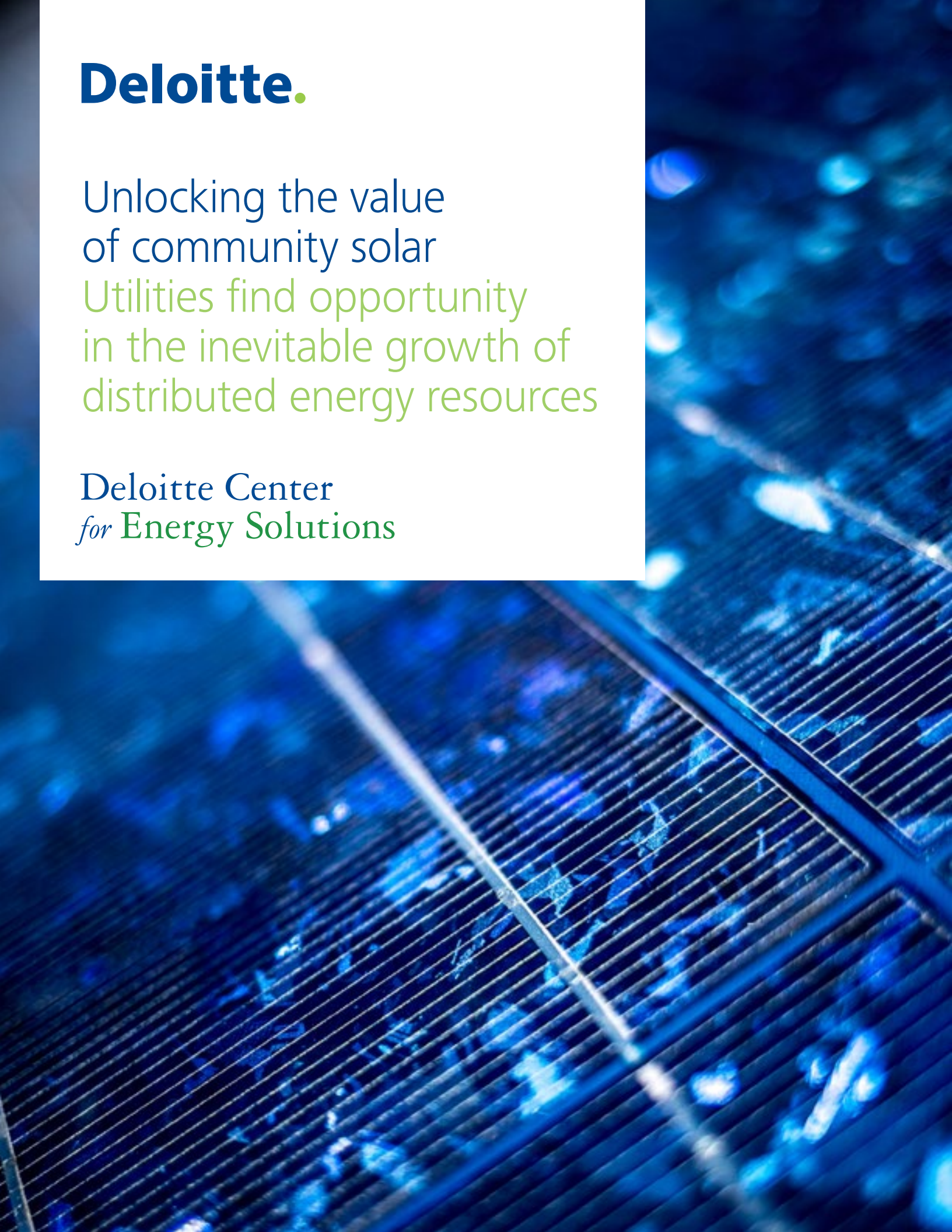




Unlocking the value
of community solar
Utilities find opportunity
in the inevitable growth of
distributed energy resources

