Community Solar for the Southeast

Implementation Guide

North Carolina Clean Energy Technology Center
Brian Lips
Autumn Proudlove
David Sarkisian
Achyut Shrestha

Reviewers/ Contributors
Hannah Pifer, Electricities
Jay Nemeth, Oakhurst Energy Solutions
Elise Fox, Savannah River National Laboratory

NC CLEAN ENERGY TECHNOLOGY CENTER

SOLAR ENERGY TECHNOLOGIES OFFICE U.S. Department Of Energy

July 2018

About the NC Clean Energy Technology Center

The North Carolina Clean Energy Technology Center is a UNC System-chartered Public Service Center administered by the College of Engineering at North Carolina State University. Its mission is to advance a sustainable energy economy by educating, demonstrating, and providing support for clean energy technologies, practices, and policies. The Center provides service to the businesses and citizens of North Carolina and beyond relating to the development and adoption of clean energy technologies. Through its programs and activities, the Center envisions and seeks to promote the development and use of clean energy in ways that stimulate a sustainable economy while reducing dependence on foreign sources of energy and mitigating the environmental impacts of fossil fuel use.

About the Community Solar for the Southeast project

The *Community Solar for the Southeast* project is focused on making solar more affordable and accessible through shared solar projects developed by electric cooperatives and municipal utilities across the Southeast. The project aims to lead a stakeholder process with member-owned and public power utilities to determine solutions needed to increase community solar project development. The team will provide technical assistance to analyze, design, and implement community solar projects.

The project is led by the NC Clean Energy Technology Center with partners, including: Rocky Mountain Institute, Fayetteville Public Works Commission, Savannah River National Laboratory, North Carolina Justice Center, National Rural Electric Cooperative Association, Roanoke Electric Cooperative, Strata Solar, EcoPlexus, Geenex, and GreenLink. The project is funded by the U.S. Department of Energy Solar Energy Technologies Office under Solar Energy Evolution and Diffusion Studies-2-State Energy Strategies (SEED2-SES).

Please contact communitysolar@ncsu.edu for more information.

Acknowledgements

This work is funded in part or whole by the U.S. Department of Energy Solar Energy Technologies Office, under Award Number DE-EE0007670.

Disclaimer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name,

trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

The contents of this report are offered as guidance. North Carolina State University, the North Carolina Division of Environmental Quality, and the North Carolina State Government and all technical sources referenced in this report do not (a) make any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may infringe on privately owned rights; (b) assume liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process in this report. This report does not reflect official views or policy of the above-mentioned institutions, agencies and governments. Mention of trade names or commercial products does not constitute endorsement or recommendation of use.

Table of Contents

About This Guide

This guide examines several issues related to community solar that are not currently addressed in existing resources. In addition to focusing specifically on the unique issues faced by electric cooperatives and municipal utilities in the southeast, this guide analyzes three distinct issues impacting the development of community solar: 1) innovative credit rate structures for participants, 2) community solar program design considerations for solar plus storage, and 3) getting buy-in from local leadership.

Three working groups were formed to explore these three separate issues. The working groups held a series of conference calls and participated in surveys between calls to provide deeper insight. The working group participants represented a range of perspectives on the issues they addressed. Working group participants included:

- Electric cooperatives and municipal utilities: Tallahassee Electric Utility, Tennessee Valley Authority, Fayetteville Public Utility Works, Blue Ridge Electric, Roanoke Electric, National Rural Electric Cooperative Association, ElectriCities
- Solar Developers and Related Professionals: Geenex, Strata Solar, Oakhurst Energy Solutions, Grid Development Partners, Commonwealth Power
- Nonprofits and Government: Community Power Network, NC Clean Energy Technology Center, Vote Solar, Rocky Mountain Institute, Savannah River National Laboratory

Most of the findings presented in this guide come directly from the input of the working groups. While none of the working groups identified a single silver bullet to the issues they explored, they did present a series of considerations that one could explore when examining these issues.

Introduction

With the notable exception of two states, the southeast has seen limited solar photovoltaic (PV) development. As of November 2017, North Carolina has the second highest installed capacity with over 3 GW of PV installed and Georgia now ranks in tenth place with approximately to 1 GW installed. The seven remaining states in the southeast have seen much less development, with under 1 GW installed collectively. Additionally, the vast majority of the PV installed in the southeast is utility-scale, driven largely by PURPA-related contracts with Investor Owned Utilities (IOUs). Just one-tenth of the PV capacity installed in the southeast is from small-scale, customer-sited systems.

