



IE Cleantech Corner

Community Solar and Best Practices in North Carolina

In recent years, the clean energy industry has grown in North Carolina. The state consistently ranks in the top 10 states for solar energy, energy efficiency, and clean energy jobs (Innab, 2020). North Carolina is also second in the nation for solar production, making it a leader in clean energy (Solar Energy Institute Association, 2020). The solar industry grew quickly due to the Renewable Energy and Energy Efficiency Portfolio Standards (REPS) as well as strong state policy and regulatory support (Solar Energy Institute Association, 2020). According to the E2 Clean Energy Jobs Report, North Carolina supplied 113,000 clean energy jobs in 2019, experienced a 5.2 percent increase in jobs, and employed 10 times more workers than the fossil fuel industry (E2 & North Carolina Sustainable Energy Association, 2020).

The growth in the solar industry has sparked an interest in solar for many North Carolinians. But in a lot of cases, residents can't install solar systems at their own homes or property due to housing structural limitations or shading from trees and other fixtures. Over three out of four residential rooftops are unable to accommodate solar panels, preventing the majority of the population from using solar energy, a clean and reliable energy source (Denholm & Margolis, 2008). Community solar solves this problem by allowing residents to still receive solar energy even if their homes are not suitable, and is also much more affordable than traditional rooftop solar.

What is community solar?

Community solar also known as shared solar, are community driven projects that provide multiple community members with solar energy coming from one solar site. Community solar projects allow customers to reap the benefits of using solar energy without necessarily having to install solar on their property. Generally, community solar projects consist of a solar site where community members can obtain financial benefit and/or power from a subscription, or own a portion of the panels (NC Sustainable Energy Association, n.d.). In a subscription program, customers pay an annual subscription price or enrollment fee to participate in the community solar project. Customers receive monthly financial credits on electric bills for the power generated by their subscribers share of the solar facility (NC Sustainable Energy Association, n.d.).

What are the benefits?

Community solar is advantageous because it gives residents more options to consume clean energy, and reduces the cost of solar energy. Through community solar, customers have the ability to control their energy choices. This presence of control and choice contributes to the shift from corporate, centralized, and monopolized fossil fuel energy to an energy economy that is controlled by communities, considers the environment, supports the local economy, and commits to the health and well-being of residents (Climate Justice Alliance, n.d.). This is a concept known as energy democracy. As a contributor to this

shift, community solar plays a role in creating healthier, cleaner, more resilient, and stronger communities. By removing barriers, such as financial and housing constraints, community solar increases accessibility to clean energy. Projects can also increase a community's energy resilience or its ability to withstand disruption (Innab, 2020). By increasing the amount of consumers using clean energy, the carbon footprint decreases.

Community solar also offers benefits to utilities. PJ Rehm from ElectriCities said when utilities implement community solar projects, they can increase customer satisfaction (P. Rehm, personal communication, September 30, 2020). "If utilities started offering community solar and they had customers that were asking for it, they would increase their customer satisfaction. You're appealing to those customers that are looking for renewable options," he said.

Utilities should also understand that clean energy is an investment, not a cost. Recent energy projects and research shows that investments are paying off (Stone, 2019). The investment in clean energy also provides clean jobs, stimulating local economic development (Southern Environmental Law Center, n.d.).

Best practices

Providing economic benefits, subscription program

Community solar programs are advantageous for customers when the participation in the program provides customers with economic benefits, allowing them to see the results of their investment. When customers pay the upfront investment costs, they should see on-bill credits for a certain amount of years. On-bill crediting provides customers with an economic benefit that is proportional to the customer's subscription size and the energy generated by the solar project (Coughlin et al., 2012). It's best if customers receive these credits on bills which can go towards amounts owed to the utility rather than a direct payment, so it is not seen as a taxable income (Coughlin et al., 2012).

Wanting to maximize their solar investment, financial credits also motivate customers to be energy efficient by decreasing energy usage and bills. Since the credit is proportional to the customer's subscription size, it is optimal that subscriptions allow for years-long time periods, protecting customers from credit variability as fossil fuel prices vary (Southern Environmental Law Center, n.d.).

