Community Solar
Program-Development Landscape

A Brief for Utility Program Designers

Community Solar Value Project
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Powered by SunShot U.S. Department of Energy

Summary

Community Solar Program-Development Landscape is part of the *Community Solar Value Project (CSVP) Solutions Toolkit*. This brief provides an overview of community solar program drivers, choices, and trends, as they impact utility-led community solar programs. This includes a quick review of state policies, of business standards and innovations, and of the players who are active in the market today. It also provides a context to help utilities respond to specific local needs and opportunities to increase the net value of their offerings. For many utilities, an early decision point focuses on whether and how to develop program components in-house or by engaging third-parties. This brief aims to support an informed decision process.

In several states, the regulated utilities' role in community solar is defined largely by legislation or regulatory policy. Here, utilities may be limited to involvement in interconnections and as billing agents for third-party program providers. In other states, or in consumer-owned utility markets where policy does not strictly define community solar, utilities have more leeway. This brief is geared primarily for those utilities.

Program-design choices maybe be characterized in term of a value chain, a set of successive activities that players operating in a specific industry perform, in order to deliver a product or service. The "links" in the community solar value chain span from planning support services through procurement of the solar resource, through all aspects of customer acquisition, administration and billing, and ongoing program implementation. In business theory, one key to improving cost-efficiency is to balance the number of profit-seeking players in the value chain against the need to involve the most capable and efficient players at each link of the chain. In seeking that balance, the utility may find answers to its questions about whether or how to outsource different program components.

Within the decision to outsource, there are yet more choices, among different kinds of solar developers and service providers. These range from established national providers (turnkey and *a la carte* developers), emerging national providers, local companies, and specialized service providers, primarily consultants. This brief looks at what each player can bring to support utility program development. Taking this broad view can facilitate more efficient and productive procurements. Finally, the brief offers a few insights about how successful utilities have led and continue to improve upon best-practices and increase the value of community solar for all stakeholders.

This work was funded in part by the Solar Market Pathways Program, powered by SunShot, in the Office of Energy Efficiency and Renewable Energy (EERE), U.S. Department of Energy, an agency of the United States Government, under Award Number DE-EE0006905.

Key words: community solar, utility, procurement, program design, outsource.

About the Community Solar Value Project

The Community Solar Value Project (http://www.communitysolarvalueproject.com) is aimed at developing best practices for new community-solar programs at electric utilities, including guidelines on how to achieve greater reach and net value in four areas: strategic solar project siting and design, project financing and procurement, target marketing for customer acquisition, and integration with solar-plus companion measures, such as demand-response and storage. In 2016, the Project also supported adoption of "win-win" program-pricing.

The project is led by Extensible Energy, LLC, with support from Cliburn and Associates, Olivine, Inc., and Navigant Consulting. Utility participants include the Sacramento (California) Municipal Utility District (SMUD), Public Service of New Mexico, and other utilities nationwide. The project is powered by SunShot, under the Solar Market Pathways program of the U.S. Department of Energy.

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This work contains findings that are general in nature. Readers are reminded to perform due diligence in applying these findings to their specific needs, as it is not possible for CSVP to anticipate all specific situations, to ensure applicability of the findings in all cases. Further, reports on case-study experience often rely upon self-reporting from sources. This information is reasonably vetted, but responsibilities rest with the sources cited.

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1. A Varied National Landscape for Community Solar

Since community solar emerged among a handful of consumer-owned utilities more than a decade ago, it has spawned a variety of business models, appealing to a range of utility- and non-utility stakeholders. Most utilities view community solar as an opportunity to offer more customer choice, especially for customers who cannot access conventional rooftop solar. Some utilities also see community solar as way to retain customers, to test alternatives to typical net energy metering (NEM) rates, or to capture technical benefits, such as strategic siting and grid integration strategies. Nascent utility interests in community solar include interest in using it as a springboard for promoting companion measures, such as demand response and storage. According to SEPA (Trabish, 2016), more than 75 utilities are offering or planning new community solar programs this year, and the majority of them are not primarily compliance-driven.

At the same time, state policies have trended toward non-utility leadership in this market, or toward mandated partnerships between utilities and third-party community solar developers. As of September 2016, 16 states and Washington D.C. have enacted community solar legislation—much of it emphasizing the non-utility role.

Whether influenced by utility leadership or by policy, community solar developments have emerged in at least 25 states. According to the Solar Energy Industries Association (SEIA), completed community solar project capacity totaled just over 100 MW in 2015, with another 100 MW expected in 2016. However, there is uncertainty about community-solar market projections, largely due to shifting policies from state to state. These conditions are typical of a young market, which benefits from experimentation, but which also struggles for degrees of certainty and standardization.

In its Q3 2016 *Solar Market Insight Report*, SEIA noted that it would hold to its 100-MW year-end projection for new community solar, even though only 10 MW had been built in the second quarter (SEIA, 2016). Many industry analysts imply that this young market will find its trajectory, if not this year, then very soon. Estimates of the market potential by 2020 range from a 2014 forecast of 1.8 gigawatts (GW) by GTM Research, to a peak range of 5.5 to 11 GW, offered by the National Renewable Energy Laboratory (NREL). Navigant forecasts that community solar will have a compound annual growth rate (CAGR) of 75 percent between 2016 and 2020, with the projected cumulative community solar market reaching roughly 1.5 GW by 2020 (Labastida et al, 2016).

The cost-competitiveness and overall value of utility-led community solar programs—especially relative to other solar choices—will likely influence how policymakers see the utilities' role in this market, moving forward. Smart utility decisions about how to design customer offers and whether or exactly how to work with third-parties can increase benefits for utilities, customers, and a range of stakeholders for years to come.

