



Bringing Community Solar to a Broader Community

Working Draft

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Executive Summary

The recent decline in solar costs has led to a solar development boom in the United States, yet there is unmet demand for solar from low- and moderate-income households. Shading, geographic location, or in the case of renters, lack of ownership, may preclude rooftop solar projects. But financial considerations also inhibit the ability of many households who lack access to upfront funds to cover the high upfront costs of solar installation, and do not have the tax appetite to utilize the federal Investment Tax Credit (ITC). There is substantial interest in solar energy, particularly community solar, as an invaluable tool to serve these households—many models require no money down, no rooftop ownership, and no tax credit appetite. However, the market remains underserved. A better understanding of the obstacles that low- and moderate-income households face in transitioning to solar, and community solar in particular, will help us identify potential solutions to those obstacles.

Community solar refers to centrally-located solar photovoltaic systems that provide electricity for participating customers. A community solar garden is similar to a community vegetable garden, where households harvest individual plots within a shared parcel of land. Likewise, community solar customers subscribe to a share of a community solar “garden” to cover a portion of their annual electricity usage. Each subscriber’s utility bill is then credited with the electricity created by their share of the community solar garden. Community solar thus provides a unique opportunity for those who lack the ability or interest to construct a rooftop solar system to nonetheless benefit from the long-term advantages of a solar energy option— no fuel cost, no moving parts, and no emissions.

The ability to hedge electricity costs against rising prices through participation in community solar programs is a valuable benefit for low- and moderate-income households—“low-income” and “moderate-income” are defined by the United States Department of Housing and Urban Development as 50% of area median income and 80% of area median income, respectively.¹ Home

energy costs fluctuate widely based on numerous factors in the crude oil market, including supply and demand, geo-political events, and weather occurrences.ⁱⁱ In Minnesota, home energy costs account for 32 percent of income for households below 50 percent of the federal poverty guideline.ⁱⁱⁱ Further, a 2015 study by the Minnesota Department of Health and the Minnesota Pollution Control Agency recommended increased energy efficiency measures to help resolve disproportionate levels of heart and lung problems in children and families in low-income neighborhoods.^{iv} Investments in community solar programs can help create a healthier community by promoting clean, renewable energy, displacing dirtier forms of electricity generation.



Several states have explored options to allow more low- and moderate-income households to access solar. Organizations in Colorado, New York, California, Minnesota, and Washington, D.C. have proposed or implemented various low-income community solar programs. This paper discusses those programs in order to identify best practices to bring community solar within reach of low- and moderate-income communities.

Low-Income Community Solar Project Models

Colorado

In May 2015, Grand Valley Power, an electric cooperative in western Colorado, and GRID Alternatives, a nonprofit working to expand low-income access to solar power, launched a new community solar project that serves eight low-income families.^v Housing Resources of Western Colorado, Atlasta Solar, and Alpine Bank provided financial support, and SunEdison, Enphase Energy, and IronRidge donated equipment. Touted as the first of its kind in the United States, the 29 kilowatt (kW) pilot project is dedicated entirely to low- and moderate-income households.

The innovative project involved the community in two distinct ways: in construction, by pairing low-income participants with job trainees, community college students, and solar developers; and in implementation of the program, by a vetting process through Housing Resources of Western Colorado, a local nonprofit. Participants must earn no more than 80% of the area median income to qualify for the project. Participating customers do not pay an upfront cost, but do pay a 2 cent/kilowatt-hour (kWh) fee to cover management costs. Subscribers receive a net metering bill credit for four years, after which the subscription is assigned to another qualifying household. These four-year rotations are estimated to save each household about \$600 in electricity costs each year, and are intended to give low-income families a temporary but sustained boost in financial standing.

While the project was carried out by a nonprofit organization and a cooperative utility, Grand Valley Power and GRID Alternatives maintain that the model could prove valuable for utilities and developers of all types. Their model was recognized in August 2015, when the Colorado Energy Office announced a \$1.2 million grant to GRID Alternatives to continue its low-income community solar work.^{vi} The grant will allow more than 1 megawatt (MW) of new community solar development



in cooperation with various utilities throughout the state, reaching at least 300 low-income households.