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for Energy Solutions



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Executive summary

US electric utilities of all types, from investor-owned to municipal to cooperatives (co-ops), are defining their own paths forward to bring solar to their customers. Community, or “shared,” solar programs are an increasingly popular option. These programs allow customers who do not own their homes, possess strong credit scores, or have adequate roof space to buy solar power, or in some cases, to invest in solar assets. While community solar is often discussed in the context of program design and customer demand, this report will analyze the market from a different angle by unpacking the unique opportunities and challenges posed to each utility type: co-ops, municipal, and investor-owned utilities (IOU). For co-ops, their member-owners’ interest in community solar has enabled them to develop more programs than any other utility type. Municipal utilities have creatively leveraged state and local government incentives to bring shared solar projects to fruition. And IOUs, largely in response to state-level legislative directives, are partnering with experienced industry players to implement new types of program models.

Shared solar has gained a foothold in the US market during the past five years and its growth shows no signs of slowing. In 2010, only two shared solar projects existed. Today 77 utilities administer 111 projects across 26 states, accounting for a combined capacity of about 106 megawatts (MW).¹ As innovation takes its course, shared solar business models are continuing to evolve, and the opportunity is becoming more evident. Utilities are finding that shared solar allows them to grow their solar generation portfolios, developers are seizing the opportunity to expand their business offerings, and more customers have the chance to buy solar power. By unlocking value in each segment of the supply chain, community solar is evolving into a growth engine for distributed solar resources.



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What is community solar?

Community solar presents an opportunity for residential or commercial utility customers to invest in a solar array or receive credits on their electricity bill for solar power not located at their home or business. Program models are constantly evolving to fit the needs of both customers and utilities. Identifying an optimal program design is not without its challenges; models vary significantly based on market and utility type. However, electric power industry players are quickly innovating to overcome barriers and utilities are increasingly seizing the business opportunity that shared solar represents.

What's in it for the customer?

Shared solar programs offer a convenient and cost-effective option to utility customers who want to buy electricity from a low-carbon, renewable resource.

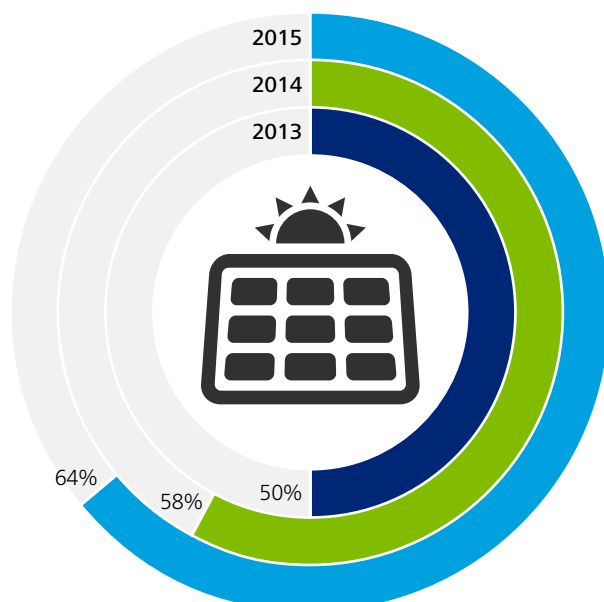
The rapid growth of the rooftop solar PV industry has demonstrated that where there's a will to "go solar," there's a way. Of the more than 1,500 household utility decision makers surveyed in the annual [Deloitte Resources 2015 Study](#), 64 percent ranked "increasing the use of solar power" among the top three energy-related issues most important to them, up from 58 percent in 2014 and 50 percent in 2013.²

As interest in solar trends upward, utility customers seek cost effective options to buy electricity from solar resources. Installing rooftop solar is a popular way for consumers to reach this goal. However, owning or leasing a home PV system may only be realistic for people who own their home, have a creditworthy FICO score (typically over 680), and live in a state with net energy metering policies. According to Greentech Media's *US Community Solar Market Outlook 2015 – 2020* report, 77 percent of US residential households are likely ineligible for rooftop installations according to these parameters, and are thereby potential candidates for community solar program participation.³