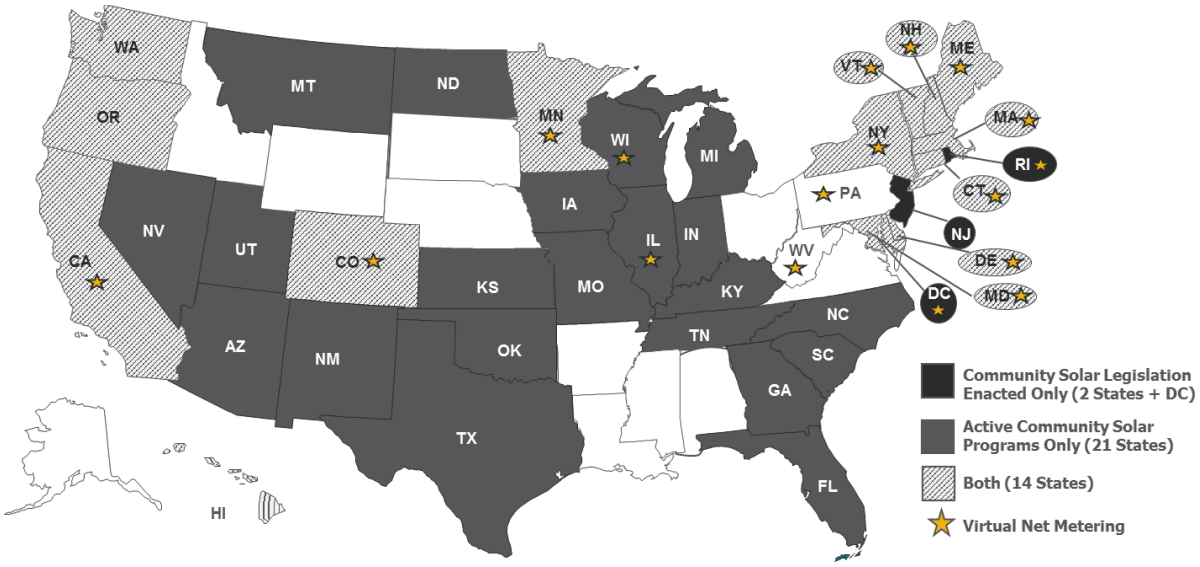


Figure 1: United States Community Solar Policy Landscape, 2016. *Source: Navigant. This map designates the states with enacted legislation and active community solar programs. California, Colorado, Massachusetts and Minnesota have the leading community solar policies and are expected to install the majority of the community solar capacity over the next two years.*

1.1 A Value-Chain for Solar Program Development

The CSVP has introduced a model program development process for utility-led community solar, which acknowledges its cross-departmental nature and facilitates the necessary give and take between market and technical concerns (Cliburn, 2016). This process, illustrated in Figure 2 below, is familiar in many ways to other utility program development processes. Yet community solar requires a relatively greater degree of cross-departmental participation, as well as alignment of sometimes-competing interests, in order to get from the idea stage to cost-competitive, strategic, and enduring program results.

It may be useful for the lead program designer to distill out of this process a simplified progression of program-development activities, from market research to program planning, to marketing, solar procurement, financing, billing, IT, ongoing project O&M, and overall program management. Bearing in mind that utility program development is truly a complex process, it is certainly practical to focus on each component activity as a progressive decision point, where the right choices can add value or cut costs. In effect, each decision point may be envisioned as one link in a solar program development value chain.

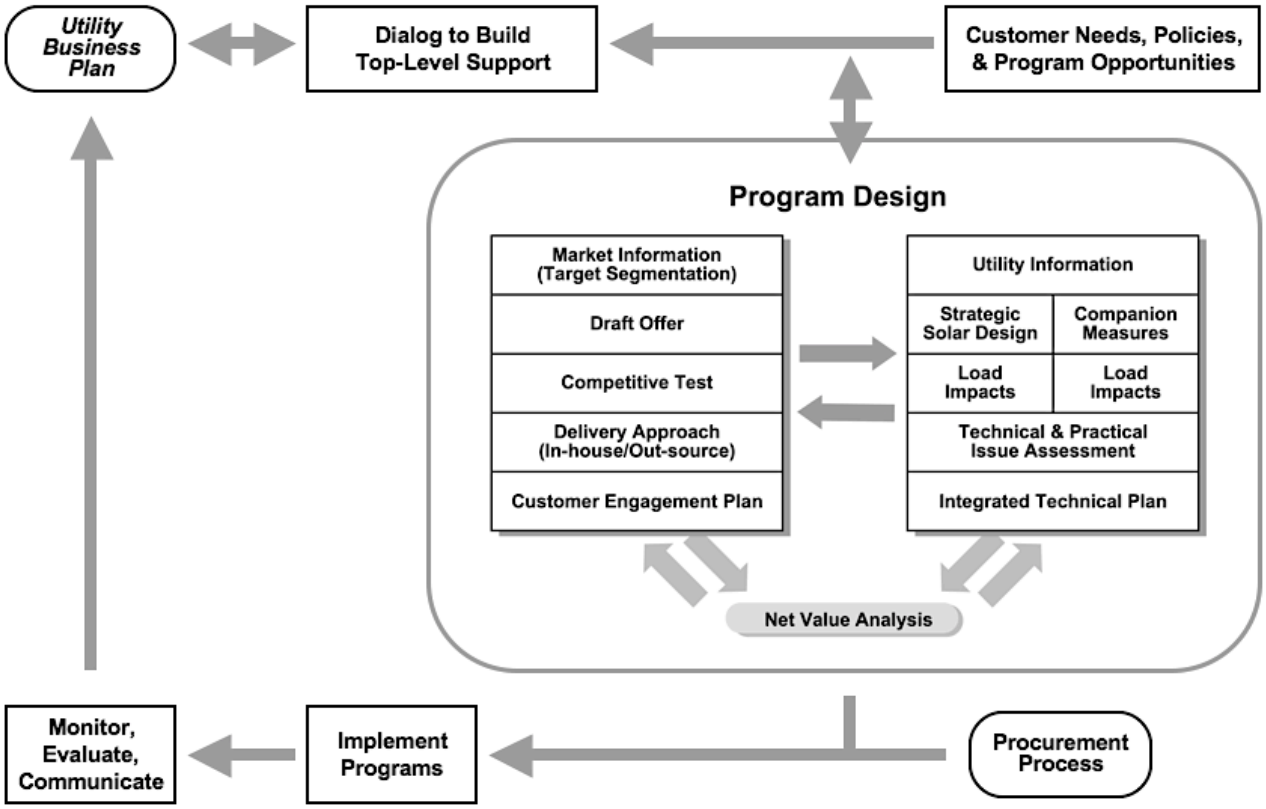


Figure 2: CSVP Community-Solar Program Development Process. Source: Community Solar Value Project. *This diagram illustrates the process whereby cross-departmental utility planning participants create their plan to manage each program component. This is, by nature, an iterative and complex process. Yet it is possible to distill out of this process a simplified progression of activities (See Figure 3), represented as a value chain.*

By definition, a value chain is a set of activities that players operating in a specific industry perform in order to deliver a valuable product or service for the market. In the solar industry, the full value chain is long, beginning with the manufacture of solar cells and panels and continuing through many component/links in solar product delivery. Here, we focus on the downstream links that are especially relevant to a successful community solar program.