The limited growth of customer-sited systems in the southeast can be partly attributed to less than favorable or nonexistent net metering rules. Low electricity rates and the illegality of third-party sales of electricity also play a role. Community solar provides an opportunity for utilities in the southeast to leverage the cost and efficiency benefits of larger ground-mounted systems to provide new opportunities for their customers to share the benefits of solar.

Investor Owned Utilities are regulated by state utility commissions. An IOU must receive approval from its regulators or have a mandate from the state legislature to implement community solar programs. Municipal utilities and electric cooperatives, however, are often not regulated or are regulated with limited oversight by the state utility commissions. Municipal utilities are governmental entities that report to the city council, and ultimately, the voters. Similarly, electric cooperatives are nonprofit entities that are member-owned and governed by their member-elected boards. This gives municipal utilities and electric cooperatives significant autonomy in decision making and flexibility in implementing community solar programs.

While both municipal utilities and electric cooperatives are non-profit entities, they differ in terms of how they treat costs and savings from utility operations. Electric cooperatives are usually obligated to distribute any excess revenue to its members according to its bylaws. Additionally, while each individual municipal utility and electric cooperative is motivated by a different set of circumstances unique to their area, there are a number of common factors influencing all of them. Most electric cooperatives and municipal utilities purchase wholesale power from a generation and transmission provider. Those power contracts can often place restrictions on the amount of electric production the utility can own or have installed on its distribution grid. These factors, and the ever-present drivers of reliability, safety, and cost effectiveness can potentially constrain the decision-making process of a utility considering community solar. However, new program design options, alternative credit rate structures, and the increased accessibility of energy storage can broaden a utility's options and offer new pathways to increased community solar.

Credit Rate Structures

The majority of existing community solar programs, including those in Colorado and most of the New England states, credit participants at the retail rate, following the traditional net metering model for customer-owned roof-mounted systems. However, utilities may be interested in other options for the rate and manner by which participants are credited to help address specific concerns like cross-subsidization or to target specific groups like low-income customers. In recent years, many states have grappled with these issues within the context of net metering, with a number of states already transitioning to new credit rate structures and compensation mechanisms for customer-owned systems. As states move to resolve these issues related to net metering, some states, including those detailed below, are also starting to apply these alternatives to the credits provided to community solar subscribers.

Recent Activity

There are several states where alternative credit rate structures for community solar have been considered and adopted.

Hawaii (Time-Varying): S.B. 2010, enacted in May 2015, allows any person or entity to "own or operate an eligible community-based renewable energy (CBRE) project," which is functionally similar to a community solar project. The legislation tasked the Public Utilities Commission (PUC) with adopting rules, including the credit rates that will be assigned to subscribers. Following a public proceeding, the PUC adopted a CBRE program framework in December 2017. The framework includes a one-year pilot phase in which the retail bill credit will be flat and based on mid-day rates. Phase two of the program, however, will utilize time-varying credit rates, including special peaker rates for projects delivering at least 85% of their output during peak periods.

Massachusetts (Incentive/Feed-In Tariff): In January 2017, the Department of Energy Resources (DOER) released its final program design for the solar incentive program that will succeed the SREC II Program. The new program, called Solar Massachusetts Renewable Target (SMART), is a 1,600 MW declining block program. Small projects will receive a 10-year fixed price term, and large projects will receive a 20-year fixed price term. Base incentive rates vary by project size, and adders are included for community solar projects ($0.03) and low-income community solar projects ($0.06).

Minnesota (Value-Based): In September 2016, the Minnesota Public Utilities Commission modified the subscriber-bill-credit rate design for Xcel Energy's community solar garden tariffs. Subscribers to solar gardens with applications filed after December 31, 2016 will be compensated at the Value of Solar Rate rather than the Applicable Retail Rate. In January 2017, Minnesota Power filed its value of solar rate, which may be the compensation method for future community solar programs. Minnesota Power's current Low Income Pilot Program is based on traditional retail rate net metering.

