



Equitable Community Solar: Policy and Program Guidance for Community Solar Programs that Promote Racial and Economic Equity

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I. Executive Summary

This white paper provides guidance for creating community solar programs that promote racial and economic equity.

It defines what makes a community solar program equitable, and states objectives that community solar programs striving to be equitable can pursue related to program structure, consumer participation, compensation, and other policy areas. For each objective, this paper recommends one or more high-level policy or program guideline designed to center marginalized communities, defined as “communities at the frontline of pollution and climate change (‘frontline communities’), and those historically and presently disenfranchised by racial, economic, and social inequity.”¹ It offers a rationale for each policy, while listing other plausible options that may work best in specific scenarios.

For example, this paper recommends using a system of adders to incentivize participation of marginalized communities and local community ownership of community solar arrays. It recommends that community solar programs provide on-bill credits, accommodate changes in address and energy use, and create a simple sign-up process. This paper describes a community solar program governance process that centers marginalized communities and promotes program transparency and adaptation.

While the research and findings in this paper apply to programs nationwide, in a case study of Cleveland, Ohio, this paper estimates that the construction phase of potential community solar programs of 10 megawatts (MW) and 50 MW would generate economic impacts of \$21 million and \$95 million, respectively, nearly twice the upfront construction costs.

This paper is intended for city elected officials and policymakers, administrators of municipal electric utilities (i.e., munis), and local advocates building equitable third-party or muni-owned community solar programs. It is most applicable to municipalities with a municipal electric utility or other lever that provides flexibility in sourcing energy, such as a Community Choice Aggregation entity. Much of this paper is relevant for policy makers and advocates designing regional or state-level community solar programs, as well.

II. Introduction

Thirty municipal electric utilities in the United States have implemented community solar programs totaling 40 megawatts of solar energy as of 2018.² Many of the remaining 2,000 munis and their local regulators, often city councils, have policy authority to unilaterally enact community solar programs.

They have good reason to do so. As detailed in this paper, community solar, also called ‘shared solar’, creates local economic value. Residents save money on their monthly bills by subscribing to a ‘solar garden’ -- they reserve a share in a solar array located offsite, and the power generated by their solar panels shows up as a credit on their utility bill. Profits also accrue to the owner of the solar panels, whether a third-party investor or a muni, as well as the landowner who hosts the array. Building solar gardens creates local jobs, promotes community climate resilience, and can reduce emissions from carbon-based electricity generation.

The State of Minnesota, for example, authorized a state-wide community solar program in 2014. Four years later, roughly 12,000 residents and 2,000 business, non-profit, and public sector customers have saved money on their monthly utility bills as subscribers to community solar gardens totaling 600 megawatts.³ In 2018, community solar employed 4,000 Minnesotan workers, generated land leases worth \$5 million and direct tax revenue of \$1 million, and reduced global warming emissions by nearly one million tons.

1 Subin DeVar, “Equitable Community Solar: California and Beyond,” *Ecology Law Quarterly*, forthcoming in 2020.

2 Herman K. Trabish, “[Utilities take note: Next generation utility-led community solar is emerging](#),” *Utilitydive.com*, October 17, 2017

3 Bentham Paulos, “[Minnesota’s Solar Gardens: The Status And Benefits Of Community Solar](#),” *Institute for Local Self-Reliance, Vote Solar, and Minnesota SEIA*, May 2019.

While the economic, climate, and resilience benefits of community solar are compelling, the extent to which a community solar program drives equitable outcomes depends on its design. Compensation structures, consumer participation guidelines, development standards, and other elements of a community solar program determine how the benefits and costs of community solar get distributed among many stakeholders, including munis; investors; installers; White, Black, and Brown residents; low-income and wealthy households; even one neighborhood or another.⁴

In a forthcoming paper, Subin DeVar, Director of the Community Renewable Energy Program at the Sustainable Economies Law Center, builds on the National Renewable Energy Laboratory’s (NREL) definition of shared solar as the allocation of “the electricity of a jointly owned or third-party-owned system to offset multiple individual businesses’ or households’ consumption,”⁵ adding two additional practices that distinguish *equitable* community solar:

- I. “intentionally focusing on benefiting marginalized communities and
- II. prioritizing local community governance and ownership.”⁶

This paper draws on the authors’ experience in Minnesota, Maryland, Washington, D.C., California, and other geographies across the country to assemble policy and program guidance for creating community solar programs that meet this definition. This paper summarizes best practices from existing municipal and state community solar programs, applies policy innovations from other domains to community solar, and introduces several policy innovations.

Finally, this paper calculates the potential economic impact of a community solar program in Cleveland, Ohio, to illustrate the projected impact of upfront investments and ongoing operations and maintenance of community solar arrays on local spending and job creation. In Appendix C, it also lists resources for further reading.

III. Policy and Program Guidance

The policy and program guidance is grouped into four content areas.

Content area	Examples of related topics addressed in this paper
Compensation	Rates of payment and reimbursement, including adders for enrolling and hiring members of marginalized communities
Consumer participation	User experience, address barriers to low- and moderate-income (LMI) participants (e.g., credit scores), subscription transfer process
Program structure	The size of the program in megawatts, who can participate as a developer, interconnection processes
Other	Program governance and transparency that centers marginalized communities

4 The EPA’s EJScreen (www.epa.gov/ejscreen), an interactive EJ map that shows pollution burden and other environmental justice metrics at the block level, is an empirical tool for identifying frontline communities.

5 See “Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation” National Renewable Energy Laboratory (2015) at v. NREL distinguishes “community shared solar” as a one model under the broader concept of “community solar.” While shared solar is the primary model of community solar, for simplicity, this paper uses community solar as a shorthand for community shared solar.

6 Subin DeVar, “Equitable Community Solar: California and Beyond,” *Ecology Law Quarterly*, forthcoming in 2020.

Each content area has a series of objectives that together describe the features of an equitable community solar program.

For each objective, there is one or more recommended policy or program guideline. In general, policy” likely must be legislated by a state or city government, while “program guidance” may be implemented by regulators or management of a municipal utility.

Appendix A includes for each objective more detail, including a rationale for the selected policy, policies to avoid, and policies and program guidance that are not a top recommendation but that could plausibly achieve the objective.