For those customers who are deciding between installing rooftop solar and participating in a shared solar program, both the upfront cost of the system and the approximate payback period typically weigh into their decision. Since 2010, the upfront cost of community solar participation has declined 43 percent from an average of \$5.13 per watt to \$2.92 per watt in 2015.⁴ GTM Research estimates that the average price of a residential rooftop solar installation in 2015 was \$3.53 per watt.⁵ Based on upfront cost alone, community solar would seem to be the leading option. However, the time it takes for the customer to make back the total cost of the system by offsetting their electricity bill

Figure 1: US Consumers want more solar power

Percentage of consumers who rank "increasing the use of solar power" among the top three most important energy-related issues



Source: [Deloitte Resources 2015 Study](#)

is a key consideration, especially for those customers who are eligible for “no money down” financing, which often has a payback period of 10 years or more. Because customers’ compensation for solar production is highly dependent upon retail electricity prices and net metering policies—which vary across the US—the payback period for rooftop vs. community solar is difficult to compare.

Another factor affecting the upfront cost of these investment options is the availability of the federal solar investment tax credit (ITC). The federal solar ITC for residential property has long been claimed by individual taxpayers with rooftop solar, but its availability for owners of shared solar programs is less clear. A private letter ruling released by the Internal Revenue Service in September 2015 held that an individual that purchased PV panels and a joint interest in related property (e.g., inverter, racking equipment) for installation in a ground-mounted off-site array with panels owned by other individuals qualified for the ITC with respect to the cost of the equipment and installation services.⁶ The power generated was delivered to the local public utility that served the taxpayer’s residence under the terms of a net metering arrangement.

What’s in it for the utility?

The opportunity that shared solar represents to investor-owned, municipal, and co-op utilities is less straightforward, but increasingly significant. While primarily developed to address customers’ interest in “going solar,” these programs can also be leveraged to bundle other products and services. Grid optimization and Renewable Portfolio Standard (RPS) compliance are two other ways that utilities can benefit.

Community solar programs not only allow utilities to offer their customers a venue for buying solar directly, they can also provide a sales channel for other services. For example, the Minnesota-based co-op, Steele-Waseca Cooperative Electric (SWCE), is pioneering an innovative bundled service offering that benefits both the utility and its customers. As part of the SWCE community solar program, customers can opt to buy their portion of the shared solar facility at a discounted rate if they also install a new electric water heater in their home.⁷ The customer uses the excess power generated by their solar array during the day to heat their hot water heater, allowing them to avoid pulling that electricity from the grid during “peak load” in the early evening. This allows the customer to effectively “store” the excess solar power generated from their array. It also helps

the utility to reduce peak demand, which is highly beneficial for the reasons described below. Other products and services utilities might consider wrapping into their programs include appliance upgrades, efficiency retrofits, and compensation for participating in demand response programs.

Utility-administered community solar programs allow the utility to make key decisions regarding the placement and design of the solar array, enabling them to optimize valuable grid resources. For example, a utility might build the array with the panels facing west to boost output late in the day during periods of peak demand. This practice, commonly referred to as solar “peak shaving,” can reduce costs by avoiding deploying expensive “peaker” plants designed to meet high demand. All consumers benefit from this approach, not only those who have invested in the array. Utilities may also choose to install tracking systems so that they can move the panels to align generation output with supply and demand. Additionally, strategically placed shared solar arrays might help utilities defer or avoid the cost of upgrading transmission and distribution assets by reducing their use and prolonging their useful life.

Finally, utilities can use community solar programs to comply with state-level RPS requirements. Utilities that are subject to an RPS may directly generate renewable energy credits (RECs) or indirectly purchase RECs from third party developers. When utilities own the solar array, they should consider structuring their program so that they, not the subscriber, claim the environmental benefits of the credits in order to apply them toward their RPS requirement.