New York

In July 2015, the New York Public Service Commission approved a Shared Renewables Program, similar to a community solar model but with multiple eligible renewable energy technologies, including solar and wind.^{vii} Although the Shared Renewables Program is not exclusively intended for low-income customers, it includes several procedural steps to ensure low- and moderate-income participation.

“Phase 1 projects,” or those projects that will be interconnected first, must be consistent with at least one of two stated goals of New York’s Reforming the Energy Vision (REV) program: areas where projects will bolster grid reliability (areas comprising at least 40% of a utility’s service territory) to maximize the benefit from local power production, and those that promote low-income customer participation (i.e., at least 20% low-income membership, defined as a customer participating in an energy assistance program or a utility-administered low-income discount program). Low-income participation thus is not an absolute requirement, but one of two options that a project may meet to be approved. Phase 1 will begin on October 19, 2015 and run until April 30, 2016.

Phase 2 of the Shared Renewables Program will commence on May 1, 2016 and open the application process to all other projects not meeting the Phase 1 project criteria. Phase 2 will also establish the Low-Income Customer Collaborative, a group dedicated to encouraging low-income customer participation in community solar programs. The collaborative will include the New York State Energy Research and Development Authority, low-income community organizers, utilities, and other interested stakeholders. The group will examine potential financial barriers and identify possible mechanisms to encourage low-income participation. By the Public Service Commission’s Order, the Collaborative is required to issue a report of its findings by January 15, 2016.^{viii}

A low-income shared solar pilot project is also being developed in New York City between UPROSE and Solar One.^{ix} As of October 2015, few details were available. The project will exclusively serve low-income families in the Sunset Park neighborhood of Brooklyn.

California

Established in 2008, California's Multifamily Affordable Solar Housing (MASH) Program provides solar incentives on qualifying affordable multifamily housing buildings.^x MASH was created by the California Public Utilities Commission using a portion of ratepayer funds set aside expressly for low-income residential solar projects.^{xi} Among the primary goals of MASH are stimulation of solar power in the affordable housing sector and improving the overall quality of affordable housing through the application of solar and energy efficiency technologies. To date, MASH has enabled 22.7 MW of solar capacity across 353 multifamily affordable projects statewide.^{xii}

SolarCity announced a new community solar project in California in September 2015, facilitated largely by the state's MASH program.^{xiii} SolarCity will finance and install solar power systems on rooftops and carports of affordable housing communities. The electricity generated by those systems will be distributed throughout the affordable housing buildings, and each resident will in turn receive a bill credit based on their share of the solar project. This new project is still in its early stages, but SolarCity plans to offer similar services in states around the country.^{xiv}

Minnesota

Two innovative projects have emerged in Minnesota in 2015 that leverage the stability of community organizations to serve low- and moderate-income communities through community solar. Although the projects are still awaiting final approval and interconnection, both models could potentially be scaled and replicated in low-income communities around the country.

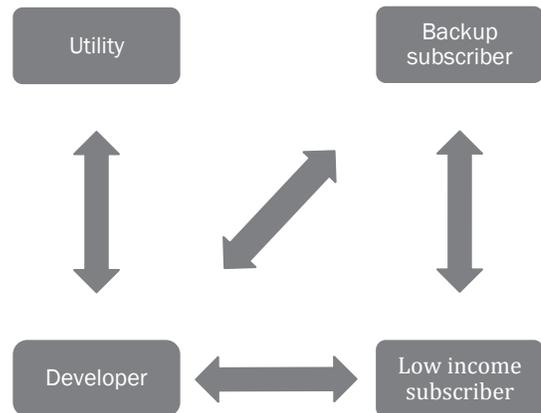
Community Action Model:

- The Rural Renewable Energy Alliance (RREAL) would use grants, Conservation Improvement Program funds, charitable contributions, and Low Income Home Energy Assistance Program (LIHEAP) dollars to be distributed by a community action agency
- Community action agency and residents would subscribe to community solar project
- Provides energy cost security using solar with no variable fuel costs