Compensation

Content area	#	Objective	Recommended policy or program guidance
Compensation	1	Ensure residential subscribers have full access to benefits of the program	Offer a rate with adequate differential for residential to enable serving them
	2	Ensure low- and moderate-income residents have full access to benefits of the program	Adders for low- and moderate-income subscribers Adders for projects comprised of a substantial portion of low and moderate-income subscribers (e.g., 40%) Adders for projects comprised of 40% or more low-income subscribers
	3	Ensure frontline communities have full access to benefits of the program	Adders for residential subscribers in priority census block groups Adders for projects comprised of a substantial portion of subscribers in priority census block groups (e.g., 40%)
	4	Increase the economic impact of local hiring	Threshold for minimum utilization of minority, women, and local workforce, plus adder for projects that exceed minimum
	5	Maximize the wealth-building potential of community solar	Adders for projects that have cooperative or community ownership
	6	Facilitate siting consistent with smart growth principles	An adder for siting in locations consistent with smart growth principles (e.g., rooftop, brownfield)
	7	Guarantee that the rate utility pays subscribers is adequate to finance a range of projects	Retail rate net metering
	8	Maintain stable and predictable rates over life of solar garden (or at least many years of development)	Retail rate net metering

Consumer Participation

Content area	#	Objective	Recommended policy or program guidance
Consumer Participation	10	Simplify billing and repayment for subscriber	Allow collection of subscriber payments to the developer on a utility bill alongside delivery of utility bill credits
	11	Ensure subscribers get full bill credit for the time they're enrolled in the program, including partial months Eliminate frictions for renters	Provide bill credits for any portion of the month that a subscriber is subscribed AND back-date credits for replacement subscribers to the date the first subscriber left
	12	Accommodate changes in address	All subscribers can move addresses within service territory/geographic area without losing subscription or facing a gap in coverage
	13	Improve user experience: Simplify subscriber sign-up and validation process	Subscriber is able to complete subscription and sizing in one stop; or if they prefer complete certain parts and come back later without pressure to commit immediately
	14	Improve user experience: Allow sign up through multiple methods	Multi-mode options for signing up (e.g., online, mail-in, in-person)
	15	Verify income without placing undue burden on low- and moderate-income subscribers or project operators, while ensuring reasonable balance between false positives (giving the adder to non-LMI households) and false negatives (denying the adder to LMI households)	Provide various paths to income verification, including residence in targeted census blocks, or enrollment in any of the following assistance programs: Low Income Home Energy Assistance Program (LIHEAP), Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), Earned-Income Tax Credit (EITC), or certain needs-tested Veterans benefits. Allow income-qualified housing and public housing to bulk enroll residents to a community solar program and pass through benefits to all residents
	16	Share the financial benefits of solar subscriptions	Allow commercial, residential, and nonprofit subscribers on the same array
	17	Distribute financial benefits of solar subscriptions	Require at least 3 subscribers per garden
18	Promote financial stability of projects by allowing backup subscribers	While capping initial base subscription by any one subscriber at 40%, allow backup subscribers: Permit any single subscriber to take up to 50-60% of project kWh generated on an annual basis	

Consumer Participation (con't)

19	Ensure LMI residents and other historically disenfranchised communities have full access to benefits of the program	Community Solar Advisory Committee (CSAC) works with muni to set a program-wide 'community standard' for participation of residential subscribers, LMI residents, communities of color, small business subscribers, and historically disenfranchised communities as a percentage of subscribed community solar program capacity, or as an absolute number of subscribers (e.g., 1,000 or 20% of subscribers are priority subscribers). (See CSAC insert on page 36 for full description of the committee.)
20	Ensure LMI residents have full access to benefits of the program	Stipulate screening mechanisms developers cannot use to limit participation by LMI residents (e.g., credit score, income)
21	Accommodate changes in electricity usage	No requirement to resize subscriber eligibility based on energy usage changes within the same address. Subscriber is allowed to increase subscription if solar capacity is available if their energy use increases.
22	Expedite subscriber transitions	Utility must allow developer to adjust subscription base in a real-time basis with clarity on when change in bill credit rights will occur
23	Allow individual subscriber to subscribe to more solar than they consume	Subscribers eligible to subscribe to up to 120% of annual usage

Program Structure

Content area	#	Objective	Recommended policy or program guidance
Program Structure	24	Create community standards for advancing equitable community solar	Delegate the development of community standards to the Community Solar Advisory Committee. Use the community standards as criteria to prioritize projects and target areas. (See CSAC insert on page 36 for full description of the committee.)
	25	Implement a project selection process that gives community developers a chance at competing with for-profit development	Implement a project selection process with the following steps: A. All projects that meet program requirements and deadlines are approved and grouped into batches (e.g., there are no program caps) B. Approved projects within a batch are ranked based on community standards around participation and local ownership; highest ranked projects are prioritized for interconnection and bureaucratic support

Program Structure (con't)

26	Make it easy for all developers, including community-based developers, to identify sites based on grid capacity	Require the local grid operator to provide transparent "hosting capacity" data that includes: how many megawatts of solar can be added to which distribution feeder lines, where those lines are located, and the utility service territory of each line
27	Streamline application and interconnection process	Develop municipal utility capacity to run transparent, streamlined application and interconnection process

Other

Content area	#	Objective	Recommended policy or program guidance
Other	28	Ensure program transparency	Require utility to issue periodic, public reports on developments, subscribed capacity, distribution of benefits, and subscriber demographics as requested by the Community Solar Advisory Committee. (See CSAC insert on page 36 for full description of the committee.)
	29	Ensure accountable governance of program	Task the Community Solar Advisory Committee with reviewing outcomes and identify changes to program design. Prioritize participation in CSAC by historically marginalized communities. Require body governing municipal utility (e.g., City Council or municipal utility board) hold a public vote on any formal CSAC recommendations to modify program structure. (See CSAC insert on page 36 for full description of the committee.)
	30	Require that community solar is considered within a municipal utility's IRP or cost of service studies	Require that community solar policies be considered in utility long-term planning processes (e.g., cost of service study, IRP-like situations), especially in coordination with Joint Action Agency planning processes

IV. Economic Impact Assessment

Next, the authors estimated the economic impact of two hypothetical, illustrative community solar projects in Cleveland, Ohio, a city with a municipal electric utility. The construction phase of projects with 10- and 50-megawatt fixed-mount arrays would generate a statewide economic impact of \$21 million and \$95 million, respectively, while the operations and maintenance (O&M) phase would generate an annual economic impact of \$0.25 million and \$1.3 million. This includes supporting 125 and over 500 jobs, respectively, such as solar energy installation managers, solar PV installers, maintenance and repair workers, electronics repairers, electrical engineers, and lawyers.

	10 MW scenario	50 MW scenario
Construction cost, \$ million	11.9	53.6
Lifetime O&M cost, \$ million	0.5	2.4
Total lifetime cost, \$ million	12.4	56.0
Economic impact - construction phase, \$ million	21.3	94.9
Economic impact - O&M phase, \$ million	0.3	1.3
Total economic impact, \$ million	21.6	96.2
Jobs supported - construction phase	121	542
Jobs supported - O&M phase	2	12
Total jobs supported	123	554

This analysis assumes that all of the labor and supplies come from within the State of Ohio.

This model does not factor in ongoing program administration costs for community solar programs, such as enrollment services, marketing, billing management, and legal fees.

Further, this does not factor in the monthly energy bill savings of people who subscribe to the solar array. Nor does it include the returns on capital the owners of the array generate as they get repaid. If the owners are community members, formed in a cooperative, for example, one can expect their profit will induce a substantial multiplier, increasing the overall economic impacts of the program. This is an area of further research.

Please refer to Appendix B for the full set of assumptions and results.

V. Conclusion

With appropriate policies and program guidelines, community solar offers states and municipalities a powerful tool for transitioning to a clean energy economy in a way that centers historically marginalized communities. Community solar programs striving to be equitable will work towards the objectives laid out in this paper, or comparable objectives, and will find new policy and program innovations that respond to the needs and desires of people living at the frontlines of climate change and social inequity. Equitable community solar programs will increase the benefit community solar programs offer to historically marginalized communities, promote community ownership, and ensure adequate program governance and accountability.