Arguably the first community solar array in the US came online in 2006 as a result of advocacy by the Ellensburg, WA City Council. It is administered by Ellensburg’s municipal utility. The total cost amounted to more than \$1 million for a 109 kilowatt system—a price tag much higher than what the same size solar array would be built for today.⁸ As a result, subscribers who originally joined the program paid a retail rate seven times what they previously paid for the incumbent resource: local hydropower. But when given the option, despite high rates, residents of Ellensburg chose to purchase their electricity from a local, solar resource.⁹ Today, due in large part to the declining cost of solar photovoltaics (PV), more consumers are being afforded this same opportunity without having to pay the premium that Ellensburg residents have.

What's in it for the developer?

As community solar adoption gains momentum amongst utilities and customers alike, several US developers have begun to build projects. Large developers see an opportunity to unlock previously unreachable solar demand while small developers are beginning to offer niche, à la carte services that align with utilities' needs.

SunEdison, Inc. launched its first program in National Grid's Massachusetts territory in September of 2015¹⁰ and NRG Energy, Inc. partnered in the same year with other solar firms to develop projects in both Massachusetts and Colorado.¹¹ Residential solar developer, SolarCity, Inc., also announced a shared solar program in 2015.

Despite the entry of these big hitters, smaller, more specialized developers continue to dominate the market. Companies such as Clean Energy Collective (CEC) were among the first to offer project development services with billing technologies that work with utility infrastructure. This allowed utilities without previous experience to offer shared solar. According to Tom Hunt, Vice President of Corporate Development at CEC, "It's a big leap to go from single to multiple offtakers. It adds a lot of complexity." These added layers might include remote meter program tracking as well as customer acquisition and billing software. Services such as these are growing into a significant business opportunity for CEC. With its proprietary Community Solar Platform, CEC has developed a software-as-a-service (SaaS) model that provides developers and utilities with the necessary tools for on-time market deployment. "We're not going to be the most cost effective developer in every market. It's too much of a local game. So CEC is now partnering with solar developers that specialize in their respective markets to offer a SaaS product that enables community solar programs," said Mr. Hunt. This offering has begun to soften one of the most significant barriers for developers looking to enter the community solar market. As more firms innovate to offer these types of services, previously unreachable solar demand could create an opportunity for more large-scale developers to grow their shared solar businesses.

State policies enable and drive community solar growth

To overly simplify a very complex matter: there are two overarching factors that typically shape utility community solar adoption: 1) regulation and market drivers affecting the utilities' territory, and 2) whether the utility is investor-owned, municipally-owned or cooperatively-owned. These factors are explored further below.

Virtual net metering enables community solar market growth

The adoption of net metering, or state policies that enable solar energy system owners to receive bill credits for excess energy produced,¹² have been integral to the growth of commercial and residential solar across the nation. Virtual net metering (VNM) allows more than one customer to benefit from the credit produced by a renewable energy resource. Though VNM enables community solar, the market has demonstrated that the availability of this policy alone is not necessarily a market driver.

VNM was derived from the concept of "remote" net metering, originally established to accommodate multi-facility commercial customers with on-site generation. Demand from these customers to apply earned credits to their various commercial accounts triggered the implementation of such net metering regulations in several states. Recognizing that similar policies could be applied to shared solar programs, states have expanded the definition of net metering to allow more customers to be eligible. As such, 12 states and the District of Columbia have developed a patchwork of VNM policies that vary by technology, utility type, and customer classification.¹³ Eleven of these jurisdictions are clustered in the Northeast and Mid-Atlantic regions. However, despite the availability of VNM, only 11 of the 111 active community solar projects are located in those states.¹⁴

So why hasn't more shared solar come online in these regions? Lack of solar resources may play a role in the Northeast. However, ownership regulations, net metering caps (which limit the amount of capacity brought online under a net metering tariff), and concerns around fair compensation for shared solar customers have also constrained growth for certain utilities in these markets. For example, Maine requires that participants have an actual ownership stake in the generation facility, creating a market for co-ops, but potentially limiting the upside for municipal utilities and IOUs.¹⁵ Delaware's policy has also struggled to attract programs, likely because the statewide net metering cap of 5 percent of aggregated customer monthly peak demand is nearly met, and as a result, behind-the-meter solar development is beginning to slow.¹⁶ Finally, the DC SUN program in Washington, DC hit a snag when the District's Public Service Commission reduced the value of shared solar customers' net metering credit to account for only generation and distribution charges, bringing compensation well under retail rate.¹⁷