Community solar projects should offer the option to subscribe to a number of panels or enroll in different subscription sizes as well. Fayetteville PWC, one of North Carolina's first community solar projects, offers a subscription program (K. Miller, personal communication, October 6, 2020). There is a \$20 fee for the first panel subscribed to and \$10 for each additional panel. During the 2019-2020 year, the monthly subscription fee was about \$1.53 per panel and the fixed monthly bill credit was \$2.51 per panel. This credit covers the entire monthly subscription fee. Residents can subscribe to up to five panels. There is no fee to unsubscribe and customers can do so at any time.

Battery storage

Battery storage involves storing electricity so that it can be used later. There are many reasons for community solar projects to use battery storage, one being to levelize what is put out on the grid. To levelize the grid, community solar projects can utilize stored energy during peak energy hours. This can save money and make community solar cheaper for its customers in the long run as the stored energy is

dispatched when the price of energy is the highest. Bob Leker, Environmental Program Consultant at the North Carolina Department of Environmental Quality, said that most electric cooperatives as well as municipal utilities purchase almost all of their power from investor owned utilities such as Duke Energy, as community solar projects only provide a small amount of power that customers get credits for using virtual net metering (B. Leker, personal communication, November 25, 2020). When Duke Energy's demand increases, the price per kWh increases as well. During these peak hours, battery storage can be used to decrease the community solar project's cost of power.

Fayetteville PWC utilizes battery storage to avoid high costs during peak hours (K. Miller, personal communication, October 6, 2020). "When we have a coincident peak hour at 8 o'clock in the morning, we can dispatch the battery's stored energy and send out about 500 kilowatts onto our grid," said Kathy Miller, Marketing Manager at Fayetteville Public Works Commission.

Up until the past few years, battery storage has been too expensive to implement, but more recently the endeavor has become more possible (J. Robinson, personal communication, November 25, 2020). James Robinson, Energy Storage Project Development Manager at Strata Solar, said this is because the large scale electric grid batteries are made using the same kind of battery used in consumer products such as laptops, cellphones, and electric vehicles. These are known as lithium ion batteries.

"As more and more technologies use lithium ion batteries for those things, in the last decade or so, the price has started to come down. As you start doing something again and again, you get better at it," he said. "So the vast majority of the batteries that have been produced so far have been for electric vehicles or for consumer electronics. The large scale grid batteries have tagged along as the price for the batteries has dropped."

Bringing community solar to low-to-moderate income communities

Low-to-moderate income communities face a number of barriers when trying to access community solar. These communities face financing struggles as they lack access to capital, commonly have lower credit scores, and have less of a tax appetite (Passera, 2017). Additionally, solar projects often do not market to these communities, making these projects even less accessible. Among these barriers, low-to-moderate income communities also have less time to research energy options, move locations more often, and face distorted price levels.

Curtis Wynn, President and CEO at Roanoke Electric Cooperative, said he has learned from his experience that most people in this income bracket tend to have more pressing issues than trying to consume clean energy, therefore these communities have a low solar appetite (C. Wynn, personal communication, November 23, 2020).

Community solar projects should focus on these communities because they have the most to gain from participation (Passera, 2017). Low-to-moderate income communities are disproportionately burdened by energy costs, spending a greater percentage of their income on utility bills than higher wage earners. These communities spend about 10 times more on energy costs than higher income communities. Additionally, low-to-moderate income communities are commonly the victims of environmental

injustices as fossil fuel plants are more likely to be sited in low-income areas. Fossil fuel plants often pollute the surrounding waters and air, causing health damage in these communities.

Ben Smith from the NC Sustainable Energy Association (NCSEA) said making community solar accessible to families and communities on a budget should be a priority (B. Smith, personal communication, October 21, 2020). “A best practice is to have some sort of program that is designed to work across enough people and to make it affordable enough that a number of people can participate,” he said.

Community solar projects need to create a value proposition (Passera, 2017). In marketing terms, this means a feature or innovation that makes the company attractive to customers. For community solar projects, this goes back to on-bill crediting. This credit needs to provide meaningful and immediate savings to low-to-moderate income communities. Additionally, to reduce barriers to participation, on-bill financing should be offered for low-income customers.