VI. Acknowledgments

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VII. Appendix

Appendix A - Detailed Policy and Program Guidance Description

Appendix A contains detailed information about the 29 objectives listed in this paper, each of which has its own box, numbered below. The first box below describes the information shared for each objective.

Topic	Information shared in Appendix A
<i>Content area</i>	Each objective belongs in one of four content areas: Compensation, Consumer Participation, Program Structure, or Other
<i>Objective</i>	The objective is listed here
<i>Recommended policy or program guidance</i>	The policy or program guidance recommended for achieving the objective, based on the experience and analysis of the authors
<i>Other plausible policy or program guidance</i>	These are other policies that can be just as effective at achieving the objective, depending on the circumstance
<i>Not recommended policy or program guidance</i>	These are policies that have a track record of producing inequitable outcomes or unsustainable financial results
<i>Rationale for recommendation</i>	A description of why certain policies are recommended over others
<i>Examples / further reading</i>	Resources to learn more. "n/a" does not suggest that no examples exist, only that this paper does not cite any
<i>Set by legislation or through program implementation</i>	<p>A high-level suggestion about whether the recommended policy or program guidance is likely best achieved via legislation, or via program implementation (e.g., the rule making and implementation process at the regulator or management of the municipal utility).</p> <p>Both paths - legislation and program implementation - are often viable ways to achieve the recommended policy. When that is the case, advocates of equitable community solar must decide which to pursue based on the political will and operational capacity of the legislator, regulator, and muni management.</p>

Compensation

1.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Ensure residential subscribers have full access to benefits of the program
<i>Recommended policy or program guidance</i>	Offer a rate with an adequate differential between residential and non-residential subscribers
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Since residential customers in most areas pay substantially higher electric rates than commercial customers, a higher rate for residential is needed to offset their electricity bill costs. Similarly, serving a large number of residential customers is more costly in terms of upfront recruitment time to secure subscribers and in terms of ongoing operation costs to support, maintain, and replace subscribers. An adequate differential in rates for residential subscribers is essential to enable developers to focus on serving residential subscribers and to ensure that the benefits those subscribers receive meaningfully offset their electric costs.
<i>Examples / further reading</i>	Residential adder in Minnesota
<i>Set by legislation or through program implementation</i>	Legislative

2.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Ensure low- and moderate-income residents have full access to benefits of the program
<i>Recommended policy or program guidance</i>	Adders for low- and moderate-income subscribers Adders for projects comprised of a substantial portion of low and moderate-income subscribers (e.g., 40%)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a

<p><i>Rationale for recommendation</i></p>	<p>An adder to the community solar subscriber compensation rate, either for low- and moderate-income subscribers individually or for any subscriber in a project comprised of at least 40% low- and moderate-income subscribers, will help maximize benefits to low- and moderate-income populations and ensure that developers place adequate focus on serving low- and moderate-income communities.</p> <p>A subscription adder for each low- and moderate-income subscriber would require individual subscriber income verification and would reward developers based on the proportion of low- and moderate-income subscribers. This approach raises questions about whether income would have to be verified on an ongoing basis and increases risk that project-verified adders may not be secured if the income of subscribers changes over time, which makes financing harder. (see Objective 15 for more information on income verification program guidelines).</p> <p>In contrast, a subscriber compensation adder for projects with 40% minimum LMI participation could cap LMI participation at that number, but does provide a general benefit to all subscribers for participating in projects that have a low- and moderate-income focus, which could help shift market demand towards those subscribers overall.</p> <p>In each case, careful attention should be paid to how income verification is defined and required to avoid a process that is overly burdensome for low- and moderate-income subscribers or project operators while ensuring adequate data precision to ensure that low- and moderate-income subscribers can actually receive benefits without unnecessary barriers.</p>
<p><i>Examples / further reading</i></p>	<p>“Insights from the Colorado Energy Office Low-Income Community Solar Demonstration Project”</p>
<p><i>Set by legislation or through program implementation</i></p>	<p>Legislative</p>

3.

Topic	Description
<p><i>Content area</i></p>	<p>Compensation</p>
<p><i>Objective</i></p>	<p>Ensure frontline communities have full access to benefits of the program</p>

<i>Recommended policy or program guidance</i>	Adders for residential subscribers in priority census block groups Adders for projects comprised of a substantial portion of subscribers in priority census block groups (e.g., 40%)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	An adder to the community solar subscriber compensation rate, either for each residential subscriber in a priority census block group or for projects with a high proportion of residential subscribers from a priority census block group, will help maximize benefits to frontline communities. A Community Solar Advisory Committee can prioritize census block groups based on environmental justice burden using the EPA's EJScreen or other empirical tool. Adders for projects with subscribers from priority census block groups will incentivize their participation. (See CSAC insert on page 36 for full description of the committee.) This geographic adder could be in addition to the income-based adder described in Objective 2; alternatively, residing in a priority census block group could be a second way to access the adder targeted to LMI residents.
<i>Examples / further reading</i>	EJSCREEN: Environmental Justice Screening and Mapping Tool
<i>Set by legislation or through program implementation</i>	Legislative

4.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Increase the economic impact of local hiring
<i>Recommended policy or program guidance</i>	Threshold for minimum utilization of minority, women, and local workforce, plus adder for projects that exceed minimum
<i>Other plausible policy or program guidance</i>	Instead of an adder paid per kilowatt-hour of energy produced for projects that exceed the minimum threshold, provide an upfront incentive (some amount of dollars per Watt of capacity) for projects that exceed the minimum. Requires funding from muni or other source

<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	<p>This recommendation assumes that there is a regional workforce development system to train new workers in a way that is culturally relevant, and that supportive tax and other incentives bolster hiring of local, minority, and female workers.</p> <p>While some basic level of workforce equity should be a required standard, having required minimum percentages creates the risk that developers will perform to the minimum standard and go no further; which is why incentives for hiring equity above and beyond the standards are crucial.</p> <p>This requirement is only viable if program supports/incentives are in place to enable it (e.g., job training, tax incentive for hiring workers from marginalized workforce).</p>
<i>Examples / further reading</i>	<p>Local workforce utilization as a criteria for program evaluation in Minnesota (pdf)</p> <p>Local hiring guidelines for California Community Solar Green Tariff (pdf)</p>
<i>Set by legislation or through program implementation</i>	Both

5.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Maximize the wealth-building potential of community solar
<i>Recommended policy or program guidance</i>	Adders for projects that have cooperative or community ownership
<i>Other plausible policy or program guidance</i>	<p>Loan guarantees for projects that have cooperative or community ownership</p> <p>Municipal bonds for projects that have cooperative or community ownership</p>
<i>Not recommended policy or program guidance</i>	n/a

<i>Rationale for recommendation</i>	Cooperative or community ownership of solar projects builds accountability to community users over both the development cycle and long-term project operations and also builds community wealth by returning profits from community solar projects to the communities that use them. Finding clear ways to incentivize cooperative and community ownership to achieve these benefits helps level the playing field in the face of often more established, better resourced for-profit developers from outside the area. All three recommended options for promoting cooperative or community ownership have strong potential. Adders make a cooperative/community-based project's offer more attractive to community members. While creating loan guarantees or municipal bonding are likely to be more complicated, they could be great options to enable access to funding and lower the cost of capital for community-based projects.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Legislative

6.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Facilitate siting consistent with smart growth principles
<i>Recommended policy or program guidance</i>	An adder for siting in locations consistent with smart growth principles (e.g., rooftop, brownfields, etc.)
<i>Other plausible policy or program guidance</i>	Adder for sites selected by municipality Set thresholds for projects in certain zones
<i>Not recommended policy or program guidance</i>	Development limited to sites preselected by municipality
<i>Rationale for recommendation</i>	Locating solar on locations that produce additional societal benefits (e.g., rooftop cooling, brownfields, shaded parking, pollinator habitats, etc.) and avoiding sites with high consequences (e.g., cutting forested land, destroying wetland) can be incentivized with adders. In some cases, particularly with brownfields and parking canopies, these sites are also often more expensive to develop solar and require enabling support. Cities can also explicitly incentivize development in certain locations or set requirements for development in certain zones. However, cities should avoid limiting solar development to only specific sites, as this will tend to stifle scalability of program.