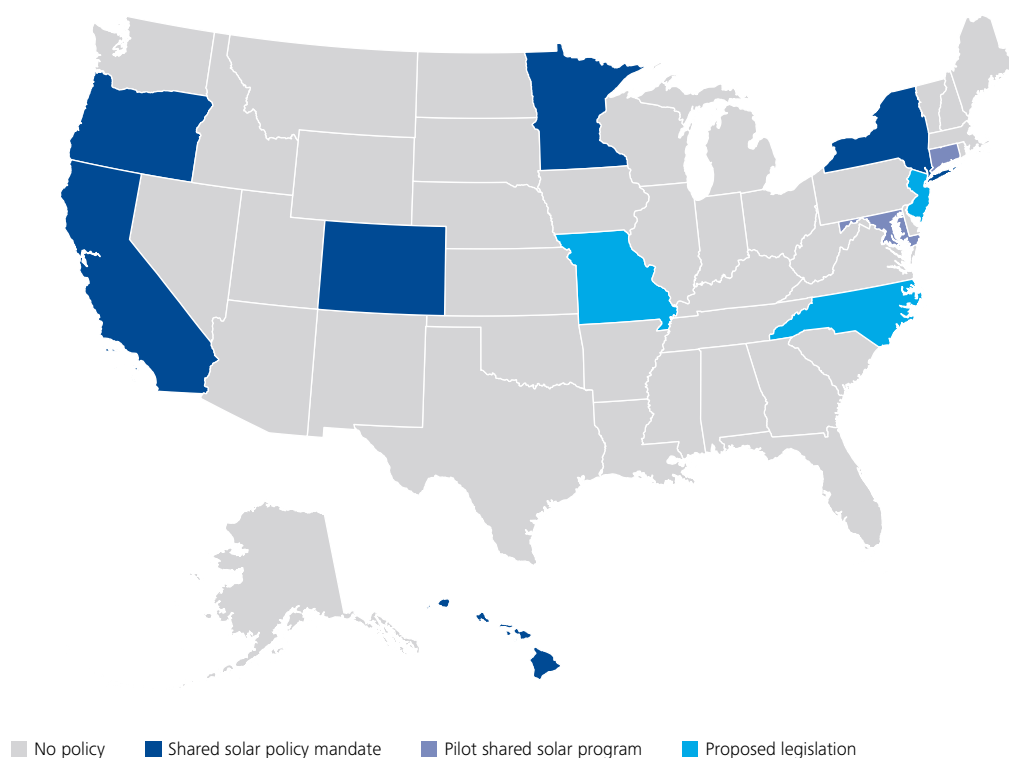
Though utilities in these states are obligated by regulation to offer VNM, that policy alone does not necessarily drive community solar growth.

State-level policy mandates drive market growth

As demonstrated by the clustering of projects in certain states, shared solar growth is often enabled or driven by state-level policy and regulation. Shared solar mandates are on the verge of spurring growth in California and Hawaii, and pilot programs are in progress in Connecticut and Maryland. Oregon recently passed into law a shared solar mandate and there is an active campaign in Virginia. Perhaps the most notable growth stories, however, are those of Colorado and Minnesota. Both states have mandated that the large IOUs operating within their jurisdiction administer shared solar programs and provide on-bill crediting to participants. This has resulted in substantial market growth over the past several years. Colorado was the first state to enact legislation in 2010

Figure 2: States with shared solar policy mandates

Visit www.deloitte.com/us/communitysolar to view an interactive map illustrating the relationship between various types of policies and community solar market growth, including shared solar policy, metering policy, deregulation, and renewable portfolio standards.