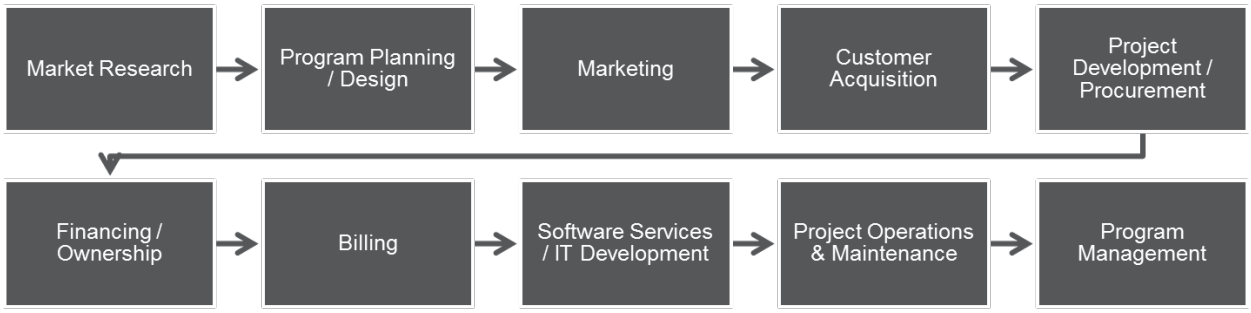


Figure 3: Simple Community-Solar Program Value Chain. Source: Navigant. *This simplified diagram highlights the products and services that a utility must access, either using in-house or out-sourced resources, in order to implement a successful community solar program.*

In business theory, one key to improving cost-efficiency is to balance the number of profit-seeking players in the value chain against the need to involve the most capable and efficient players for delivering value at each link. The right balance is going to be different for each utility: When is it better to rely primarily on in-house expertise and resources, and when is it better to outsource, in order to acquire necessary program products or services?

The community solar market was initially driven by smaller utilities, many of which lacked in-house solar expertise. Many of these utilities found that working with third parties was a practical solution. Clean Energy Collective (CEC) and SunShare were two early industry leaders spearheading a popular "one-stop-shop" community solar approach. Today, these companies and others also offer *a la carte* products and services to utilities, adapting to many policy structures. In addition, some third-party providers today work on only one or two links of the value chain, providing highly specialized products and services.

On the other end of the spectrum, a few utilities, such as Tucson Electric Power (TEP), have proposed to meet most their program needs internally. For example, TEP has an in-house solar developer, who leads utility identification and acquisition of solar sites, organizes financing, takes a hand in project design, and selects and oversees the EPC contractor. By compressing the value chain, TEP has driven significant costs out of solar procurement and has proposed a highly competitive program offer.

According to the *2015 Utility Solar Snapshot* (Edge et al., 2016), utilities planning community solar programs preferred utility-managed programs over third-party managed programs. Yet nearly one-third of all utilities surveyed said they would consider both approaches. More examples of why and how utilities assess their program-development choices, and how this impacts overall costs and benefits, are discussed in sections below.

2. Community Solar Business Models

Although many different business models are potentially useful for community solar, there are essentially two broadly defined generic models that represent starting points for utility program development. One model is generally associated with utility-led programs, and the other with third-party led programs.

To some extent, policy dictates which community-solar business model prevails in any given jurisdiction, and how it might be customized or improved upon. For example, states with vertically integrated monopoly utilities generally have the most leeway on utility project ownership and operations. In restructured states, utilities may be restricted from owning solar assets, but often may arrange third-party PPAs. In states like Massachusetts, only third parties can own and operate community solar. Consumer-owned utilities are generally unconstrained by state regulations on community solar, but they have tax considerations in determining whether to finance their own solar resources. Resources, such as the U.S. Department of Energy Solar Market Pathways Community Solar Toolkit (http://solarmarketpathways.org/toolkit/community-solar) can help utilities to get their policy bearings. In addition, CSVP offers additional guidance on financing for community solar on its website.

The following are generic descriptions of the two predominant utility business models. Note that there are many variations on each, especially in regard to which component products or

services in the value chain the utility opts to provide directly, and which it opts to acquire from one or more third parties. Federal securities regulations and laws governing specific jurisdictions can affect the details of a viable business model, adding yet more variation to the market landscape.

2.1 Utility Outsourced Model

The outsourced model allows the utility to roll out a program relatively quickly and to shift many program risks, including project development and customer acquisition risks, to a third-party developer. In this model, the participating customer pays the third-party an upfront or monthly fee in exchange for a bill credit from the utility. The most typical utility-outsourced model is a full turnkey program.

This model has proven to be very popular with smaller utilities, but less so with larger and investor-owned utilities (IOUs). Typically, the utility does not own the solar asset. However, it is not uncommon for a PPA structures to allow the utility to have step-in rights, i.e. the right of first refusal to buy out a project or the right to take ownership at the end of the term of the contract when the solar asset is fully depreciated. In this way, the out-sourced model can deliver long-term utility value.