<i>Examples / further reading</i>	Principles of Smart Growth from the EPA Massachusetts SMART brownfield adder (pg 13)
<i>Set by legislation or through program implementation</i>	Legislative

7.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Guarantee that the rate utility pays subscribers is adequate to finance a range of projects
<i>Recommended policy or program guidance</i>	Retail rate net metering
<i>Other plausible policy or program guidance</i>	Value of solar Value of distributed energy resources Pre-existing feed in tariffs (though these could undervalue subscriptions if designed around wholesale supply rather than community supply)
<i>Not recommended policy or program guidance</i>	n/a

<p><i>Rationale for recommendation</i></p>	<p>In many areas, residents who have the ability to to install solar on their own buildings (i.e., property ownership, appropriate roof orientation, and capital access) receive retail rate compensation for solar on their roofs do so through net metering. In areas where retail net metering is in place, extending this benefit to community solar subscribers who are unable or unwilling to install solar on their own homes ensures they will receive the same financial benefits as households with rooftop arrays. Since members of historically marginalized communities are more likely to rent and to have low and moderate incomes, retail rate net metering for community solar ensures a basic level of equity between solar-ready homeowners and historically marginalized community members who subscribe to community solar.</p> <p>Additionally, retail rate net metering is usually adequate to finance and develop community solar. This is the simplest option that offers a viable rate in most areas.</p> <p>Some areas have experimented with developing a Value of Solar (VOS) or Value of Distributed Energy Resources (VDER) rate, which attempts to calculate the actual value that solar provides to society by estimating avoided fuel, power plant and distribution infrastructure, avoided operations and maintenance costs, avoided environmental costs, and other factors. In principle, this is an excellent model as it ensures that community solar participants are fairly compensated for the value their subscription provides to society while also ensuring that other customers are not unfairly charged. However, Value of Solar calculations are inherently complex and are often at best approximations of real value, which will vary substantially between geographic locations, times of day and year, and a wide range of other unknown variables that may evolve over the 25-year life of a solar array. Many areas that have attempted to implement Value of Solar or similar proceedings have found the process overly complicated, lacking in public transparency and accountability, and rates for community solar that result in no project development.</p>
<p><i>Examples / further reading</i></p>	<p>Retail rate net metering for community solar (retail rate virtual net metering)</p> <ul style="list-style-type: none"> • <u>Net metering changes allow Ashland, Oregon residents to build community and offsite solar projects</u> <p>Value of Solar:</p> <ul style="list-style-type: none"> • Austin Energy <u>Value of Solar</u> • Minnesota <u>Value of Solar</u> <p>Value of Distributed Energy Resources:</p> <ul style="list-style-type: none"> • New York: <u>Value of Distributed Energy Resources</u> • <u>Is New York's "Compromise" the Future for Net Metering?</u>

<i>Set by legislation or through program implementation</i>	Legislative
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8.

Topic	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Maintain stable and predictable rate structure over the life of a solar garden (or at least many years of development)
<i>Recommended policy or program guidance</i>	Retail rate net metering
<i>Other plausible policy or program guidance</i>	Establish a rate schedule for the duration of the project: Lock in current retail rate, VOS, or feed-in tariff, and apply annual escalator
<i>Not recommended policy or program guidance</i>	Value of solar or other feed-in tariff that is recalculated annually with revised values applying to existing projects
<i>Rationale for recommendation</i>	<p>The recommended policy of retail rate net metering creates security for subscribers that their bill credits will likely cover utility costs. It also offers a simple and clear rate that works well for marketing and political purposes. Since the retail rate fluctuates, however, it creates some financing uncertainty.</p> <p>The plausible policies may work just as well or better in specific contexts. While a fixed rate schedule over 25 years creates financing stability with clearly known revenues, it may not correlate well with retail rates.</p> <p>These options mitigate or eliminate the risk that rate structures change suddenly or without warning. While adjustments to the rate structure are acceptable for new sets of proposed projects year-to-year, a stable development environment with low risk of major rate swings for future proposed projects is essential to develop a mature, stable industry and prevent booms and busts in development, which may cause bankruptcies or incentivize bad actors or create other negative effects.</p>
<i>Examples / further reading</i>	<p>Maryland's regulations (20.62.02.04.D) define compensation as covering all volumetric portions of the cost of service.</p> <p>Minnesota's Value of Solar offers a predictable schedule of tariffs for community solar based on a fixed set of escalators</p>
<i>Set by legislation or through program implementation</i>	Legislative

9.

	Description
<i>Content area</i>	Compensation
<i>Objective</i>	Compensate unsubscribed energy at a fair base rate that provides a meaningful incentive to subscribe
<i>Recommended policy or program guidance</i>	Wholesale rate plus transmission value (60 - 70% of retail rate)
<i>Other plausible policy or program guidance</i>	Value of solar Pre-existing feed-in tariff rates
<i>Not recommended policy or program guidance</i>	Avoided cost
<i>Rationale for recommendation</i>	<p>Ensuring fair but not excessive compensation for energy that is not subscribed by a customer is essential for financeability while also providing an incentive to recruit subscribers. If rates for unsubscribed energy are too low, it creates unacceptable financing risks and makes it hard for projects to be developed. It also provides electricity to the utility at unfairly low rates. At the same time, the compensation rate for unsubscribed energy should be significantly different from the rate for subscribed energy so that developers/operators have clear incentive to maintain the community nature of a project by maintaining an active base of subscribers.</p> <p>Since the energy generated by a community solar project offsets other energy supplied at the wholesale rate as well as the need to transmit energy over long-distance transmission lines (because it is produced on the local distribution grid), compensation based on the wholesale energy rate plus the transmission component of electricity costs avoids windfall utility profits, and yet is likely far enough below retail to motivate developers to maintain a full subscription.</p> <p>If an area decides to use a Value of Solar approach to baseline compensation, this could also be a fair rate to compensate unsubscribed energy, assuming subscribed energy has other adders for residential/low- and moderate-income participation, preferable siting, etc. Since the value of solar is complex and political fraught to calculate, doing so in a small jurisdiction is particularly challenging. Value of solar offers large solar programs, however, a tool to balance fairness across utilities and third parties.</p>
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Legislative