through the Solar Garden Policy Act. Currently home to about 27 MW of shared solar across 37 projects,¹⁸ Colorado defined its own fair compensation structure and declared systems with nameplate capacities equal to or less than 2 MW as being eligible under the Act.¹⁹ The state's electric co-ops

have embraced shared solar, accounting for 11 of Colorado's programs. Additionally, the state's RPS policy requires IOUs in Colorado to purchase power from shared solar arrays, incentivizing the growth of IOU-administered programs.²⁰ Inspired by Colorado's growing shared solar market, Fresh Energy, a Minnesota clean energy think tank, along with a coalition of other environmental stakeholders, successfully advocated for the enactment of Minnesota's Solar Energy Jobs Act in 2013. Currently there are 10 co-ops in the state that administer 13 community solar farms, accounting for an aggregate capacity of about one megawatt.²¹ To bring Minnesota's largest IOU into the market, the 2013 legislation directed Xcel Energy to propose a shared solar program that placed no limit on the amount of solar to be built for consumption by the utility's 1.2 million Minnesota customers. In July 2015, the utility issued an RFP soliciting bids for 29.5 MW of community solar—a huge opportunity for developers.²² However, the need for updated interconnection standards has delayed the program's rollout. Debates ensued between Xcel Energy, various developers, and the Minnesota Public Utilities Commission (PUC) regarding the appropriate size of community solar projects and the rules around "co-locating" several arrays at the same site.²³ Ultimately, some developers reached a settlement agreement with Xcel Energy that was adopted in part by the Minnesota Public Utilities Commission. As of October 2015, community solar project proposals can be no larger than 1 MW per site.²⁴