	Fuel Assistance	Solar
Year 1	\$	\$\$\$
Year 2	\$	—
Year 3	\$	—
Year 4	\$	—
Year 5	\$	—
Total cost	\$\$\$\$\$	\$\$\$

Just Community Solar Coalition Model:

- Shiloh Temple International Ministries congregants and Minnesota Interfaith Power and Light members who are north Minneapolis residents are eligible; selection not based on credit scores
- If subscribers fail to make monthly payments, faith-based institutions serve as backup subscribers would increase their share to make up the difference



Policy Proposals

Washington, D.C. Solar Roundtable

In 2014, the George Washington University Solar Institute and DC Solar United Neighborhoods (DC SUN), a resident-led advocacy group, convened a daylong roundtable discussion to develop recommendations on how to maximize solar deployment for the benefit of low-income residents.^{xv} The discussion sought to identify solar investment programs which would draw from the



numerous opportunities provided by community solar. The roundtable participants determined that a multipronged approach would best address the barriers to low-income solar deployment.

The approach relies on two main Washington, D.C. policies: first, the Community Renewables Energy Act of 2013 allows community solar projects to be built in Washington, D.C. Secondly, the District's Renewable Portfolio Standard (RPS) requires energy suppliers who do not meet their solar requirements under the RPS to pay fines known as Alternative Compliance Payments. The roundtable used a hypothetical investment of \$5 million in funds generated by these policies to develop two innovative and complementary programs.

The first program developed by the roundtable was the Leveraged Low Income Financing and Credit Enhancement Program. The program would utilize a \$4 million government investment to eliminate financing risk for those with inadequate credit history. In short, the program's design is as follows: the District Department of the Environment would select a private administrator for the guaranteed loan portfolio through a Request for Proposals (RFP). The selected administrator would hold the guaranteed loan money, and approve loans based on criteria established in the RFP. Once a loan fund was established, community groups or solar developers could propose a community solar project, and a majority of ownership of any project would be allocated to low-income residents. Considering administrative costs and a 20% default rate, the roundtable estimated \$36 million in guaranteed loans from the initial \$4 million investment that could build 14.4 MW of solar installations in Washington, D.C.

A complementary program, the Low Income Rebate Program, was also developed to reduce the upfront costs of a community solar project and allow lower-income residents, who often have less disposable income, to invest in and own part of a renewable energy project. The program would give low-income residents an upfront rebate on a sliding scale of \$1 to \$3 per watt to cover the share of a community solar project funded by the credit enhancement program. The roundtable also

noted that the rebate program could replace or allow for expanded use of Low-Income Home Energy Assistance Program (LIHEAP) funding.

Other Solutions

Solar “impact investments”

In recent years, financial institutions have increasingly looked to nonprofit organizations to identify potential investments that can promote positive social change, while also producing a positive return for investors. Community solar is an incredible investment opportunity in this regard. “Impact investors” and philanthropic organizations have gravitated toward energy projects to make stable investments in communities around the United States. Notably, the St. Paul Port Authority has established the Trillion BTU Energy Conservation Program, which combines public and private money to fund energy efficiency projects for Minnesota businesses. The unique interaction between public and private investments could also drive progress in low- and moderate-income community solar projects.

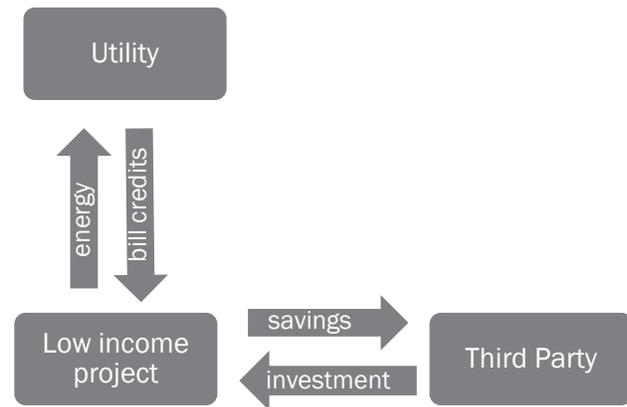
Mosaic, a company that crowdsources funding for solar projects, allows users to donate toward loans to allow a borrower to install a solar array on a school or commercial building. The borrower signs a power purchase agreement (PPA) with the building owner, under which the building owner purchases the output of the panels at a fixed price. Mosaic then receives a small fee from interest and principal on the loan, and distributes the remainder as a return to the investors.