Consumer Participation

10.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Simplify billing and repayment for subscriber
<i>Recommended policy or program guidance</i>	Allow collection of subscriber payments to the developer on a utility bill alongside delivery of utility bill credits
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Eliminates the “two-bill” problem for customers - receiving one bill from the utility and a separate bill from the community solar developer, which is confusing, even though the net cost is lower than prior to community solar. On-bill billing creates repayment certainty by including subscriber payments on the same utility bill, which have very low rates of non-payment.
<i>Examples / further reading</i>	See recommendation by the Coalition for Community Solar Access (CCSA) (pg. 16)
<i>Set by legislation or through program implementation</i>	Both (depends on existing rules)

11.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Ensure subscribers get full bill credit for the time they’re enrolled in the program, including partial months Eliminate frictions for renters
<i>Recommended policy or program guidance</i>	Provide bill credits for any portion of the month that a subscriber is subscribed AND back-date credits for replacement subscribers to the date the first subscriber left
<i>Other plausible policy or program guidance</i>	Subscribers receive bill credits based on the allocation of subscription benefits within a project at the beginning of the month. This ensures subscribers are not required to receive service at that address for the entirety of the whole month to receive the full month’s credits

<i>Not recommended policy or program guidance</i>	Provide bill credits only for subscribers who are enrolled for the full calendar month. Pro-rate bill credits for subscribers who leave for their partial month, but only give credits to a replacement subscriber starting on the 1st of the following month (or the date they sign)
<i>Rationale for recommendation</i>	This policy minimizes losses due to subscriber turnover. If a subscriber moves from one eligible address to another, and their subscription changes locations mid-month, they should not lose that month's benefits simply because of the change. Failing to pay for credits due to turnover disadvantages renters and other highly mobile populations. It also adds collections risk for project operators, making it harder to finance projects.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

12

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Accommodate changes in address
<i>Recommended policy or program guidance</i>	All subscribers can move addresses within service territory/ geographic area without losing subscription or facing a gap in coverage
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	Subscriber must wait weeks or months - and lose bill credits in the process - to have their subscription verified (e.g., resized based on energy usage or estimated square footage at the new address) and added at a new address. Subscriber cannot change address and keep their subscription.

<i>Rationale for recommendation</i>	<p>This policy cuts down on the administrative headaches for the subscriber and the developer, and ensure neither loses bill credits.</p> <p>Once a subscriber has a valid subscription, they should either not be required to resize their subscription if they move, or the resizing should be conducted in such a way that subscriber retains original benefits and subscription until resizing is completed and not experience a gap in coverage. In some existing programs, subscribers are not eligible to receive credits at a new address until they have completed a new address validation, which can take weeks or months, meaning the subscriber and the operator lose bill credits and revenue during this time.</p>
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program (possible legislative enabling)

13.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Improve user experience: Simplify subscriber sign-up and validation process
<i>Recommended policy or program guidance</i>	Subscriber is able to complete subscription and sizing in one step; or, if they prefer, complete certain parts and come back later without pressure to commit immediately
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Delays in the subscription sign-up process can make it hard for subscribers to stay in contact and retain understanding and interest around the subscription offer (e.g., if the utility waits weeks to provide information as to how many kilowatts the subscriber is eligible for). At the same time, forcing a subscriber to complete the entire subscription process all at once prevents the opportunity for deliberation and thoughtful evaluation that some subscribers need to ensure that a community solar project is right for them. Ideally, a subscriber would be able to complete a subscription (including any sizing) in one step if they prefer; or to complete certain parts and come back later without pressure to commit immediately

<i>Examples / further reading</i>	See Colorado low-income-verification form , Colorado's criteria , and the Low-Income Solar Policy Guide (pg. 6). See the Connecticut Green Bank's options for LMI eligibility .
<i>Set by legislation or through program implementation</i>	Program

14.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Improve user experience: Allow sign up through multiple methods
<i>Recommended policy or program guidance</i>	Multi-mode options for signing up (e.g., online, mail-in, in-person)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Minimize barriers to access. Different subscribers will prefer to use online, mail-in, and in-person forms of subscription offer evaluation and sign-up
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

15.

Topic	Description
<i>Content area</i>	Consumer participation
<i>Objective</i>	Verify income without placing undue burden on low- and moderate-income subscribers or project operators, while ensuring reasonable balance between false positives (giving the adder to non-LMI households) and false negatives (denying the adder to LMI households)

<i>Recommended policy or program guidance</i>	Provide various paths to income verification, including residence in targeted census blocks, or enrollment in any of the following assistance programs: Low Income Home Energy Assistance Program (LIHEAP), Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), Earned-Income Tax Credit (EITC), or certain needs-tested Veterans benefits. Allow income-qualified housing and public housing to bulk enroll residents to a community solar program and pass through benefits to all residents
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	<p>A clear, simple standard for determining eligibility for LMI subscribers is essential for minimizing the burden of income verification on subscribers and project operators. Such a standard also improves the predictability of the proportion of subscribers who qualify for the adder, which affects the profitability and financeability of the project.</p> <p>This approach raises questions about whether income would have to be verified on an ongoing basis and increases risk that project-verified adders may not be secured if the income of subscribers changes over time, which makes financing harder.</p> <p>Accuracy may not be the ultimate goal, but rather a desirable balance between false positives (giving the adder to non-LMI households) and false negatives (denying the adder to LMI households)</p>
<i>Examples / further reading</i>	<p>“Getting SMART: Making sense of the Solar Massachusetts Renewable Target (SMART) program” See also the Massachusetts SMART low-income adder rules</p> <p>See also “Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers.” NREL (2018), pg. 19-25</p>
<i>Set by legislation or through program implementation</i>	Legislative

16.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Share the financial benefits of solar subscriptions
<i>Recommended policy or program guidance</i>	Allow commercial, residential, and nonprofit subscribers on the same array
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Allowing many types of energy users to participate in a program broadens the base of support and allows more types of subscribers to receive benefits of program. It also allows more effective community-based project development; for example, by reaching more residential subscribers who are connected with a local business, community organization, or place of worship that also subscribes. Additionally, allowing larger commercial subscribers in the same solar project as residents and small businesses can strengthen financeability of projects.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program (possible legislative enabling)

17.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Distribute financial benefits of solar subscriptions
<i>Recommended policy or program guidance</i>	Require at least 3 subscribers per garden. Limit initial base subscription by any one customer to no more than 40% of the garden
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Avoids models with just a few large corporate/organizational subscribers while still allowing small community solar projects where only a handful of subscribers can participate due to limited capacity.