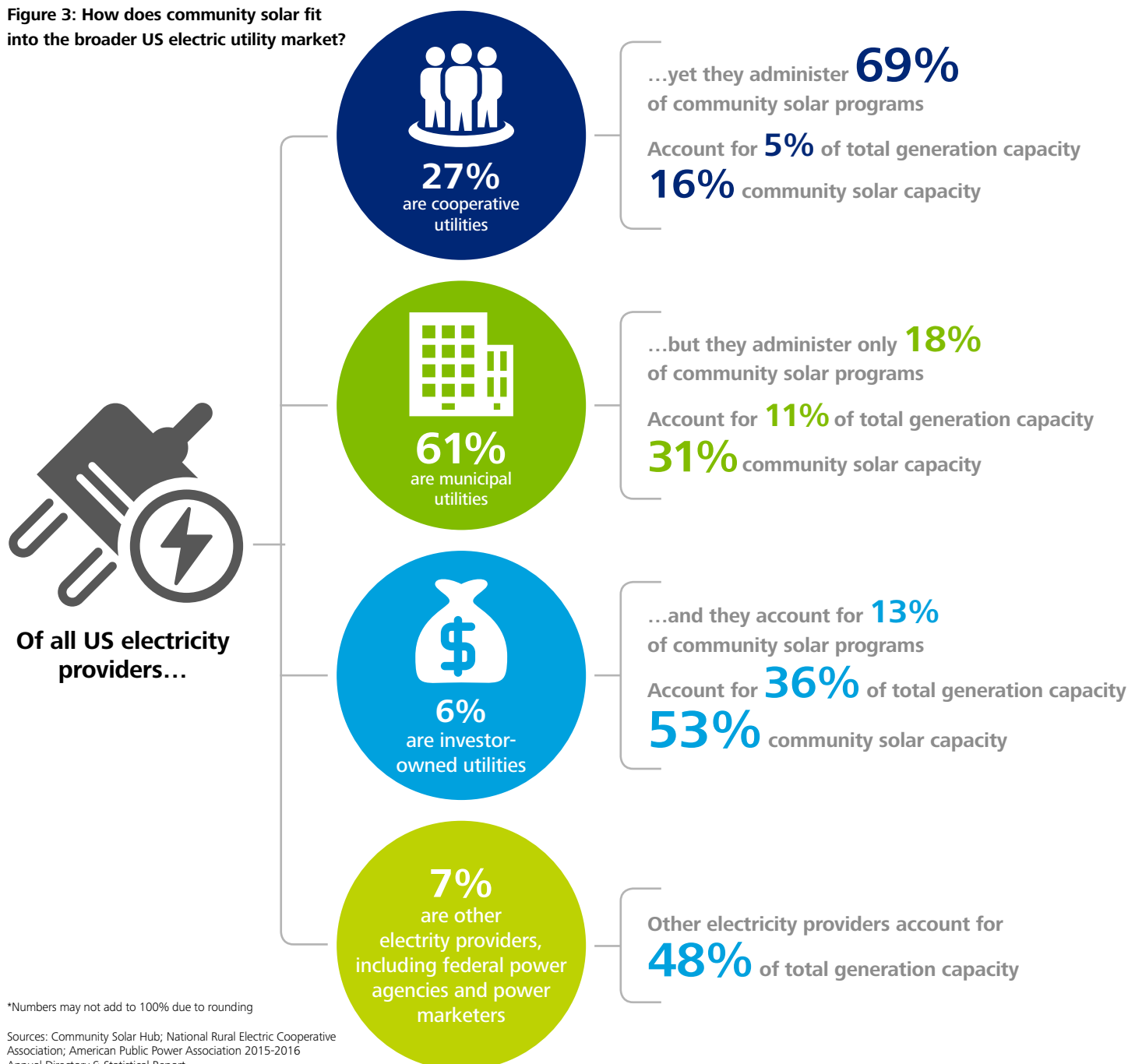


Growth trends vary significantly by utility-type

In many respects, the shared solar opportunity is a function of a utility's size, structure, and the markets it serves. However, it's also important to understand how each utility type fits into the broader US electric utility market.

For example, only 26 percent of electric providers are co-ops, yet they account for well over half of community solar programs, suggesting that co-ops might have an advantage in community solar adoption over other types of utilities.²⁵ Figure 3 provides further insight into this comparison.

Figure 3: How does community solar fit into the broader US electric utility market?



Nimble cooperatives navigate community solar tides

Electric co-ops are at the forefront of community solar development. According to their industry association, the National Rural Electric Cooperative Association (NRECA), electric co-ops are “private, not-for-profit businesses governed by their consumers (known as consumer-members).” These utilities serve an estimated 42 million people in 47 states.²⁶ Co-ops provide and deliver about 11% of the nation’s electricity sales. Despite reaching fewer customers than other utility types, 69 percent of community solar programs are administered by co-ops, which accounts for 57 percent of projects.²⁷ Their shared solar arrays are typically on the smaller side at around 350 kW.²⁸ Project sizes is increasing—the average size of planned co-op projects is 747 kW—however, currently co-ops account for only about 16 percent of US community solar capacity.²⁹

The growth of co-op administered community solar is a testament to the strong demand for solar amongst utility customers. When endowed with authority, utility “prosumers” (who, in the case of co-ops, are also owner-

members) have shown they will overcome barriers to purchase their electricity from solar power. Co-ops’ ability to deploy innovative services more swiftly than municipal utilities and IOUs is a function of their small size and their communal ownership structure.

The growth of community solar programs amongst co-ops can be challenging, as their service territories include the majority of “persistent poverty counties” in the US. Of the millions of Americans served by co-ops, an estimated 4 million live in these counties.³⁰ Low income areas have thus far been slow to adopt community solar, posing a barrier to reaching many co-op customers. Additionally, co-ops are typically careful not to shift the costs of shared solar programs onto non-participating customers who might struggle to pay their monthly electric bills.

Co-ops can also face challenges when determining the ownership structure and size of the system. Because their customers have an ownership stake in the utility, these elements are an especially important aspect of design, and a variety of ownership structures are beginning to emerge. Co-ops motivated to own their community solar arrays might contract CEC or another service provider for IT and billing implementation but choose to own the facility themselves. Several cost-effective financing options are available to co-ops, including low interest loans, federal financing through the Rural Utilities Service (RUS) or New Clean Renewable Energy Bonds (NCREB).³¹

The downside of PV system ownership for co-ops, however, is their inability to monetize the federal solar ITC as non-profit entities. To capture the economic value of the ITC, co-ops generally consider third-party ownership. This is where size plays a role. For systems less than 2 MW, the lease buyout structure—where the co-op initially leases the project from the developer, but has the option to buy the project for fair market value after a certain period of time—is frequently the best option. At 2 MW or more, co-ops might begin to find investors interested in tax equity flip structures. To ensure the success of these larger projects, it is especially important for co-ops to market their shared solar program effectively and confirm that it is fully subscribed.