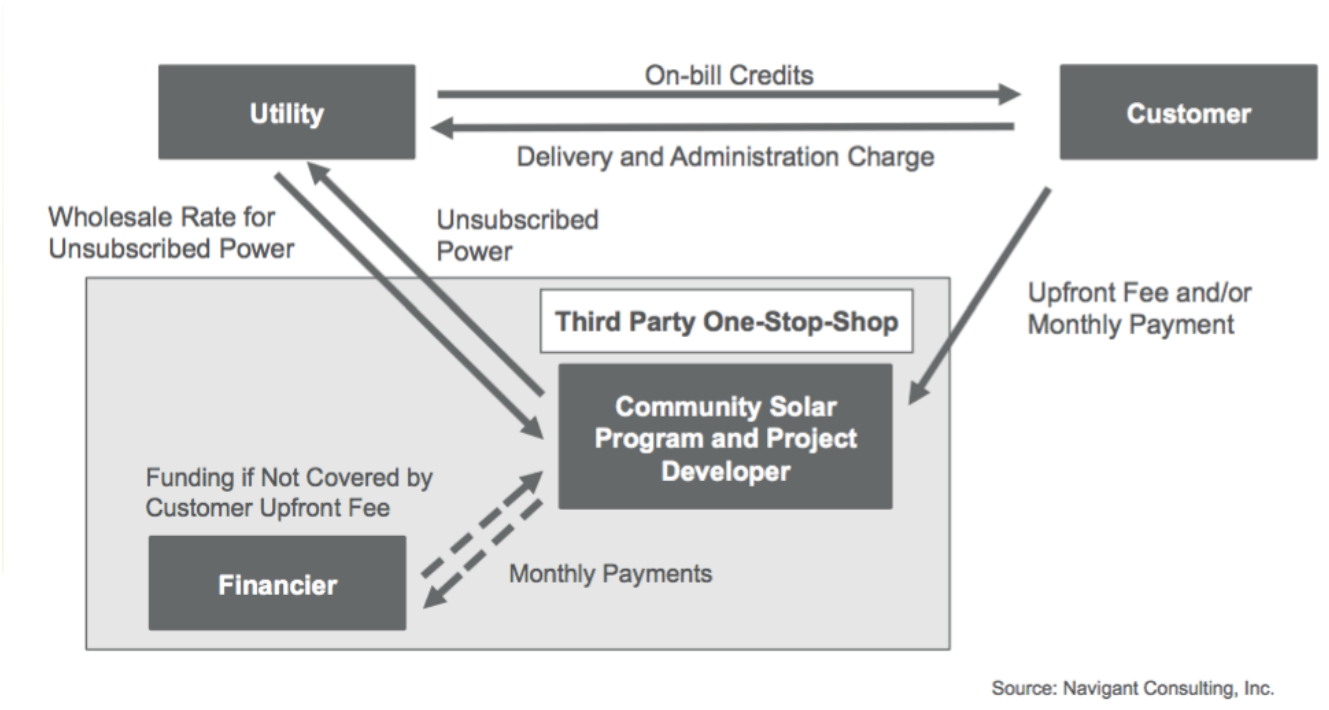


Figure 4: Generic Business Model for Outsourced Community Solar. Source: Navigant.

2.2 Utility-Led Model

The utility-led model offers the utility the greatest leeway for strategic customization and clear utility branding, which may benefit customer acquisition and retention. In the generic utility-led model, the participating customer pays the utility a monthly fee or rate for community solar in exchange for a bill credit. The utility develops the customer offer and implementation details, and it procures the community-solar resource. Procurement may involve development and direct ownership of the project. Alternatively, it may involve a PPA with a third-party developer, with or without an eventual utility "flip" or buyout. Often, the question of "ownership versus PPA" is dictated by state policies, including normalization rules, or by the tax status of the utility.

In the utility-led model, utility leadership may extend to some or all components of the value chain. Some utilities have found significant added value through their RFP specifications, for example, identifying sites that incur relatively low system-integration costs, calling for smart inverters or other preferred technologies, or by simply requiring a high level of transparency in how bidders explain their cost structures. A nascent trend involves utilities calling for community solar to be compatible with companion measures, e.g., offering energy efficiency, storage, or load management opportunities to enhance the community solar offer.

As more IOUs begin to launch community solar programs and as programs grow in size, the market is expected to tilt toward a utility-led model. Due to the market shift toward this generic model, developers have responded with more customized service offerings, in addition to the original "one-stop-shop" option.

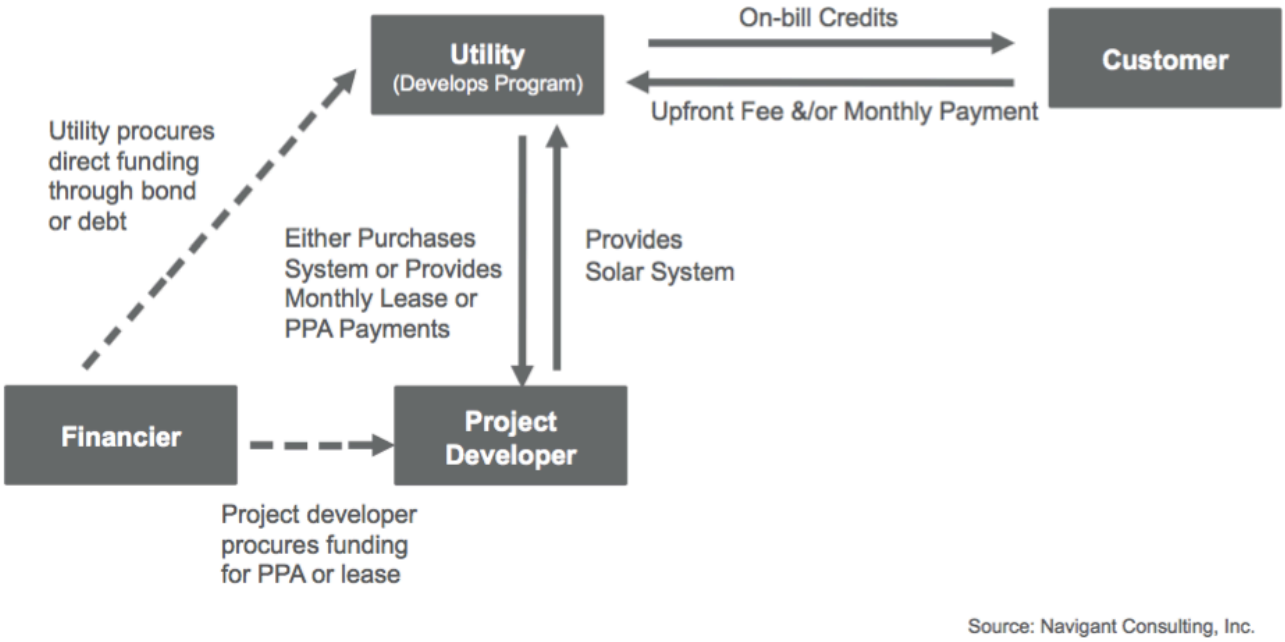


Figure 5: Generic Business Model for Utility-Led Community Solar. Source: Navigant.

2.3 Pricing Strategies and the Relationship to Scale

Interviews with utilities for this brief revealed that being able to offer customers a competitively priced program, relative to current electricity rates, is one of the most important program design objectives. Some utilities design the offer, including pricing, in-house; others rely on turnkey program developers or on consultants to design pricing. The long-term outcome is better if the utility brings an understanding of community solar offers and pricing options, as well as its concerns about pricing, to the discussion with third-party providers. If the utility is satisfied with the program cost and pricing structure, it is more likely to promote program success and expansion.

Over the last five years, two generic pricing models have emerged:

Panel Purchase or Lease. The customer pays an upfront one-time payment to purchase one or more panels in the solar project. On a monthly basis over the term of the agreement (between five and 20+ years), customers are credited on their bills for the electricity produced by their panel(s). The rate each customer is credited for share generation ($/kWh) depends on the program, usually determined by the utility, following an internal or state-mandated methodology. Some community solar programs offer customers the ability to participate through incremental monthly lease payments, or they finance the purchase through monthly payments. The purchase and lease variations look similar, but raise different tax and risk-management issues.