In order to combat these challenges, the North Carolina Department of Environmental Quality weatherization assistance program helps low-income North Carolinians save energy, reduce their utility bills, and stay safe in their homes (“Weatherization Assistance Program,” n.d.). For the Fayetteville PWC community solar project, this program provided a grant to 10 low-income community members, paying the enrollment fee for 12 panels for each customer as well as the monthly subscription fees for the next 15 years (K. Miller, personal communication, October 6, 2020).

Wynn said another challenge is making sure these individuals are energy efficient (C. Wynn, personal communication, November 23, 2020). He said even if the individual or household participates in community solar, the gains will be lost if the clean energy is wasted due to energy inefficiency in heating and cooling systems or other appliances. He said the value of community solar can help solve the fundamental problem of energy efficiency. In an effort to do this, Roanoke Electric Cooperative is participating in a U.S. Department of Energy research project known as “ACCESS” (Achieving Cooperative Community Equitable Solar Sources) in order to expand solar energy affordability (National Rural Electric Cooperative Association, 2020). Wynn said this project involves philanthropic organizations who make the upfront investments in community solar and keep the credits, while the solar panel provides power to individuals who may be low-to-moderate income.

Siting

There are many site characteristics that utilities should consider when deciding on a site for a community solar project. Ben Smith from NCSEA said that solar energy can cause congestion on the current electric grid (B. Smith, personal communication, October 21, 2020). This is because the interconnection of solar can cause an overabundance of energy flowing at a time. He said, sometimes, the grid can’t handle the two-way flow. As a result, the grid needs an upgrade in these locations. Due to this, community solar projects should be located where the electric grid does not need an upgrade as they can be expensive and time consuming.

Additionally, community solar projects should be sited close to where people live. Areas to consider are underserved and low-to-moderate income communities, areas with high unemployment, counties with

high poverty rates, as well as brownfield sites (Southern Environmental Law Center, n.d.). Brownfield sites are abandoned or underused areas due to the threat of environmental contamination, which hinders redevelopment (“Brownfields Program,” n.d.). The brownfield site classification breaks the barrier to redevelopment and puts these areas back to reuse.

Renewable energy certificates

Renewable energy certificates (REC) represent the environmental benefits of generating electricity from clean energy sources rather than by fossil fuel plants (Southern Environmental Law Center, n.d.).

Renewable energy certificates are receipts for using clean energy (B. Smith, personal communication, October 21, 2020). Although many utilities keep their RECs to prove they are using clean energy for the state’s Renewable Energy and Energy Efficiency Portfolio Standards, it is a good way to validate that you, as a customer, are actually getting clean energy.

Portable and transferable

Community solar subscriptions should be portable, so that customers can take subscriptions with them if they move within the utility’s territory (Southern Environmental Law Center, n.d.). Community solar subscriptions should also be transferable. This means that if the customer moves outside of the utility’s territory, the subscription can be transferred to another subscriber (Southern Environmental Law Center, n.d.). The customer is also able to relinquish the subscription at any time. These measures can make clean energy more accessible to more transient customers.

Public input

A community solar project will not be successful if there is not an interest from within the targeted communities. This is why it is important to gain and listen to public input. Utilities should seek input and incorporate the feedback to ensure community members, consumer advocates, and stakeholders buy in (Southern Environmental Law Center, n.d.). Seeking public input ensures that there are higher levels of participation, allowing the public to understand the project has been well-structured.

It is also important to seek public input because all communities are different and have different needs. Seeking public input allows project directors to truly understand the needs of the community and successfully serve on those needs, which influences the structure and details of the community solar project.

For example, Fayetteville PWC in partnership with ElectriCities, surveyed the Fayetteville region’s customers ahead of time to quantify customer interests (P. Rehm, personal communication, September 30, 2020). They found that there was a large interest in community solar as nearly 28.3% considered themselves green champions or those interested in reducing their environmental footprint. Rehm at ElectriCities said gauging customer interest was advantageous because it helped the community solar project decide on the size and structure of the project.

Marketing and communication

It is important for community solar projects to offer a value proposition to the community. Any project should be framed as one that will reduce the demand for fossil fuels therefore reducing individuals’ carbon footprints benefitting the climate crisis. It should also be framed as one that will provide cost-

saving measures and economic benefits to customers. Marketing measures should meet the customers where they are at.