Financial incentives often enable municipal utility programs

As described in the Ellensburg, WA example, community solar was born by the will of municipal utility customers and, by extension, their local government. Municipal utilities account for 18 percent of shared solar programs in the US, 31 percent of capacity, and about 15 percent of projects.³² Washington State has been a leader in municipal shared solar administration for years, largely due to the \$0.30/kWh state incentive offered to solar facilities developed on community-owned property, such as schools, parks, or government buildings. That attractive incentive coupled with the utilities' close ties to the public agencies that own community property has spurred the growth of municipally administered community solar programs in the state.

Even in states that don't offer such a direct incentive, the relationship between municipal utilities and their respective city and state governments has enabled municipalities to creatively leverage public funds to finance programs. From making use of a state-level tax credit, like the Ashland Municipal Utility's use of the Oregon Business Energy Tax Credit,³³ to tapping funds from a local government agency, as the City of St. George did with Energy Services Department funding to create Dixie Escalante Electric's SunSmart program,³⁴ the majority of municipally administered community solar programs have leveraged one incentive or another to make the economics work. Furthermore, California municipal utilities are seeking opportunities to capture funds accrued through the revenues of the state's cap-and-trade program, to invest in renewable energy and energy efficiency programs that directly benefit disadvantaged communities and low-income households.³⁵ Authorized by the California Global Warming Solutions Act of 2006 (AB 32), cap-and-trade program dollars must be spent on efforts that reduce greenhouse gas (GHG) emissions,³⁶ making a municipally administered community solar program a good candidate.

Investor-owned utilities show strong potential for shared solar growth

Though only a small number of IOUs administer community solar programs, they've developed them in a big way. Though IOUs administer only 13 percent of the shared solar programs in the US, they account for 28 percent of projects and 53 percent of capacity.³⁷ There are still a few kinks in the system, but due to the drivers discussed above, IOU deployment of community solar is likely to increase in coming years.

Interconnection standards designed for distributed energy resources are an important factor for large IOUs to consider, especially when bidding out capacity to developers. In Minnesota, where Xcel Energy has begun to deploy its shared solar program, the state's PUC and other stakeholders have begun to work together to accommodate the growth of solar and other distributed resources. According to Fresh Energy, "In anticipation of the growth of distributed resources, the Minnesota PUC and other stakeholders are evaluating the state's interconnection standards as part of comprehensive grid modernization planning." For Xcel's Minnesota program, project timeline uncertainty has been challenging for developers and ultimately delayed the deployment of the program.

Though interconnection issues have posed a challenge, Xcel Energy's plan to approve projects adding up to "north of 250 MW" in Minnesota by the end of 2016 demonstrates that the opportunity is worth the effort.³⁸ And the incentives are only becoming stronger. IOUs previously deterred by third party ownership can now own and potentially rate-base shared solar assets while leveraging services such as CEC's Community Solar Platform. Such partnerships will likely allow more IOUs and their investors to see the value of shared solar programs. As the kinks in the system begin to get ironed out and more resources become available, it's likely that the role of IOUs in this market will become increasingly significant over the next several years.



Conclusion

The evolution of community solar is a classic case of business model innovation turning a challenge into an opportunity. Foreseeing the inevitable growth of distributed energy resources, utilities are deploying these programs to get ahead of the game and to capture the benefits that distributed resources provide to the grid. Often utilities also aim to further engage their customers and, when applicable, comply with state-level regulations. Though the design of these programs varies greatly by market and utility type, this growing trend of shared solar adoption represents how a highly regulated industry can leverage technology and policy to adapt to a changing business climate. Strong consumer demand for solar and innovative program design will likely propel US shared solar growth for years to come.

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