<i>Examples / further reading</i>	See " Focusing the Sun: State Considerations for Designing Community Solar Policy ." NREL (2018), pg. 11-13
<i>Set by legislation or through program implementation</i>	Legislative (usually)

18.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Promote financial stability of projects by allowing backup subscribers
<i>Recommended policy or program guidance</i>	While capping initial base subscription by any one subscriber at 40%, allow backup subscribers: Permit any single subscriber to take up to 50-60% of project kWh generated on an annual basis
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Back-up subscribers - subscribers that are able to accept additional kilowatts in a period in which another subscriber terminates, leaves the area, or defaults - significantly strengthen the financeability of community solar projects by ensuring a subscriber will be on hand if another subscriber vacates capacity. Making back-up subscriptions flexible enables the back-up subscriber model to exceed 40% for short periods in which there is a vacancy of residential or small commercial subscribers. This allows offering subscriptions to low- and moderate-income and low-credit individuals as financiers can be assured of an available back-up subscriber whose subscription can be temporarily increased to use the energy made vacant until a new residential or small business subscriber can be secured.
<i>Examples / further reading</i>	See " Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers ." NREL (2018), pg. 11-14 for strategies to reduce customer turnover and default risk.
<i>Set by legislation or through program implementation</i>	Legislative (usually)

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Ensure LMI households and households of other historically marginalized communities have full access to benefits of the program
<i>Recommended policy or program guidance</i>	Community Solar Advisory Committee (CSAC) works with muni to set a program-wide 'community standard' for participation of residential subscribers, LMI residents, communities of color, small business subscribers, and historically disenfranchised communities as a percentage of subscribed community solar program capacity, or as an absolute number of subscribers (e.g., 1,000 or 20% of subscribers are priority subscribers). (See CSAC insert on page 36 for full description of the committee.)
<i>Other plausible policy or program guidance</i>	<p>Escalating cap: After first year of development, if program is not achieving participation goals, cap development of projects that are not seeking to increase (above the percentage of program participation goals) the portion of service to residential, low- and moderate-income, and small business participation and do not cap projects that do serve those demographics until the program is in compliance with goals.</p> <p>Require developers meet a certain proportion of residential and/or low- and moderate-income to qualify for the program. This is especially important in the event there is a program cap</p>
<i>Not recommended policy or program guidance</i>	<p>Require that developers meet a certain portion of residential/ low- and moderate-income participation on a per project basis</p> <p>Muni sets community standards</p>
<i>Rationale for recommendation</i>	<p>Establishing a community advisory body to review and set standards for community solar development will help ensure that community solar proceeds in accordance with community goals. Setting such goals with an advisory body to ensure progress towards them creates an incentive for equity, access, and community benefit; requirement is only viable if it provides access to bill credits/other incentives that enable low- and moderate-income/residential access</p> <p>Community standards will be used to determine thresholds for participations, prioritizing projects, setting adder rates, etc. Each community will need to establish their own standard.</p>

<i>Examples / further reading</i>	See also " Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers. " NREL (2018), pg. 28-32 for strategies to engage LMI customers
<i>Set by legislation or through program implementation</i>	Both

20.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Ensure LMI households have full access to benefits of the program
<i>Recommended policy or program guidance</i>	Stipulate screening mechanisms developers cannot use to limit participation by LMI households (e.g., credit score, income)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	In many existing programs, developers screen potential subscribers based on credit score, income, or other factors, largely due to financier preference to serve these types of customers. Prohibiting such discriminatory screening at the policy level can help ensure that financiers and developers that wish to participate do not create standards that de facto exclude low- and moderate-income community members.
<i>Examples / further reading</i>	n/a See " Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers. " NREL (2018), pg. 10-11
<i>Set by legislation or through program implementation</i>	Legislation

21.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Accommodate changes in electricity usage
<i>Recommended policy or program guidance</i>	No requirement to resize subscriber eligibility based on energy usage changes within the same address. Subscriber is allowed to increase subscription if solar capacity is available if their energy use increases.

<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	If a subscription is limited based on subscriber use, the subscriber should not be required to resize their subscription if their energy use within the same property goes up or down; once their eligibility is verified, that subscription size is locked in. Otherwise, developers would face substantial uncertainty about whether their garden would remain full just based on changes in subscriber usage patterns. Similarly, requiring subscribers to resize their subscription if their energy use changed would inhibit incentives to increase energy efficiency and would impose an undue administrative burden on subscribers and program operators.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program (usually)

22.

Topic	Description
<i>Content Area</i>	Consumer Participation
<i>Objective</i>	Expedite subscriber transitions
<i>Recommended policy or program guidance</i>	Utility must allow developer to adjust subscription base in a real-time basis with clarity on when change in bill credit rights will occur
<i>Other plausible policy or program guidance</i>	Utility must allow developer to adjust subscription base in a monthly basis with clarity on when change in bill credit rights will occur, and that ensures the full month of credit is allocated to subscribers
<i>Not recommended policy or program guidance</i>	Allow changes in subscriptions only periodically (e.g., every 6 months)
<i>Rationale for recommendation</i>	Crucial to minimizing losses during subscriber transitions and ensuring that new subscribers can sign on and expediently receive benefits. This also enables a back-up subscriber strategy. Utility must have a system by which subscribers and allocations can be updated at any time so that subscriptions do not get out of whack with eligible customers.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

23.

Topic	Description
Content Area	Consumer Participation
Objective	Allow individual subscriber to subscribe to more solar than they consume
Recommended policy or program guidance	Subscribers eligible to subscribe to up to 120% of annual usage
Other plausible policy or program guidance	Subscribers eligible to subscribe to up to 100% of annual usage. Do not limit subscription size based on usage.
Not recommended policy or program guidance	n/a
Rationale for recommendation	Allow subscribers to secure an amount of solar that ensures their bill nets to zero over the full 25-year life of the project (since solar production will degrade approximately 20% over the 25 year project life)
Examples / further reading	This is true of most state net metering policies.
Set by legislation or through program implementation	Legislative (usually)

Program Structure

24.

Topic	Description
Content Area	Program Structure
Objective	Create community standards for advancing equitable community solar
Recommended policy or program guidance	Delegate the development of community standards to the Community Solar Advisory Committee. Use the community standards as criteria to prioritize projects and target areas. (See CSAC insert on page 36 for full description of the committee.)
Other plausible policy or program guidance	n/a
Not recommended policy or program guidance	n/a
Rationale for recommendation	Each community must define for itself equity and how to achieve it. A formal process for doing so through the CSAC must center the participation of frontline communities.

<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	TBD

25.

Topic	Description
<i>Content Area</i>	Program Structure
<i>Objective</i>	Implement a project selection process that gives community developers a chance at competing with for-profit development
<i>Recommended policy or program guidance</i>	<p>Implement a project selection process with the following steps:</p> <ul style="list-style-type: none"> A. All projects that meet program requirements and deadlines are approved and grouped into batches (e.g., there are no program caps) B. Approved projects within a batch are ranked based on community standards around participation and local ownership; highest ranked projects are prioritized for interconnection and bureaucratic support
<i>Other plausible policy or program guidance</i>	If there is a cap, use community standards to prioritize projects for approval in alignment with any adders that incentivize certain types of projects. Approve top-ranked projects.
<i>Not recommended policy or program guidance</i>	If there is a program cap, do not hold a lottery or create a need for expensive pre-development prior to award
<i>Rationale for recommendation</i>	<p>The batch approval process prioritizing community standards enables the most community-aligned projects to move forward in an expedited manner without jeopardizing opportunities for other developers. It is essential for a scaled program unless the capacity cap is very high. In a program with a capacity cap, a free-for-all application process will advantage large/out-of-state/established developers over community-sourcing, privileging volume, existing firms, and developers with capacity to handle pre-development expenses.</p> <p>In a program with a capacity cap, it is especially important the process for approving projects avoid the following elements:</p> <ul style="list-style-type: none"> A. A lottery that privileges developers with volume B. First-come-first-serve protocol that privileges developers with capacity to move fast C. Require significant pre-development expenses prior to awarding a project that privileges wealthy developers
<i>Examples / further reading</i>	n/a

<i>Set by legislation or through program implementation</i>	Program
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26.