Smith said there is an overall need for better publicity and marketing for community solar projects (B. Smith, personal communication, October 21, 2020). He said one way to combat the lack of marketing is by involving municipalities, towns, and cities. They can partner with utilities looking to expand in community solar. He said these partnerships would be beneficial because cities and towns could do outreach with their constituents better than a utility could do.

Miller from Fayetteville PWC said this community solar project was well-marketed (K. Miller, personal communication, October 6, 2020). The project acquired a billboard, radio shows, website, flyer distribution, commercials, social media, and other media to market and publicize this project. The project also included a variety of outreach initiatives such as community events and meetings.

Conclusion

The idea of community solar is to make clean energy more accessible. By appealing to those who are unable to install solar panels on their own homes, community solar broadens the barriers to clean energy sources. Through economic and program structure design and choices, community solar becomes a cheaper, more accessible source of clean energy than rooftop solar. This is an innovative and new idea that has a lot of room to grow, but surely offers enough benefits to customers and utilities to see that it will. Rehm from ElectriCities said their annual surveys show an increasing trend in the interest of renewable energy, so he expects to see more community solar projects in the future (P. Rehm, personal communication, September 30, 2020).

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Sources

Climate Justice Alliance. (n.d.). *Energy Democracy*. Climate Justice Alliance. <https://climatejusticealliance.org/workgroup/energy-democracy/>

Coughlin, J., Grove, J., Irvine, L., Jacobs, J., Phillips, S., Sawyer, A., & Wiedman, J. (2012). U.S. Department of Energy. <https://www.nrel.gov/docs/fy12osti/54570.pdf>

Denholm, P. & Margolis, R. (2008). Supply Curves for Rooftop Solar PV-Generated Electricity for the United States. National Renewable Energy Laboratory. <https://www.nrel.gov/docs/fy09osti/44073.pdf>

E2 & North Carolina Sustainable Energy Association. (August 2020). *Clean Jobs North Carolina 2020: Powering North Carolina's Economy with Clean Energy*. E2. <https://e2.org/wp-content/uploads/2020/08/E2-NCSEA-Clean-Jobs-North-Carolina-2020.pdf>

Innab, N. (2020, August 12). Using Community Solar to Grow North Carolina's Clean Energy Industry. *NC Sustainable Energy Association*. <https://energync.org/community-solar-benefits-nc/>

National Rural Electric Cooperative Association. (July 2020). *Opportunity for Cooperatives to Participate in DOE Research Project "ACCESS" To Expand Solar Energy Affordability*. National Rural Electric Cooperative Association. <https://www.cooperative.com/programs-services/bts/Documents/Advisories/Advisory-Solar-ACCESS-Project-Cooperatives-Recruitment-July-2020.pdf>

NC Sustainable Energy Association. (n.d.). *Community Solar*. NC Sustainable Energy Association. <https://energync.org/community-solar/>

North Carolina Department of Environmental Quality. (n.d.). *Brownfields Program*. North Carolina Department of Environmental Quality. <https://deq.nc.gov/about/divisions/waste-management/brownfields-program>

North Carolina Department of Environmental Quality. (n.d.). *Weatherization Assistance Program*. North Carolina Department of Environmental Quality. <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/weatherization-assistance-program>

Passera, L. (2017, December 11). Community Solar for Low-Income: Benefits and Barriers. [Webinar PowerPoint slides]. North Carolina Clean Energy Technology Center. <https://nccleantech.ncsu.edu/wp-content/uploads/2018/05/Passera-Laurel-Community-Solar-for-Low-Income-Benefits-and-Barriers.pdf>

Solar Energy Institute Association. (2020, September 10). *North Carolina Solar*. Solar Energy Institute Association. <https://www.seia.org/state-solar-policy/north-carolina-solar>

Southern Environmental Law Center. (n.d.). *Community Solar: Best Practices for Utilities in the South*. Southern Environmental Law Center. https://www.southernenvironment.org/uploads/publications/CommSolar_Utility_Best_Practices.PDF

Stone, A. (2019, April 30). Clean Energy Is An Investment, Not A Cost. *Forbes*. <https://www.forbes.com/sites/andystone/2019/04/30/clean-energy-is-an-investment-not-a-cost/?sh=44b42f653c82>