Currently, although Mosaic funds projects across the United States, investments are limited to residents of California. Further, Mosaic finances residential solar projects owned by homeowners, so the area utility does not play a role in the financing structure of the project. However, the company expects to expand its investment opportunities in the future with regulatory approval. Given the

proper regulatory framework, this crowdfunding model could work in community solar projects as well.^{xvi}

Solar developer SolarCity announced in October 2014 that it was launching a new public offering of solar bonds, the first such offering in the country.^{xvii} The bonds are sold in increments of \$1,000, and earnings are paid by income

received from monthly payments by SolarCity customers. Functionally, the bonds are investments in the company itself, as opposed to individual projects. However, like the Mosaic model, these solar bonds could provide a strong source of cash flow to cover initial costs if deployed in community solar projects.



“Pay as you go” model and credit requirements

One of the many benefits of community solar is its potential to increase access among those who aren’t able to take advantage of various financing options, in part because some community solar subscriptions do not require any upfront payments. Nonetheless, low- and moderate-income households with insufficient or inadequate credit histories are essentially shut out of the community solar process. Most developers require subscribers to meet a minimum FICO credit score in community solar contracts in order to qualify even for “pay as you go” subscriptions. With “pay as you go” subscription models, if a particular subscriber does not pay his or her bill, the developer can simply cancel the subscription until payment is received and reallocate the subscription capacity.

Solar developers in Minnesota have stated that they are specifically targeting individuals with FICO scores of 700 or above for community solar projects, presumably to minimize default risk.^{xviii}

The high credit score required by many solar developers prevents low- and moderate-income households from accessing community solar programs. To promote low- and moderate-income inclusion in community solar projects, states could require solar developers receiving tax credits or low interest government-backed loans to lower their required credit score thresholds.

Green banks

“Green banks” have been successfully established in several states to leverage public funds to garner private investment. Connecticut established the nation’s first “green bank,” the Connecticut Clean Energy Finance and Investment Authority (CEFIA), in 2011. Built to shift the state’s clean energy market from government-based incentives to private-sector financing, the CEFIA will prompt the shift in four distinct stages: government subsidies for renewable energy projects; green bank financing with reduced subsidies, which is where the market currently lies; green bank financing, such as loan guarantee programs, with no subsidies; and finally, private-sector financing, such as loans.^{xix}

Prior to the establishment of the CEFIA, 80 percent of the clean energy incentives in Connecticut were from grants, rebates, or other subsidies. Today, 80 percent of the state’s clean energy resources are spent on financing instruments, such as loans and credit enhancements, to directly support residential and commercial clean energy projects. The creation of a green bank in Minnesota would provide a centralized source of funding for renewable energy projects, which could drive capital toward community solar programs and support solar investment in low- and moderate-income communities.

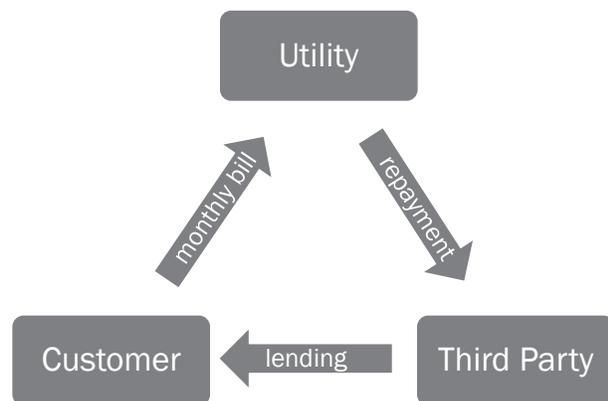
On-bill programs

On-bill financing programs, in which the energy utility acts as a lender, allow customers to repay energy improvement costs directly to the utility over time as part of their utility bill. On-bill financing

has previously been explored in Minnesota. In the 1990s, Northern States Power (now part of Xcel Energy) ran an on-bill financing program that was discontinued after its shareholders were forced to cover for numerous customer defaults.^{xx} Interest in on-bill financing has since waned considerably in the state.