Topic	Description
<i>Content Area</i>	Program Structure
<i>Objective</i>	Make it easy for all developers, including community-based developers, to identify sites based on grid capacity
<i>Recommended policy or program guidance</i>	Require the local grid operator to provide transparent “hosting capacity” data that includes: how many megawatts of solar can be added to which distribution feeder lines, where those lines are located, and the utility service territory of each line
<i>Other plausible policy or program guidance</i>	Grid operator pre-selects and publically identifies sites for development that have adequate capacity on local feeder lines
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Important to streamline effort to develop projects in viable locations. Without transparency into viable grid locations, communities and developers can spend significant resources attempting to develop sites that prove unviable. This is especially burdensome to community-based development efforts.
<i>Examples / further reading</i>	Xcel Energy’s Minnesota subsidiary provides a minimally detailed hosting capacity map ; California investor-owned utilities also provide online maps (registration required)
<i>Set by legislation or through program implementation</i>	Program

27.

Topic	Description
<i>Content Area</i>	Program Structure
<i>Objective</i>	Streamline application and interconnection process
<i>Recommended policy or program guidance</i>	Develop municipal utility capacity to run accountable, streamlined application and interconnection process
<i>Other plausible policy or program guidance</i>	Hire third-party to administer interconnection process while hosting utility builds capacity
<i>Not recommended policy or program guidance</i>	n/a

<i>Rationale for recommendation</i>	Third party management can be valuable to avoid unnecessary expense and delay if utility lacks experience or is reluctant to streamline the program; however, it is not essential if the host utility is both experienced and supportive.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program (usually)

Other

28.

Topic	Description
<i>Content Area</i>	Other
<i>Objective</i>	Ensure program transparency
<i>Recommended policy or program guidance</i>	Require utility to issue periodic, public reports on developments, subscribed capacity, distribution of benefits, and subscriber demographics as requested by the Community Solar Advisory Committee. (See CSAC insert on page 36 for full description of the committee.)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	This reporting will inform CSAC and encourage public accountability.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

29.

Topic	Description
<i>Content Area</i>	Other
<i>Objective</i>	Ensure accountable governance of program

<i>Recommended policy or program guidance</i>	Task the Community Solar Advisory Committee with reviewing outcomes and identify changes to program design. Prioritize participation in CSAC by historically marginalized communities. Require body governing municipal utility (e.g., City Council or municipal utility board) hold a public vote on any formal CSAC recommendations to modify program structure. (See CSAC insert on page 36 for full description of the committee.)
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Centers frontline communities and adds oversight capacity to city councils with many other issues competing for their time. Helps equip grassroots community groups to understand and guide local development decisions and ensure that projects developed help meet local needs.
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

30.

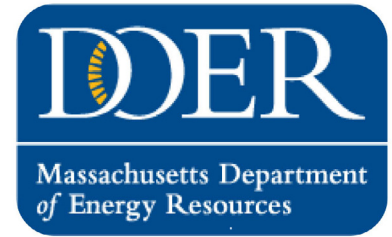
Topic	Description
<i>Content Area</i>	Other
<i>Objective</i>	Require that community solar is considered within a municipal utility's IRP or cost of service studies
<i>Recommended policy or program guidance</i>	Require that community solar policies be considered in utility long-term planning processes (e.g., cost of service study, IRP-like situations), especially in coordination with Joint Action Agency planning processes
<i>Other plausible policy or program guidance</i>	n/a
<i>Not recommended policy or program guidance</i>	n/a
<i>Rationale for recommendation</i>	Large scale resources get considered most often for municipal utilities at the Joint Action Agency level; a city could promote smaller scale resources via a policy that these options be wrapped into muni's planning processes
<i>Examples / further reading</i>	n/a
<i>Set by legislation or through program implementation</i>	Program

Case Study / Example - Adders

The [Solar Massachusetts Renewable Target Program](#) (SMART) includes a set of adders to incentivize several community solar attributes. These include off-taker adders, a location based adder, and an energy storage adder. Each adder is worth between 1 and 6 cents per kilowatt hour.

Using adders, the state of Massachusetts has incentivized community solar installations that promote both equitable access to renewable energy and sustainable land use decisions. A 2018 policy, it is still undergoing revision to work more effectively.

While the SMART program applies to Massachusetts investor-owned utilities, the adder system could be adapted to projects owned by municipal electric utilities or by 3rd parties in jurisdictions with munis.



Case Study / Example - Threshold for Workforce Utilization

Illinois' [Future Energy Jobs Act](#) (FEJA) creates a plan to get Illinois to a cleaner, more resilient energy system. It has created programs for renewable energy development, energy efficiency improvements, and workforce training and utilization.

The energy workforce stipulations under FEJA allocate funding for job training, which will be done by "[community-based, diversity-focused organizations](#)." As renewable energy project development ramps up through FEJA, including community solar installations, local job training ensures that people are not being left behind in the renewable energy shift.



Case Study / Example - Transparent Grid Operator Data

Investor-owned Xcel Energy provides a [hosting capacity map](#) for Colorado and Minnesota. With this estimate of the hosting capacity for additional distributed energy, developers can more easily identify project sites. Hawaiian Electric also offers grid [locational value maps](#) for Oahu, Maui County, and Hawaii Island to help customers plan distributed generation projects.

Having this capacity hosting information freely available will help smaller-scale developers, who may find information request fees prohibitive to rapid deployment.



CSAC description

The Community Solar Advisory Committee (CSAC) is a governance body of community members and representatives from the municipal electric utility and local government that is authorized to oversee a community solar program. It will work closely with the municipal electric utility to track key metrics and recommend program reforms. Equitable community solar legislation will require the local regulator of the municipal electric utility, often city council, to hold a public vote on all formal recommendations from the CSAC. The CSAC will prioritize membership of historically marginalized communities.

The CSAC is to work with the muni to set a program-wide 'community standard' for participation of residential subscribers, LMI residents, communities of color, small business subscribers, and historically disenfranchised communities, including priority census blocks, as a percentage of subscribed community solar program capacity, or as an absolute number of subscribers (e.g., 1,000 or 20% of subscribers are priority subscribers). These community standards will guide project prioritization and serve as a working definition of what constitutes an 'equitable' community solar program in that area.

The CSAC will provide oversight and accountability by requesting from the utility periodically, public reports on developments, subscribed capacity, distribution of benefits, and subscriber demographics. CSAC will review these outcomes and recommend modifications to the program for the regulator to vote on.

Adder summary

This paper recommends rate adders to incentivize development consistent with the principles of equitable community solar. The adders apply to projects with some or all of the following elements:

- Cooperative/community ownership structure
- Hiring local, minority, and women workers in the development, construction, and O&M phase
- Siting consistent with smart growth principles
- Offtakers:
 - Participation of low- and moderate-income households
 - Participation of households in priority census block groups identified by the CSAC

Appendix C - Municipal Community Solar in Cleveland - Economic Impacts

Methodological Notes:

The calculation for the economic impact analysis utilized a researcher-modified Jobs and Economic Development Impact (JEDI) model developed by NREL. Specifically, it used inputs from IMPLAN (IMpact Analysis for PLANing) version 3.1 and NREL's U.S. Solar Photovoltaic System Cost Benchmark reports, among other sources, to calculate the total economic impact for community solar projects of 10 MW and 50 MW fixed-mount arrays in Cleveland, Ohio, a city with a municipal electric utility.