Subscription Rate. The customer enters an agreement with the utility or third-party program developer to pay a community solar rate ($/kWh) for a share of project output. This rate may be higher than the current standard rate, but many programs lock the rate in for a set term, so long as customers remain in the program. In this way, as standard utility rates rise, customers may save over the term of the their participation in the program. Customers are usually exempt from fuel-adjustment charges, clean energy riders, etc., but they pay a customer service charge. Variations to the subscription approach may include a periodic "true-up" based on actual project generation or different ways to define the share, i.e., keying to kWh blocks or to a percentage of the customer's energy use.

As larger utilities and state programs become more prominent in the community solar landscape, the market has shifted away from the panel purchase or lease model and toward the subscription model. Most customers do not want to make a large up-front investment, and program designers (especially for large utility-led programs) see managing many separate long-term agreements with participants as burdensome. The panel-purchase model is especially troubling for utilities that are concerned about the long-term disposition of the community solar assets.

In terms of price point, community solar was initially accepted as a premium-priced offer. However, with across-the-board solar cost reductions and the long-term cost stability of solar generation, many community solar customers have come to expect long-term cost-savings. Survey research conducted by Shelton Group and SEPA found that on the whole, customer interest in solar is driven by potential financial benefits (65%), followed by environmental impact (38%) and energy control (34%). (SEPA & Shelton, 2016) Many customers are willing to pay a small premium (ideally in the range of one to two cents) in the short run, assuming the program price is locked in as retail rates rise, and that the program is otherwise structured to customer needs.

Market research for community solar is a fairly new field, as community solar itself is unfamiliar to most utility customers. CSVP offers information resources (Mitchell-Jackson et al., 2016) on best-practices for community solar market research, including ways to segment the market to match pricing and other aspects of the program offer to market-segment needs. Like other links in the community solar value chain, market research may be out-sourced or completed mostly in-house.

Whether a customer saves money immediately or has to pay a premium to subscribe depends on current utility electricity rates, solar procurement costs, the accepted net value ($/kWh) of the solar resource, and state policy on NEM.

Many community solar programs struggle to compete with the rooftop solar market, as generation from community solar is seldom credited at full retail NEM rates, which rooftop systems currently receive in major markets. Despite evidence that customers are looking for a better deal, many utility-led community solar programs have charged a $0.01/kWh to $0.04/kWh premium, and many programs have simple paybacks approaching ten years or more.

With the ongoing debate across the country about value of solar (VOS) and NEM policy reform, uncertainty exists regarding how states will compensate all forms of distributed solar in the future. Many states are now exploring changing their NEM policies away from full retail NEM compensation. Such changes would impact the competitiveness of many community solar programs. Currently, community solar must receive full retail NEM compensation only in Massachusetts, while Colorado and Minnesota offer a VOS rate; California values community solar at the avoided cost of energy, and other community solar programs vary. According to Navigant Research (Navigant, 2016), NEM rate reform may actually cause a market shift from rooftop solar to larger community solar projects, which offer relative economies of scale.

The quest for community solar cost-competitiveness, absent full NEM compensation, has led to another debate, over the proper location and project scale for community solar. Some states specify that community solar should be located on the distribution grid or meet “community scale” size restrictions. For example, Minnesota law limits community solar projects to one MW each, in maximum groupings of five co-located projects. California’s community solar law states that projects should be “in reasonable proximity to enrolled participants” (Stanton & Klein, 2016). Such guidelines are rooted in the idea that community solar is a proxy for local customer systems. But some utilities and third parties argue for projects on the high end of distribution scale (up to 20 MW) or for solar power purchased out of remote utility-scale systems in order to maximize economies of scale and customer savings.

The CSVP and others, including the Rocky Mountain Institute (Brehm et al., 2016) argue for keeping community solar local, building portfolios of mid-sized projects (primarily less than 5 MW) that unleash other distributed energy benefits, beyond what CSVP has called the solar “sticker price” (Cliburn et al., 2016). RMI has asserted that “community-scale solar is at a sweet spot between utility-scale and behind-the-meter solar.” RMI cites its work with relatively small set of utilities that have dramatically reduced community-scale solar costs. Cliburn, Bourg, and Powers have modeled how just a few, carefully selected and conservatively assessed values can close the gap between utility-scale and distribution-scale projects, at least to within range of an inconsequential initial premium.

The latest PV pricing benchmarks from NREL (Fu et al., 2016) calculate national weighted-average installed costs per Watt DC for projects of different sizes in Q1 2016. A 500-kW commercial rooftop project was benchmarked at $2.06; a 1-MW project was benchmarked at $2.03. On the utility scale, a 5-MW fixed-tilt ground-mount project was benchmarked at $1.92; a 10-MW project at $1.83, and a centralized 100-MW project at $1.49. Actual installed costs vary considerably by region and by individual project. Further, design improvements, such as single-axis tracking, which raises 5- and 10-MW project costs by about a dime each, may significantly improve net economics. Nevertheless these benchmarks are a useful starting place for closing the cost gap. Figure 6 shows typical cost components of small- to large utility-scale systems. It is important to ask, 1) can improved procurement strategies reduce the installed costs of project fleets, and 2) what are the net total benefits an improved local strategy, and how does that improve the net levelized cost of energy from the procurement decision? CSVP will release a brief in 2017 on lowering community solar procurement costs. A few examples of utility lessons learned are summarized in Section 4.