New York (Value-Based; Location-Based): The Public Service Commission (PSC), in its July 2016 Order Establishing a Community Distributed Generation program, directed the PSC staff to initiate a proceeding to 1) identify an interim approach to DER valuation, including a plan for moving from net metering to DER valuation that was to be adopted prior to December 2016, and 2) establish a methodology for a DER compensation mechanism based on the locational marginal price plus distribution (LMP + D) approach. In March 2017, the PSC issued an order on the future of net metering in the state. The order is one of the major milestones in New York's Reforming the Energy Vision proceeding, addressing the transitional steps from traditional net metering to a Value of Distributed Energy Resources (VDER) tariff that accurately values and compensates DERs. Beginning March 9, 2017, community solar, remote net-metered projects, and large distributed energy projects are compensated through the Phase I Value Stack VDER tariff that includes energy (based on LMP), capacity, environmental, and demand reduction credits.

North Carolina (Avoided Cost): H.B. 589, enacted in July 2017, authorized and established rules for community solar. The legislation directs Duke Energy Carolinas and Duke Energy Progress to file plans for community solar programs, limited to an aggregate 20 MW for each utility. Participants will be credited at the utility's avoided cost rate, and the program must hold non-participating customers harmless. Subscribers must also be offered the option to own the RECs associated with the energy produced by the community solar facility.

Oregon (Value-Based): S.B. 1547 of 2016 established a community solar program for the state. The legislation set the basic criteria and directed the Public Utility Commission (PUC) to establish the rules for the program, which must require utilities to enter into 20-year power purchase agreements with certified projects and incentivize customers to participate while minimizing cost shifts and financial burdens. The PUC worked in parallel to develop its Resource Value of Solar (RVOS), which will be the bill credit basis for community solar participants. The PUC issued Order 17-357 in September 2017, adopting the RVOS. The RVOS utilizes eleven elements (energy, generation capacity, transmission and distribution capacity, line losses, administration, market price response, RPS compliance, integration and ancillary services, hedge value, environmental compliance, and security, reliability, and reserves) for calculating an hourly avoided cost profile for each year of the life of a solar PV system.

Working Group Insight

Responses from working group members also identified a value-based approach as a viable alternative to retail rate crediting. Potential value streams identified by working group members include avoided generation costs, demand reduction, REC value/renewable portfolio standard compliance, and ancillary services. Additional specific value streams were identified for energy storage, including solar smoothing (renewables integration), back-up power, transmission and distribution deferral, voltage support, and frequency regulation.

Since most electric cooperatives and municipal utilities in the southeast purchase the majority of their electricity from a generation and transmission provider, they may recognize energy and demand savings as the only quantifiable values. Fayetteville Public Works Commission (FPWC), a large municipal utility in North Carolina, is planning a community solar plus storage project, in which it will credit participants for both avoided energy and demand costs. Since FPWC pays a per-kWh energy rate and a monthly coincident peak demand charge to its wholesale supplier, calculating the energy and demand charge savings provided by the solar and storage system is relatively straightforward. Many other public power utilities are assessed a demand charge by their wholesale supplier, making this unique option available to a large number of utilities. This option may be categorized as a type of value-based rate or as building upon the simple avoided energy rate option.

Credit Rate Options

The Program Design and Credit Rates working group identified six specific credit rate designs that may be employed by utilities developing community solar projects.

Table 1. Credit Rate Options

Credit Structure	Description	Advantages	Disadvantages
Avoided Cost Rate	Participants are credited at either the utility's wholesale energy purchase rate or a state-approved avoided cost rate.	+ Relatively simple to calculate and implement + Does not subsidize participants	- Unlikely to encourage participation - May not compensate participants for full project benefits
Feed-In Tariff	Participants are credited at a fixed above-retail rate.	+ Provides a strong financial incentive to participate + Can encourage low-income participation	- Likely to create cross-subsidization - May require dedicated incentive funds