Other specifications and assumptions include the following:

- Module and inverter costs (typically noted as 'hard costs') are constant per watt, regardless of project size. Mounting, electrical, installation, permitting, and business overhead exhibit increasing returns to scale.
- Used entire state model since Cleveland may not have supply to have 100% local labor, materials, etc. Assumed that mounting and electrical equipment, modules, inverters, and maintenance materials are all manufactured locally. These are reasonable assumptions based on a survey of Ohio's manufacturing capacity.
- Payroll parameters using the Occupational Employment and Wage Estimates from BLS.
- Jobs are defined as full-time equivalents (FTE), or 2,080-hour units of labor (i.e., one construction period job equates to one full-time job for 1 year).

Summary of Costs from Economic Modeling

	10 MW	50 MW
Project Construction or Installation Cost	\$11,982,300	\$53,645,376
Direct Operating and Maintenance Costs	\$522,123	\$2,418,105

Construction Phase Economic Impacts, 10 MW Scenario

	Jobs	Earnings	Value Added	Economic Impact
Construction and Installation Impacts	37	\$2,537,300	\$2,805,700	\$3,246,200
Module and Supply Chain Impacts:				
<i>Manufacturing Impacts</i>	22	\$1,763,000	\$2,892,300	\$8,347,800
<i>Trade (Wholesale and Retail)</i>	10	\$661,400	\$1,178,700	\$1,909,800
<i>Professional Services</i>	3	\$167,200	\$280,900	\$470,700
<i>Other Services</i>	7	\$644,800	\$1,061,200	\$1,795,800
<i>Other Sectors</i>	12	\$213,400	\$492,800	\$876,000
Induced Impacts	31	\$1,536,200	\$2,678,100	\$4,600,600
Total Impacts	121	\$7,523,200	\$11,389,700	\$21,247,000
Multiplier	3.27	2.97	4.06	6.55

O&M Phase Economic Impacts, 10 MW Scenario

	Jobs	Earnings	Value Added	Economic Impact
Direct Effect	1.5	\$87,000	\$87,000	\$87,000
Indirect Effect	0.5	\$35,000	\$57,500	\$121,700
Induced Effect	0.4	\$18,900	\$32,900	\$56,500
Total Effect	2.3	\$140,800	\$177,300	\$265,100
Multiplier	1.53	1.62	2.04	3.05

Construction Phase Economic Impacts, 50 MW Scenario

	Jobs	Earnings	Value Added	Economic Impact
Construction and Installation Impacts	171	\$11,535,500	\$12,658,500	\$14,149,600
Module and Supply Chain Impacts:				
<i>Manufacturing Impacts</i>	101	\$8,293,400	\$13,683,500	\$38,792,000
<i>Trade (Wholesale and Retail)</i>	44	\$2,967,400	\$5,288,900	\$8,569,900
<i>Professional Services</i>	10	\$566,700	\$966,400	\$1,610,100
<i>Other Services</i>	27	\$2,676,300	\$4,404,800	\$7,453,600
<i>Other Sectors</i>	52	\$945,500	\$2,289,000	\$4,206,600
Induced Impacts	137	\$6,731,300	\$11,734,400	\$20,158,600
Total Impacts	542	\$33,716,100	\$51,025,600	\$94,940,400
Multiplier	3.17	2.92	4.03	6.71

O&M Phase Economic Impacts, 50 MW Scenario

	Jobs	Earnings	Value Added	Economic Impact
Direct Effect	7	\$434,900	\$434,900	\$434,900
Indirect Effect	3	\$174,500	\$286,400	\$606,600
Induced Effect	2	\$93,800	\$163,600	\$281,000
Total Effect	12	\$703,200	\$884,900	\$1,322,500
Multiplier	1.71	1.62	2.03	3.04

Appendix D - Resources to inform collaborations that promote equitable community solar

Preparing for the arrival of community solar in an intentional way is critical to the successful roll out of the program. Community solar is not a business-as-usual municipal energy decision. Rather, it is a vehicle to alter the source of electricity, to maximize community access to its benefits, and to enable direct community control of those generation assets. In some cases, collaborations with a municipal utility or community choice provider can increase program impacts and lasting benefits.

Pre-development working groups of public-sector representatives, utility representatives, business leaders, and community leaders can address policy, market, and financial barriers to new community solar programs. Once a program is mapped out, transitioning an ad hoc pre-development group into a more formal governance structure like the Community Solar Advisory Council described in this report can also bring increased transparency and equitable opportunities for community solar, and become a catalyst for other strategies for making a just transition to a clean energy economy.

Pre-development support could include education campaigns to community-facing agencies and nonprofits on the coming program, connecting with local zoning officials to ensure that local zoning codes are accommodating, and establishing loan guarantees or other financial supports for community-owned enterprises involved in project development.

By working with municipal utilities and community institutions, community solar planners may also access public funding or in-kind services, or upstream support from joint action agencies or others in utility and institutional networks. Rocky Mountain Institute and others have [documented](#) savings from pooling efforts to support community-scale solar development.

Below is a brief list of other resources to inform community solar working groups and program supporters.

Policy guidance & program implementation

Clean Energy States Alliance (CESA)

- [Consumer Protection For Community Solar](#)
- [Bringing the Benefits of Solar Energy to Low-Income Consumers](#)
- [Solar with Justice](#)

Coalition for Community Solar Access (CCSA)

- [Community Solar Policy Decision Matrix](#)

Community Solar Value Project (CSVP)

- [Solutions](#)

Interstate Renewable Energy Council (IREC)

- [Shared Renewables for Low-to-Moderate Income Consumers](#)

Institute for Local Self Reliance (ILSR)

- [Beyond Sharing](#)

National Renewable Energy Laboratory (NREL)

- [Up to the Challenge: Communities Deploy Solar in Underserved Markets](#)
- [Design and Implementation of Community Solar Programs for Low- and Moderate-Income Customers](#)
- [Low-Income Community Solar: Utility Return Considerations for Electric Cooperatives](#)
- [Focusing the Sun: State Considerations for Designing Community Solar Policy](#)

NC Clean Energy Technology Center

- [Community Solar Opportunities for Low-to-Moderate Income Households in the Southeast](#)

Smart Electric Power Alliance (SEPA)

- [Community Solar Program Design Models](#)

Vote Solar

- [Low-income Solar Policy Guide](#)

Project resources

Elevate Energy

- [Community Solar Business Case Tool](#)

Rocky Mountain Institute (RMI)

- [Shine™ Solar Procurement Framework](#)

Solar United Neighbors

- [Starting a project in your community](#) (Maryland example)

Consumer Education & Support

Solar Energy Industries Association (SEIA)

- [Residential Consumer Guide to Community Solar](#)
- [Guide to Land Leases for Solar](#)

Solar United Neighbors

- [Shopping for Community Solar flyer](#) (Maryland example)