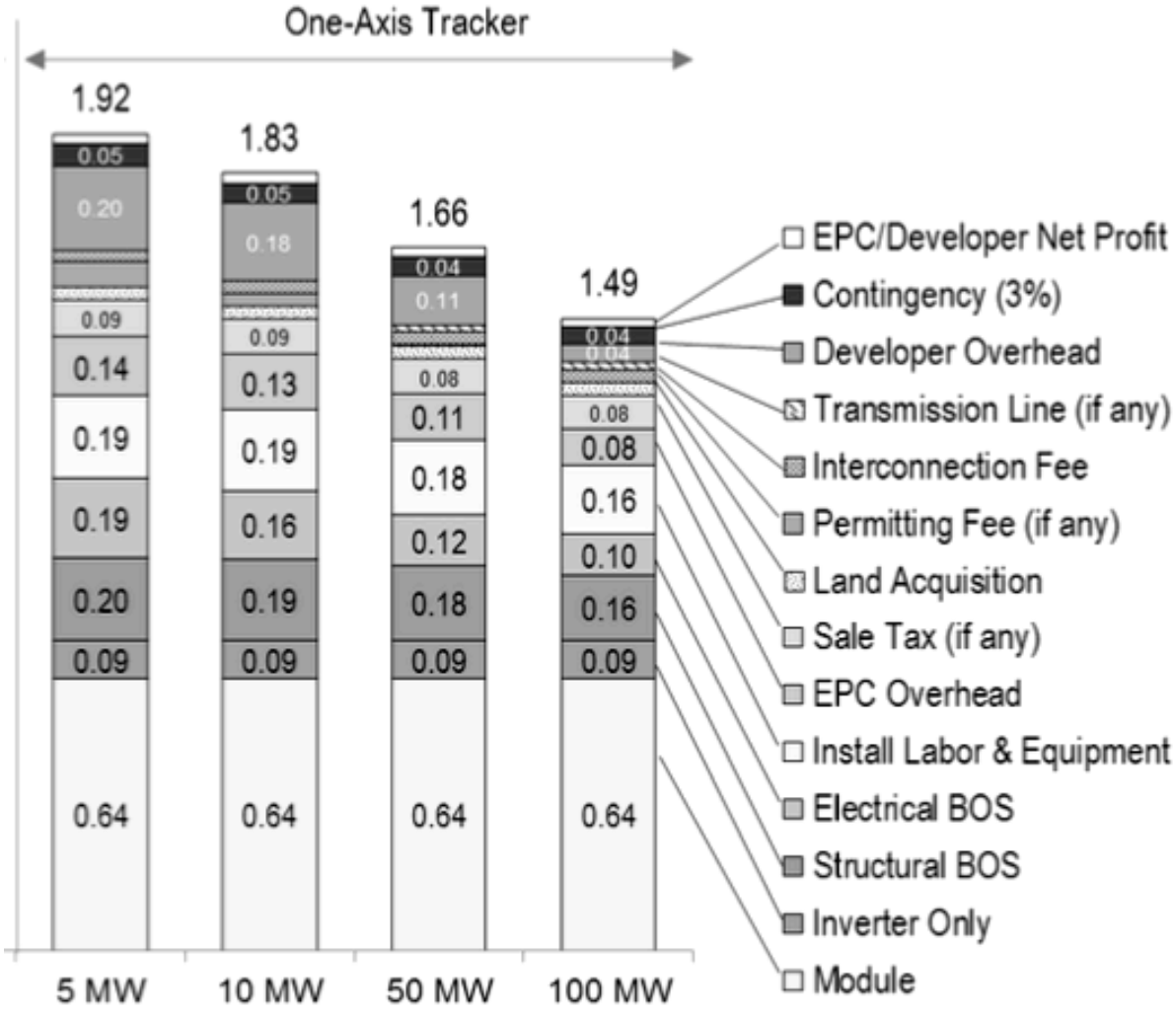


Figure 6: Benchmark Installed Solar Costs ($/W DC) for a Utility-Scale Single-Axis Tracking Projects. Source: NREL, Q 1 2016. *The breakout of component costs suggests areas where costs may be reduced for distribution-scale project procurements, relative to the 50- and 100-MW centralized project options. In addition, a full economic analysis of community-solar options would include strategic values associated with local vs. centralized installations.*

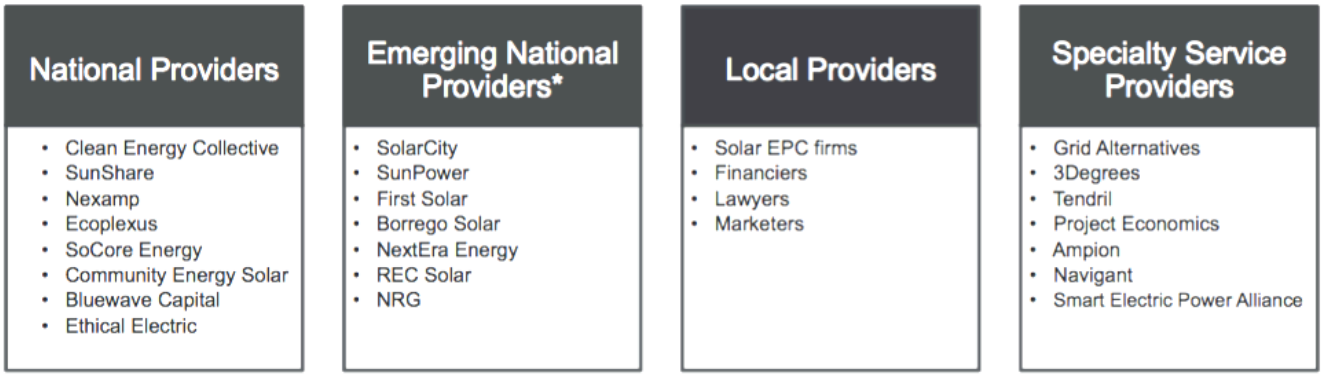
In some jurisdictions, policy-makers have agreed to test the value of community-scale solar as an integrated distributed energy resource (iDER) strategy. The result could be a higher accepted net value of the solar resource ($/kWh); a partial wires-charge reduction for these projects; or some other form of compensation to program participants for associated grid benefits. Some utilities, like Sacramento Municipal Utility District, are launching shared solar programs that use large-scale solar resources along with some distributed solar projects, too. They hope to capture ready economies of scale, while further testing the local-solar value proposition. The New York Public Service Commission has been one leader of local solar iDER strategies, which encompass community solar (Stanton & Kline, 2016).

Navigant cites interviews completed for this brief, with major solar developers and utilities that are moving to larger utility-scale projects, as evidence of a significant trend. No doubt, scaling up will be one way—but perhaps only one among many—that utilities and third-parties use to lower costs and program pricing.

3. Third-Party Providers and the Utility Request for Proposals

A number of companies provide products and services all along the community solar value chain. These industry players can be divided into four categories:

- *National Providers*. These players are active in multiple states and in most cases provide services along the value chain, from turnkey packages to *a la carte* customizations.
- *Emerging National Providers*. These include large national solar companies that have made announcements about entering the community solar sector, yet have released little confirmation of their progress. Some of these providers may become market leaders, but it is too soon to know.
- *Local Providers*. These companies are likely to play an increasingly important role in the development of community solar programs. They include engineering, procurement and construction (EPC) firms, specialty service consultants (from market-researchers to legal advisors and IT specialists), high-profile local installers, and others. They typically work with national providers and collaborate with utilities and other local stakeholders in putting projects together. They compete best on projects that emphasize local economic impacts and bring complementary utility skills and resources to the table.
- *Specialty Service Providers*. These national players provide community solar program consulting (e.g. 3Degrees provides program design, marketing and implementation expertise and Navigant focuses on policy research, program design, and solar economics), or they focus on certain customer segments (e.g. Grid Alternatives focuses on low income community solar and Tendril focuses on customer acquisition and engagement).