On-bill repayment, however, provides a promising alternative. On-bill repayment programs allow a third party to act as a lender, with the utility bill simply acting as a “pass-through” to recover the loan from the customer. Minnesota law provides language allowing utilities to implement on-bill repayment to facilitate investments in “energy conservation or renewable energy projects.”^{xxi}

The on-bill repayment structure, involving the energy utility, the customer, and a lender, could align seamlessly with community solar projects, facilitating easier access among those customers who may not have the upfront funds to pay for such projects.



Low-income carve out

The Colorado Public Utilities Commission, as part of its final rule implementing the Community Solar Gardens Act of 2010, requires that investor-owned utilities set aside 5 percent of each proposed community solar garden for low-income subscribers in order for the garden to qualify for state Renewable Energy Credits (RECs).^{xxii} This carve-out encourages low-income participation and invites developer and utility innovation in providing programs to serve low-income customers. Indeed, the Grand Valley Power-GRID Alternatives project was spurred in part by the need to provide low-income solutions, expressly provided in the Colorado community solar rule.

California has implemented a similar carve-out in its Green Tariff Shared Renewables Program. The program, which applies to the three largest investor-owned utilities in the state, establishes two components—a green tariff component and an “enhanced community renewables” component—to allow customers to elect to receive 50 to 100 percent of their electricity demand from solar generation.^{xxiii} Notably, the program includes an “Environmental Justice reservation” expressly requiring 100 MW of its 600 MW cap to be located in “disadvantaged communities,” identified by census tract and intended to serve areas disproportionately affected by environmental pollution, environmental degradation, or socioeconomic vulnerability.^{xxiv}

The Minnesota community solar statute does not contain an express carve-out provision for low-income subscribers. However, such a provision could be added through legislation amending the current law. Alternatively, the Public Utilities Commission (PUC) could recommend a threshold for low-income participation using its quasi-judicial authority.

Low Income Home Energy Assistance Program (LIHEAP) funds

According to a paper by the George Washington University Solar Institute, “Bridging the Solar Gap,” the United States Department of Health and Human Services distributed \$3.4 billion to states through the LIHEAP program to assist low-income families with their home energy bills in fiscal year 2014.^{xxv} LIHEAP is a program in which the U.S. federal government distributes funds to each state, which in turn grant assistance to qualifying low-income households to pay their home heating or cooling bills. States can use up to 15 percent of their LIHEAP funds for weatherization activities or other energy-related home repair under current law.^{xxvi}

Further expansion of the LIHEAP program to include solar would boost development of community solar projects. California, for example, directly invested a portion of its LIHEAP funding to support solar deployment for LIHEAP-eligible homeowners. The Solar for All California program financed solar PV systems for 1,482 low-income households using \$14.7 million in LIHEAP funds



and an additional \$3.5 million from outside investments.^{xxvii} Further, RREAL's current solar assistance program uses LIHEAP eligibility to verify applicant income eligibility, and if approved, would use LIHEAP funds directly to cover community solar subscriptions. This model could be replicated throughout Minnesota's low- and moderate-income communities, with approval and support from LIHEAP administrators.

Securities and tax credits

The 30 percent Federal Investment Tax Credit (ITC), which applies to solar projects that are operational prior to December 31, 2016, has been a major financing tool spurring increases in solar development in the past few years. In 2017, the ITC is set to expire for residential systems, and the credit for commercial systems will revert to the previous 10 percent level established by the Energy Policy Act of 1992.^{xxviii} With the expected decline in the ITC, it is crucial for current low-income solar development to meet the 2016 deadlines, and for the next wave of development to find new financing tools.