Credit Structure	Description	Advantages	Disadvantages
Location-Based Rate	Participants are credited at a project-specific rate, based on value to the distribution system and/or location-differentiated energy prices.	+ Helps avoid cross-subsidization + Encourages projects to be developed in the most beneficial locations	- Very challenging to calculate in vertically-integrated utility territories - Public power utilities in the southeast do not typically pay location-differentiated energy prices
Retail Rate	Participants are credited per kWh at the same rate they purchase energy from the utility.	+ Simple to implement + Easy for customers to understand + Provides customers with strong financial incentive to participate	- Creates potential cross-subsidization
Time-Varying Rates	Participants are credited at different rates for energy produced during peak and off-peak times.	+ Helps avoid cross-subsidization + Can align demand charge benefits for utility with customer bill savings	- More difficult to implement - Public power utilities in the southeast frequently pay a flat wholesale rate for energy
Value-Based Rate	Participants are credited at a custom rate, reflecting the value of solar or solar + storage to the grid.	+ Helps avoid cross-subsidization + Generally perceived as fair + Can often provide a strong financial incentive to participate	- Can be challenging to calculate - Many different methodologies available
Avoided Energy & Demand Rate (Type of Value-Based Rate)	Participants are credited at a rate reflecting the utility's avoided energy and demand charge costs	+ Does not subsidize participants + Can provide a financial incentive to participate	- Only simple to calculate for utilities paying a demand charge - May provide an unpredictable stream of benefits (storage can help mitigate this)

Several credit rate design options exist for utilities developing community solar projects, each with its own set of advantages and disadvantages. Each utility should consider its goals (e.g. avoiding cross-subsidization, providing a positive financial value to participants, encouraging low-income participation) and capabilities (e.g. administrative capacity, granularity of energy prices, ability to calculate various value streams), as well as customer desires (e.g. support environmentally-friendly electricity generation, save money, simplicity) when considering different credit structures.

Solar + Storage Program Design

Interest in energy storage has been growing in recent years as new technologies have emerged and prices have continued to decline. Energy storage presents a number of potential value streams for utilities that integrate energy storage into their systems and for electricity customers who install behind-the-meter energy storage.

Policymakers in a number of states have grappled with developing a policy framework for advancing energy storage. In 2017 alone, at least 31 states took action specifically related to energy storage[1]. States have considered mandates for their utilities to deploy a certain amount of energy storage, commissioned studies and investigations into the benefits of energy storage, and have approved energy storage pilot projects. Some states, including California and Hawaii have also recently amended their net metering rules or other distributed generation compensation policies to account for customers who combine energy storage with PV. However, no utility or state government has yet developed a community solar program that integrates energy storage. While there are many potential value streams for the utility, it is unclear how best to treat those values in a community solar program.

Findings

There are a variety of value streams that accrue to a fully integrated utility that installs energy storage. Storage could be used to offset system demand and potentially delay or offset the deployment of additional generation. Energy storage could also help with frequency regulation, voltage support, transmission and distribution deferral, back-up power supply, and smoothing the effects of interment resources on the system.

Most electric cooperatives and municipal utilities in the southeast, however, are not vertically integrated. Instead of generating their own electricity, they purchase electricity and demand from transmission and distribution providers, often an Investor Owned Utility operating in the state. For these utilities, the value of energy storage is generally confined to reducing the demand component of their transmission and distribution charges.

[1] NC Clean Energy Technology Center, “50 States of Grid Modernization Q4 2017 Quarterly Report”

Participants in the working group indicated that the demand component of a utility's power supply agreement with their generation and transmission provider can be significant, sometimes accounting for 50% or more of a utility's wholesale power expense. If deployed and managed optimally, energy storage could reduce the utility's demand during the peak hours and thus reduce the demand component of their costs. There are some risks, however, that the utility should keep in mind.

For a typical cooperative or municipal utility to maximize the value associated with energy storage, they will need to time the discharge of the battery carefully to coincide with the moment of peak demand. In most cases utilities are billed based on their demand during their transmission and distribution provider's coincident peak. They may receive advanced notice from their provider that a peak is coming and can plan to discharge their energy storage to meet that peak, but there still remains a risk that they will miss the peak.

Another risk is related to the agreements between utilities and their generation and transmission providers. In some cases, these agreements may put limits on the amount of energy storage the utility can install. Utilities should examine the terms of their agreement to fully understand their restrictions.

Program Design Options

Given the number of values that energy storage provides to the utility, a utility will need to consider how to handle those benefits if energy storage is coupled with a community solar project.

Utility Retains the Benefits
A utility could consider adding energy storage to a community solar project and keeping the energy storage financially separate from the solar project. The utility would assume the full costs of purchasing and maintaining the energy storage system. The fees paid by subscribers to the community solar project would not include any costs associated with the energy storage system, and the credit rates they receive would not include any of the benefits from the energy storage system. Under this option, all customers of the utility would share equally in the costs and benefits associated with the energy storage system.