* Limited project-development documentation available from these companies to date; some have significant commitments.

Figure 7: Community Solar Third-Party Players. Source: Community Solar Value Project. *This reflects a market assessment as of late-summer 2016. Listings of companies are representative, and not all-inclusive.*

The field of providers that focus on community solar has grown slowly, and two providers, Clean Energy Collective and SunShare, have held the lead for more than five years. Other providers (exemplified in Figure 7) have strong business models, including some that focus on solar development and others that offer services in program design and delivery.

3.1 Third-Party Perspectives on Barriers to Market Growth

In interviews for this brief, community solar developers and service providers were asked to identify industry barriers, i.e., asking, What changes in procurement requests would trigger greater interest on your part? Their suggestions to spur the market included

- *Procurements that capture greater economies of scale*. This might include procuring projects in the 2- to 10-MW range, instead of projects under 0.5 MW; procuring multiple projects in the 500-kW to 1-MW range simultaneously through one request for proposals (RFP); building a larger project of greater than 5 MW and carving out a portion of the capacity for community solar.
- *Joint or shared procurements*. These include consumer-owned utilities that wish to procure a smaller project, working with neighboring utilities or through associations on a joint RFP.
- *Pre-identification of sites*. If the utility can identify a few sites prior to the RFP, this shortens the project development timeline and manages risks associated with the uncertainty and risk of finding and obtaining land. Giving developers two or three sites to choose from allows them to determine their most appropriate site and to bid more aggressively. In some states, such as New York and California, utilities are also asked to identify best sites in terms of grid capacity.
- *Improved third-party developer compensation*. Development contracts vary from utility to utility, making it difficult for developers to replicate their business models. If the developer is involved in acquiring customers and managing ongoing participation, too, then associated utility agreements and rates structures must be mutually agreeable.

- *RFPs that welcome creative project solutions*. Developers interviewed consistently said that they prefer flexibility to strict specifications on requests for proposals, and they benefit from meetings (e.g., bidders' calls) to discuss the job.
- *Policy support*. While this is not an immediate remedy, developers look for support at the state and national level to increase standardization of programs and processes.

As large regional markets for community solar develop, including California's 600-MW market potential, project procurement concerns will undoubtedly shift. Yet for now, the community solar market nationwide is largely comprised of electric cooperative and municipal utilities, together representing almost 90 percent of community solar programs (Deloitte, 2016). Their average project size is well within the range suitable for siting on the distribution grid. And, in fact, a number of third party providers, both local and national, are working to serve them.

Especially if the utility program is going to focus on distribution-scale solar, then developers who are successful and committed to working at the specified scale may be best prepared for the job. For them, challenges often center on risk management: Is the site identified and pre-screened? Assuming a PPA agreement, will the utility be the contractual off-taker for unsubscribed shares? Is construction contingent upon reaching a project subscription goal? These and other concerns affect project finance and the development timeline.

3.2 Utility-Identified Benefits of Working with Third Parties

For the utility, the decision to outsource some or all components of the program development value chain requires an internal review of many trade-offs. Moreover, the utility program manager must complete this review within the broader context of an interdepartmental program planning process. But in summary, the potential benefits of a well-considered outsourcing plan include:

- *Improved Program Roll-out*. Third-parties can offer quick, efficient program roll-out.
- *Potential for Improved Cost Effectiveness*. Particularly for smaller community solar programs, bringing in third-party expertise instead of reinventing the wheel can be beneficial and cost effective.
- *Access to Experience*. Third parties can bring previous experience designing and marketing community solar programs and acquiring program participants.
- *Bill Integration*. Some third parties offer billing and software integration platforms.
- *Federal Incentive Monetization*. Third-party developers can help consumer-owned utilities or IOUs subject to normalization to take better advantage of tax incentives.

4. Utility Leadership in Lowering Costs and Adding Value to Community Solar Programs

The CSVP holds a premise that utility leadership can add value to community solar, whether program components are developed in-house or whether they are significantly outsourced to third parties. Under most state policy regimes, there are opportunities for utilities to lower

costs and add value all along the community solar value chain. These opportunities are present, whether through direct utility involvement in project development or through their leadership working with third-parties.

A half-dozen utility community solar program managers were interviewed for this brief, supplementing information already available in the literature. Reflecting upon their decisions about working with third parties, utilities commonly cited the following areas of concern:

- *Preparedness for Program Design and Procurement*. Several utilities cited the importance of self-education, involving program managers and others across utility departments, in order to assess capabilities and needs, and in order to spot ways to improve program cost-effectiveness.
- *Pricing Transparency*. Utilities would appreciate more transparency in pricing from community solar providers, as the utilities decide whether to handle aspects of the project scope internally or not, and how to maximize savings that they could pass along to customers. Some utilities recognized that third parties are becoming more open about their cost structures, as the community solar market grows.
- *Consistency and Quality of RFP Responses*. Some utilities mentioned that RFP respondents used different assumptions in their analyses, making it difficult to compare bottom line economics of different solar development proposals. The solution to this problem rests partly with the utilities' care in writing the RFP and partly with the developers' care in responding. A CSVP *Resource Guide for Local Procurement* (Romano & Auker, 2016) is an early response to this concern, referring to best-practice processes and linking to an archive of sample utility community solar RFPs.
- *Contract Negotiation*. A number of utilities that have contracted with third-parties commented on the length and difficulty of contract negotiations, requesting an easier process to avoid project delay.
- *Partial Value Chain Support*. The increasing willingness of third-parties to provide flexible offerings has been helpful. For cooperatives and municipal utilities, working with third parties to leverage tax benefits can add value, but not all of these utilities want turnkey services. Many prefer to draw on in-house capabilities, as well as on other sources of expertise. Generally, smaller and consumer-owned utilities are open to using third-party expertise for program design, marketing and customer acquisition, and billing/IT. Yet, larger investor-owned utilities view such activities as core to their business model, and they tend to develop such capabilities in-house. A few utilities interviewed are moving to create community-solar development processes that parallel their existing processes for developing other customer programs and engineering project procurements. These utilities may prefer to use third parties only for solar EPC services on pre-identified sites.
- *Operation and Maintenance Funds*. Utilities that are considering outsourcing project development expressed the importance of setting aside operation and maintenance (O&M) funding for the duration project.
- *Utility as Primary Customer Contact*. Several utilities commented that they prefer the utility to remain the primary customer contact.

