Equipment Grant Program to provide solar thermal and solar electric systems.

More than 400 solar energy systems have been installed on low-income households in Minnesota since 2005, enabling participants to cut their energy bills by 25%. The nonprofit Rural Renewable Energy Alliance (RREAL) has achieved these results through strategic partnerships with housing authorities, state agencies, community-based organizations and federal resources.

Low-income populations face many barriers to accessing clean, renewable and sustainable energy. In fact, low-income households commonly spend between 15% and 20% of their income on energy-related expenses. The combination of energy inefficient housing and unpredictable energy costs means that many low-income households find themselves stuck in a cycle of energy poverty.

Low Income Home Energy Assistance Program (LIHEAP) is a federal program that provides funding to states to help low-income homeowners with weatherization and energy efficiency. RREAL has created a successful approach that identifies homeowners who are eligible for LIHEAP funding by working with state and nonprofit

For more information contact:
RREAL: www.rreal.org
groups that have pre-existing relationships with potential low-income customers. As RREAL works with LIHEAP participants to weatherize their homes, they also introduce them to the Minnesota Renewable Energy Equipment Grant Program (REEGP) – a grant program that enables homeowners to install solar thermal or solar electricity. The coupling of these two programs allows customers to improve their energy efficiency and meet a significant amount of their energy demand with solar, driving down and stabilizing energy costs for the household.

RREAL’s approach to connecting with low-income participants is replicable for other organizations across the country, as the federally-funded LIHEAP program is available in 96% of the counties in the United States.

Lessons Learned

Connecting Programs and Partnerships Makes it Work

RREAL’s approach successfully connected existing programs and helped to simplify the customer’s experience. It also relies on important partnerships with housing agencies and community-based organizations. These connections have enabled RREAL to make solar accessible to low-income households.

Exploring Weatherization and Community Solar

RREAL is now working to expand their rooftop solar program to include the option to participate in community solar. This gives participants the opportunity to be part of a shared community solar project, rather than putting solar on their individual home. RREAL is currently working with the Leech Lake Band of Ojibwe to construct a 200kW shared solar array that would provide energy to LIHEAP recipients in the community. This would be the first community solar project located on tribal lands in the country. They hope the Leech Lake array demonstrates the opportunity to provide energy security and cost stabilization to homeowners who might not otherwise be able to afford solar. The installation will have the ancillary benefit of providing training in solar construction to graduates from the Leech Lake Tribal College, thus building local capacity in solar development and installation.

While RREAL would like to be able to offer community solar projects across Minnesota, the task is daunting with over 180 utilities in the state, five of which are in the Leech Lake territory alone. To get started, RREAL has found working with utility cooperatives to be a promising avenue for progressing community solar.
West Virginia is ranked 37 among the 50 states for installed solar electricity systems, according to the National Renewable Energy Lab. The state’s voluntary renewable portfolio standard was repealed, there are no state incentives for solar and the legislature has considered overturning net-metering.

In the midst of this challenging environment, installing solar can be even harder for nonprofit organizations because they cannot take advantage of tax incentives. Power Purchase Agreements (PPAs) are not allowed in West Virginia and common sources of funding, such as the United States Department of Agriculture (USDA) are targeted to for-profit companies.

To make solar possible for nonprofit community organizations, social enterprise Solar Holler has developed an innovative approach that requires no upfront cost and creates immediate savings. To date, four projects have been installed: Shepherdstown Presbyterian Church, Bolivar-Harpers Ferry Public Library, Courtyard Apartments (affordable housing) and the Cabell-Huntington Coalition for the Homeless.

Funding for these solar projects came from local supporters that wanted to help the nonprofit organizations. Supporters installed remote controllers on their hot water tanks through a program run by Mosaic Power in the PJM Power Pool. Mosaic Power uses remote controls to adjust the times the hot water heater turns on and off – having no impact on the homeowner, but having significant impacts on energy efficiency collectively. Each participant earns $100 each year, which they donate to enable the solar installation. Using these funds, in addition to the value of renewable energy credits (RECs), Solar Holler was able to donate the solar system to the nonprofit organization. Once a system has been paid for, the water heater income will continue to be used to support other solar projects in West Virginia. To date, Solar Holler has coordinated the installation of over 200 water heater controllers.

A creative crowdfunding model leveraged revenue from energy efficiency to put 24kW of solar on nonprofit buildings in Appalachia.

For more information contact: www.solarholler.com

1  https://openpv.nrel.gov/rankings
2  PJM territory includes the following states in whole or in part: all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.
Lessons Learned

Educational and Networking Opportunities

Customer acquisition is among the greatest challenge for both solar energy and energy efficiency service providers. Community organizations, including churches, schools and community centers, provide a way to reach potential customers in an efficient way. In addition, the Solar Holler approach provided a tangible way for community members to support a nonprofit organization they cared about. Gaining community member involvement helped to create a network of support for solar. More than 100 families were involved in the program to put solar on a Presbyterian Church and when the legislature began to reconsider the state's net metering legislation, these households quickly became advocates. Legislators received more than 600 letters, leading to a unanimous vote in support of net metering.

Messaging that Resonates with your Audience

West Virginia has a history rooted in energy. The state has long been an important source of coal and natural gas, and continues to produce 15% of the nation's fossil fuel energy. Building on this rich history, Solar Holler is committed to demonstrating that solar offers a way for West Virginia to continue its tradition as an energy leader – even the company logo and tagline “Mine the Sun” reflects the history of mining in Appalachia.

Link Energy Efficiency and Solar

To some extent, the water heater program is only made possible because West Virginia is in the PJM Power Pool. However, in any market, there are creative ways to link cost savings from energy efficiency and demand response to help cover the cost of solar energy installation. In some cases, Solar Holler found that solar isn’t the best option, but they still work with the organization to implement efficiency measures. Every dollar saved means more money is available to help the nonprofit pursue its core mission.

Manage the Size of the Crowd

The water heater model has been successful, but managing the installation of water heaters in homes across a large, low-density rural area proved to be a challenge. To simplify things, Solar Holler stopped installing single-family residential systems. They found that multi-family housing and other buildings that include many water heaters offer a more efficient approach.

Help Grow the Solar Market

After completing the first couple of projects, Solar Holler was overwhelmed with interest. With fewer than two dozen people in the solar industry operating in the state, demand quickly outstripped supply. In this challenge, Solar Holler found an opportunity. Last year, Solar Holler partnered with Coalfield Development Corporation to launch the first solar job training program in West Virginia. Participants will have the opportunity to apprentice with the Solar Holler installation crews for two years while earning an associate degree and NABCEP solar certification. Thus far, 20 people have completed the program, increasing the number of solar installers in West Virginia by approximately 40%.