Community Solar Subscribers Share Costs and Benefits
A utility could consider making energy storage a component of the community solar project. The fees paid by subscribers would help recover the utility's costs associated with the energy storage system in addition to the solar system. In return, subscribers to the community solar plus storage project would also be credited a share of the amount of money the utility avoids paying in its demand charge with its transmission and distribution provider as a result of the energy storage system. This extra value stream could improve the economics for participants in programs where the credit rate they receive is less than the retail rate.

Utility Shares Some of the Benefits with a Target Customer Class

If the utility is trying to reach a certain customer class, such as low- to moderate-income customers, the utility could consider sharing the benefits of the energy storage system with just them. By concentrating the benefit into a subset of the overall base of participants, the economics could be improved to the point that previously hard-to-reach customers receive a tangible savings on their monthly bill.

Implementing Energy Storage

As with building a solar project, a utility could consider several different ownership options for implementing a solar plus storage system, including full ownership, partial ownership, or contracting with a private developer. A utility that wishes to own the system itself could consider directly buying the system if their balance sheet can support it, financing with a private lending institution, financing though Clean Renewable Energy Bonds, or seeking funding through the Renewable Energy for America Program. Since electric cooperatives and municipal utilities are tax exempt, they cannot claim the federal Investment Tax Credit, which a utility will need to consider in weighing its ownership options.

A utility not interested in direct ownership could consider contracting with a third-party developer. Most utilities that contract with a third-party on a solar project do so through a power purchase agreement (PPA) or a lease. A PPA provides the most direct pathway, where the utility purchases the output of the system at a predetermined rate. Solar plus storage, however, makes an electricity-only PPA challenging because the third-party would receive compensation for the additional value provided by the energy storage asset. With solar plus storage still in its early stages, there are not many examples of PPAs that include storage. But utilities may want to explore a few different options with their third-party developer.

Lease

A utility could consider leasing the solar plus storage equipment from a third-party. The leasing payment for a solar plus storage project would be higher than a solar-only project, but the demand savings that come from the energy storage system could offset the increased leasing payment.

Time-of-Delivery PPA

A utility could consider entering into a PPA with a third-party developer that includes higher rates for electricity delivered during peak times. This approach, however, may be incongruous with the agreement the utility has with its generation and transmission provider. Most agreements between a utility and its generation and transmission provider has a single energy charge that does not fluctuate with the time of day, and a single monthly or annual demand charge, which is tied to the generation and transmission provider's coincident peak. A Utility pursuing a time-of-delivery PPA for a solar plus storage provider may want to seek assurances from the third-party provider that the battery discharge will be timed to coincide with the period when they are assessed their demand charge by the generation and transmission provider.

PPA with Capacity Payment

It may be possible for a utility to enter a PPA with a third-party developer that has a flat energy rate, but also includes a monthly payment for the available capacity of the energy storage system. As with a time-of-delivery PPA, this arrangement may also be incongruous with the utility's agreement with its generation and transmission provider. In this case, a utility may also want assurances from the third-party provider regarding the energy storage system's ability to reduce its demand charges.

Getting Buy-in From Local Leadership

While IOUs require a legislative mandate to implement community solar programs, the electric cooperatives and municipal utilities are often self-regulating and can implement community solar programs without legislative or regulatory action.

The decision making ability rests on the leadership of the electric cooperative or the city council, and they generally have the ultimate say in the implementation of community solar programs. Many forward-thinking utilities have decided to implement community solar to meet their various strategic goals including cost savings, customer engagement, and environmental benefits. In other cases, interest in community solar has sprung from the bottom up, with customers or members encouraging the utility leadership to evaluate these programs.

The Getting Buy-in From Local Leadership working group discussed effective strategies to reach out to the leadership of electric cooperatives and municipal utilities. The working group participants noted that each electric cooperative and municipal utility is unique. "If you've seen one co-op, you've seen one co-op." Instead of developing a standard template for outreach to all utilities, the working group suggested a few key considerations when reaching out to an electric cooperative or municipal utility about community solar.