Examples of replicable, high-value utility innovations cover all areas of CSVP's interests. As noted, these will be further documented and assessed in upcoming CSVP publications. A few examples, drawn from utility interviews, focus on project siting and design; customizing to meet target-market needs; incorporating solar-plus companion measures; and attention to the procurement process.

Examples of Utility-Led Community Solar Innovation

1) Strategic Solar Siting and Design

- One utility estimated that finding the project site typically represents 5 to 7% of developer's cost. This utility and others have reduced costs by identifying or providing the site. Utilities may leverage decades-long relationships with local governments and other utilities (e.g., water utilities), to obtain good sites that would elude third parties. Strategic siting is an emerging interest; most often, utilities can tell developers where adding solar would be problem, but they are exploring new ways to tell where solar could add grid benefits.
- Utilities concurred that careful site review is important, in order to minimize permitting and compliance costs, and to address NIMBY issues before they arise. Whether the developer or the utility chooses the site, it may present costs and delays that are not readily apparent.
- Several utilities asserted that they are more likely than a developer to include system design improvements that might add costs upfront, in return for benefits that accrue over the long term. This includes strategic use of single-axis trackers or selecting and operating new interconnection technologies for added project value. The utility may wish to include strategic design objectives in RFP specifications.

2) Customizing to Meet Target Market Needs

- A major innovation in this area involves utilities partnering with third-party developers and non-profits that focus on low- to moderate-income needs. For example, one utility worked with a third party to mobilize volunteer labor for a "solar barn-raising" construction event, which lowered project costs and also attracted media coverage, to help meet subscription goals.

3) Incorporating Solar-Plus Companion Measures

- Some utilities see community solar as (to use a CSVP phrase) creating a market-based laboratory, to test innovations that boost grid-integration value. For example, Austin Energy will co-locate a utility-side storage battery with its new community solar project. There is not an immediate pay-off, as the storage project will be run separately and requires an upstream subsidy at this time. However, the utility is looking to gain experience with storage, and it is giving customers the chance to be part of the utility's unfolding 21st Century iDER strategy.

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- Other utilities are using storage water heaters as a currently economical companion measure for community solar. The controlled water heaters reliably provide hot water, at the same time as they serve as thermal batteries. Utilities aggregate this demand-response resource across participants, and share the benefits back, by buying down the cost of the community solar resource or providing other incentives. Utilities have been the leaders for this innovation, but third parties in both demand-response and solar have expressed interest in supporting it.

4) Attention to the Procurement Process

- Several utilities interviewed are taking a fleet-development approach to accessing economies of scale. For example, utilities can deploy similar community-scale projects under one procurement. If projects are to be built out over time, the final cost paid to the developer for succeeding units can be adjusted to update the pricing. Early subscribers could benefit from this arrangement, too, if their subscription costs are adjusted to factor in declining fleet average costs in future years. Distribution engineers prefer the geographic diversity of these projects, compared to one large-scale project.
- Smaller utilities may have trouble building expertise in-house, but for electric co-ops and public power utilities, their generating and transmission (G&T) cooperatives, joint-action agencies, or financing partners (e.g., CFC), may step in. This innovation mirrors the developers' desire for larger, shared procurements.
- Some utilities work with "buy-side consultants" to oversee project procurement and to help negotiate more confidently. RMI has cited a Lawrence Berkeley National Lab study that shows a 60 percent spread in installed costs for larger commercial and industrial solar projects; this range suggests that some contracts are not being effectively negotiated (Brehm et al., 2016). Several utilities interviewed said they issued a Request for Information before the procurement, as a way to self-educate before they issued the RFP.

5. Conclusion

Community solar is a concept that is evolving, affected by broader solar economics, policies, other competing customer choices, and by utility and non-utility players who together comprise the community solar program-development landscape. Most utilities view community solar as an opportunity to offer more customer choice, especially for customers who cannot access conventional rooftop solar or who find other aspects of the program offer appealing. Some utilities also see community solar as way to retain customers, to test alternatives to typical NEM rates, or to capture technical benefits, such as strategic siting for solar projects and grid integration strategies or operational flexibility. Utility leadership in community solar has spawned innovations in program design and development, as well as rising demand for even more attractive and carefully targeted programs. In these ways, utilities

are better able to serve customer interests in financial gain; positive environmental impact; control and choice in their energy use, and more.

The pressures utilities feel to compete on price with net-metered rooftop solar and to some degree with programs styled after green tariffs, has created some uncertainty about how community solar will develop in the future. Further, state policies have trended toward non-utility leadership in this market. This includes a strong role for third parties in the emerging California market, which could reach 600 MW and affect market trends nationwide. Questions of whether or how NEM policies may change nationwide also could have far-reaching impacts. An easing of net metering rules could make community solar—which tends not to include a full net metering benefit—relatively more attractive.

In this environment, many third-party community-solar developers, as well as some utilities, see promoting economies of scale as the surest way to lower program costs, and improve competitiveness.

Other utilities—and particularly those that have regulatory leeway—are still focused on community solar as an opportunity to unlock numerous economic benefits of distributed solar and iDERs. They have innovated ways to mimic economies of scale by procuring multiple, similar community-scale projects, or by arranging a group buy. These are led by several electric cooperatives, but the fleet-development approach is widely applicable, and the group-buy concept may be adapted in different ways, such as working with a carport-solar site host who could monetize the value of the shade, while helping to make local community solar happen. Other utilities have promoted opportunities in strategic solar siting and strategic design, or target marketing, or in adding demand-response and storage companion measures, and in new pricing plans that offer a good deal for both the utility and the customer. Some of these utilities are working with third-party developers and service providers, driving selective and careful procurement strategies, to determine which are the best choices for getting each of the program-development components they need. The CSVP team has demonstrated that in many cases, the economics of local, community-scale solar can compare favorably with large-scale, centralized solar options, and CSVP's work to document cost-reductions and value enhancements is ongoing.

This brief specifically highlights the challenges and the benefits to utilities in working with third-party providers. As the community solar market is evolving, there is increasing diversity among third-party providers, from those specializing in one component of the solar value chain to those offering both full-service program development and *a la carte* options. In this market, there is also a key role for utility leadership, to set a high bar for their internal cross-departmental teams and for their third-party partners, so community solar can reach its game-changing potential.

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