The United States Department of Housing and Urban Development also administers the Low-Income Housing Tax Credit (LIHTC), which helps finance the development of affordable housing projects. Certain affordable housing projects that include solar installations can qualify for the LIHTC. For example, by utilizing the LIHTC, the Northeast Denver Housing Center was able to finance an affordable housing solar project that provides renewable energy for 30 low-income residents.^{xxix}

Securities law provides another hurdle in the construction of a community solar project. Each solar project typically is subject to certain federal and state securities laws, and in community solar programs, where subscribers each have a stake in the project, securities issues can become complicated. Some state registration exemptions have eased some of these concerns. Vermont, for example, has established the Solar/Utility No-Action (SUN) Exemption to reduce the regulatory costs and burdens typically associated with securities registration of community solar projects.^{xxx} Colorado

has also issued a securities opinion interpreting developers and subscribers' securities obligations.^{xxxix} Although developers should still ensure that they are in compliance with applicable securities laws, these state actions have provided some clarity with regard to securities issues.

The federal tax credits discussed above can be replicated or reinforced at the state level. Like the current federal ITC, the state investment tax credits could either apply to companies that install, develop, or finance a community solar project, or be applied to a subscriber's income taxes.^{xxxix} An additional low-income tax credit could apply directly to community solar developers who meet a certain threshold of low- and moderate-income participation in a given community solar project. All of these policies would provide greater economic certainty for developers and stimulate low- and moderate-income participation.

Recommendations for Best Practices

Low- and moderate-income inclusion in community solar projects will be best achieved using a suite of practices and policies.

Capitalizing on Existing Opportunities

1. Engagement and outreach between developers and non-traditional partners, such as nonprofit organizations, is necessary to identify potential community solar projects. These relationships could produce community solar projects to identify and serve communities that may not be able to access community solar on their own. Outreach programs could also include job training and technical education elements. The creation of a working group dedicated to low-income participation, similar to New York's Low Income Collaborative, could promote better coordination between the various stakeholders in community solar projects to answer unmet demand.

2. Policymakers should consider mechanisms to increase solar access for households with low credit scores because the current minimum of 650 or 700 used by many developers inhibits low-income participation. States could require developers receiving tax credits or low interest government-backed loans to accept lower credit scores from applicants.
3. Utilities and third-party lenders, such as nonprofit organizations, should explore innovative financing options, such as on-bill repayment, as a tool to bolster community solar development in low- and moderate-income communities. This mechanism would allow community solar customers without the funds to pay for the upfront costs of a project to spread those costs out over time.
4. Community solar program design could formalize the “back-up subscriber” model. Where a project’s applicants exceed its approved capacity, developers could instead offer to include applicants as “back-up subscribers” to cover subscriptions in return for a credit or rebate to the back-up subscriber. This would be particularly valuable in markets where demand exceeds supply.

Creating Long-Term Policy Solutions

1. State legislation, such as tax credits or securities exemptions, could incentivize solar developers to dedicate a larger amount of their portfolio to low- and moderate-income community solar projects. These state tax policies would be especially valuable if the federal ITC is not extended beyond 2016.
2. LIHEAP programs could be expanded to fund community solar subscriptions. California’s “Solar for All” pilot program was designed to use a portion of the state’s LIHEAP allocation to fund solar projects in low-income communities. State policymakers could request approval from the U.S. Department of Health and Human Services to allow similar programs to develop nationwide.

3. The establishment of a “green bank” has successfully promoted clean energy investment in several states. A green bank could establish numerous loans, credit enhancement programs, and rebates for low-and moderate-income community solar projects. The establishment of a green bank could further promote private funding streams as well, such as impact investments.
4. A low-income participation carve-out has resulted in increased participation among underserved communities in Colorado and New York. Carve-outs could require participation thresholds or siting requirements, and charge a proportionate fee if a program does not meet the required low-income participation level. Minimum participation requirements can act as a key regulatory mechanism to ensure that low- and moderate-income households have access to community solar.

Conclusion

To meet the unmet demand for community solar among low- and moderate-income communities, stakeholders and policymakers alike must both make use of existing policies, and encourage new and innovative solutions. Increased access to clean, affordable solar energy would reduce the energy cost burden confronted by many low-income households. By utilizing various financing options and project models, community solar can truly ensure solar for all.

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