Customer Satisfaction

The members of an electric cooperative elect the board of directors who manage the cooperative. The board of directors provides vision and direction for the programs operated by the cooperative. Since the tenure of the board depends on satisfied members of the cooperative, the board has an interest in making sure they are satisfied with the cooperative's direction and the programs it operates. If the members of the cooperative communicate a strong interest in community solar, the board would likely move forward to create a community solar program.

The customers of a municipal utility do not directly choose the leadership of the utility. However, the customers elect their city council which has authority over the governance of the municipal utility. If the citizens pressure the city council for it, the city council can guide the municipal utility to develop a community solar program.

Local Champions

Local champions can help spark the interest of a utility's customers and organize an appeal to the utility's leadership. The local champion could be an individual, a group of volunteers, a local environmental organization, a local business, or a faith-based organization in the utility's territory. The local champion understands the community and how to reach large pockets of the population. The local champion can hold events to generate interest across the community, work with the utility to gather input from the community about program characteristics that would be attractive to them, and can help promote the program once it has been implemented.

Economic Development

Community solar can provide a variety of economic development benefits to local communities. Developing large-scale solar projects can stimulate the local economy with potential direct jobs during the construction phase of the project, as well as secondary jobs resulting from new spending associated with the direct jobs[2]. Clean, affordable, and reliable electricity can also be an attractive feature for acquiring new businesses and retaining existing ones. Companies may appreciate the opportunity to support a local solar project that serves their community.

Utility Associations

Electric cooperatives and municipal utilities are usually part of a larger statewide association. Utilities typically have a strong relationship with their member association, and will often reach out to them for trusted advice on implementing new programs including community solar. Additionally, the National Rural Electric Cooperative Association (NRECA) is the national association for the electric cooperative and the American Public Power Association (APPA) is the national association for municipal utilities. NRECA has been actively supporting the development of community solar programs for their members[3].

For electric cooperatives, their statewide organization also sometimes serves as their generation and transmission provider. If a cooperative installs a community solar facility, its generation and transmission provider may be affected by the decrease in sales. However, if the generation and transmission provider is a product of the cooperatives themselves, they'll have an interest in

---

[2] Center for Climate Strategies, "Spurring Local Economic Development with Clean Energy Investments: Lessons from the Field," https://www1.eere.energy.gov/wip/solutioncenter/pdfs/clean_energy_investment_cases.pdf

[3] https://www.electric.coop/wp-content/Renewables/community-solar.html

helping the cooperative meet its goals. A generation and transmission provider may even take the lead themselves by owning or acquiring a larger system for its member cooperatives to share, achieving greater economies of scale by aggregating their collective interest. When seeking buy-in from the leadership of a utility for a community solar program, one should be mindful of these relationships and the opportunities they present.

Challenges Unique to Municipal Utilities

Implementing changes at a municipal utility can be more challenging for a municipal utility than an electric cooperative due to a level of bureaucracy and a different incentives structure. The leadership of an electric cooperative generally includes the board and the CEO. They have the final say over the cooperative's programmatic decisions. Municipal utilities, however, can have a more complex bureaucratic framework in which to operate. Many parties within local government may want to provide input on new programs and services adopted by the utility. Implementing community solar may require buy-in from the town board or city council, the mayor, the director of the utility, the city planner, the city manager, and other officials. This can require a longer time frame for finalizing decisions on implementing community solar programs.

Resource Constraints

Rural electric cooperatives and municipal utilities are often constrained in staff and other resources required to plan and deploy solar projects. If a staff member is tasked with coordinating a community solar program, their regular work still needs to get done. Additionally, PV technology is often a new technology to many utilities who may be unsure of its characteristics, costs, and benefits. The utility might also lack an understanding of its purchasing options.

Community Solar and Wholesale Power Contracts

Most electric cooperatives and municipal utilities (referred to here as "purchasing utilities") have wholesale purchase contracts with one or more other utilities (referred to here as "generating utilities") to purchase power under certain terms. These contracts can impact the ability of electric cooperatives and municipal utilities to undertake community solar projects and the economic feasibility of those projects that are possible. When a purchasing utility is interested in pursuing community solar, it is important to understand how contracts with generating utilities (and the organizations which procure power on their behalf - the Generation and Transmission (G&T) cooperative for the electric cooperatives and the joint action agency for municipal utilities - which often have contracts with generating utilities that then result in limits on their members) may constrain aspects of possible community solar projects. This section reviews terms in several different power supply agreements to help illustrate how utility contract terms can affect the ability of electric cooperatives and municipal utilities to pursue community solar.

Background

Electric cooperatives and municipal utilities and/or some larger wholesale power procurement organizations usually have power supply agreements with generating utilities. These agreements stipulate the rates at which the purchasing utility purchases power from the generating utility, and also specify the generating utility's role in meeting the load of the purchasing utility. Not all agreements work the same way, so many electric cooperatives and municipal utilities will have agreements with somewhat different terms, but there are several common topics covered in most of these contracts.

Exclusivity

Power supply agreements may have an "exclusivity" or "full requirements" provision which makes the generating utility solely responsible for meeting all of or almost all of the load of the purchasing utility, subject to some limitations or exclusions[4]. These provisions can limit the ability of a purchasing utility to install and use its own generation resources, as the purchasing utility may be committed to meeting all of its load through purchases from the generating utility. However, these provisions can include certain exceptions that may allow purchasing utilities to buy from third parties or use their own resources for some purposes, even if there is a general requirement to buy all generation from one or several generating utilities.

Some purchasing utilities have power supply agreements with multiple generating utilities; in these cases they will have separate commitments to each of the generation utilities with certain amounts or categories of load committed to each generator. FPWC, for example, has power supply agreements with both Duke Energy Progress and the Southeastern Power Administration.

Renewable Portfolio Standard Requirements

Currently North Carolina is the only state in the southeast that has a binding Renewable Portfolio Standard policy; Virginia and South Carolina have voluntary renewable energy goals for utilities[5].

Power supply agreements may allow electric cooperatives and municipal utilities to use their own generating assets, or purchase power from third parties, to meet the requirements of renewable

[4] For example, see Fourth Amended and Restated Full Requirements Power Purchase Agreement Between North Carolina Eastern Municipal Power Agency and Duke Energy Progress, LLC.

[5] http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/03/Renewable-Portfolio-Standards.pdf

portfolio standard policies. For instance, the agreement between Duke Energy Progress (DEP) and FPWC allows FPWC to construct or purchase the output of electric generating facilities in order to meet the requirements of legislation. The resources used to meet the RPS requirements are called “Compliance Resources.” However, FPWC must give DEP 180 days notice before purchasing or constructing such resources, and issues such as metering, scheduling, and reliability must be negotiated between DEP and FPWC.

The agreement between NCEMC and DEP allows for NCEMC to purchase or use its own generating resources to meet RPS requirements. It classifies these resources as either direct or indirect alternative resources depending on whether they are connected to DEP’s transmission system or if they are “behind the meter”; the classification is relevant for crediting purposes.

PURPA Qualifying Facilities

The Public Utilities Regulatory Policy Act (PURPA) of 1978[6], obligates utilities to purchase generation from certain facilities, termed “Qualifying Facilities,” or QFs. Small renewable generation facilities are one category of QF. PURPA allows states to set their own limits on the size of PURPA QFs and on the contract terms that utilities must offer to PURPA QFs. As PURPA requirements apply to electric cooperatives and municipal utilities, wholesale contracts often have provisions allowing purchasing utilities to buy generation from PURPA QFs even when these contracts normally prevent the purchasing utilities from buying generation from third parties.

The Energy Policy Act of 2005[7] removed restrictions that previously limited the ability of utilities to own PURPA QFs. As such, it is possible for utility companies to finance and/or own QFs under PURPA, and then sell the generation back onto their own systems. However, wholesale contracts may treat generation from PURPA QFs differently than generation from other purchasing-utility-owned facilities, limiting the ability of purchasing utilities to reduce their purchases from the generating utility through PURPA generation.

Conclusion

Community solar unlocks new pathways for utilities to develop solar projects and for their customers to share in the benefit. While utilities are very diverse in terms of their priorities, motivations, and restrictions, there are many ways in which community solar can be implemented to meet those specific needs. New technologies like energy storage provide an opportunity for utilities and their customers to maximize the benefits of a community solar project, and many options exist for the ways in which community solar subscribers can be compensated for their share of the system’s production. By carefully balancing the interests of the utility with those of their customers, an effective community solar program can be designed to offer a win-win to all parties.

---

[6] http://legcounsel.house.gov/Comps/PURPA78.PDF
[7] https://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf