

# LOW-INCOME **SOLAR POLICY GUIDE**

**A road map to successful policies and programs that are creating access to solar technology and jobs nationwide.**





LOW-INCOME SOLAR POLICY GUIDE

## ABOUT THIS GUIDE

The Low-Income Solar Policy Guide was developed by nonprofits GRID Alternatives, Vote Solar, and the Center for Social Inclusion, to help drive the proposal and adoption of new low-income solar policies and programs, both as stand-alone efforts and as part of broader renewable energy programs. It is meant to be a tool for policymakers, community leaders and others who are working on solar access at the federal, state and local level.

There are many effective policy tools for supporting solar adoption among consumers at large, and nearly all of them help expand low-income access to solar power to some extent. However, fully enabling low-income solar participation requires policies and programs that are specifically designed to address the unique barriers faced by these communities. This guide provides an overview of those barriers, as well as underlying principles for successful programs, existing policy tools that can be used to create programs, and examples of state and local models that have successfully improved access.

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## FOREWORD

For generations, fossil fuel power has disproportionately impacted the health and well-being of low-income communities, particularly communities of color and indigenous communities. Emissions from power plants sited in these communities contribute to high rates of asthma and cancer, and the presence of heavy industry contributes to a cycle of poverty and public disinvestment in neighborhoods that can least afford it.

In addition to the health impacts, these same energy sources are a major contributor to climate change. Pre-existing vulnerabilities mean that low-income families are impacted more by climate change-related natural disasters and extreme weather. While Hurricane Sandy impacted every New Yorker, the poorest neighborhoods suffered the worst impacts and took the longest to recover from lost homes, wages, and – yes – electricity.

For these reasons and others, social justice groups at both the local and national level have declared energy to be a civil rights issue. The NAACP's Just Energy Report<sup>(1)</sup> calls for clean energy progress and states that "community involvement in paving new energy pathways is especially important because our energy system is broken and communities of color are paying the highest price." The status quo of energy production, where just a few hold the energy resources, needs to be rethought. Through solar and other clean energy technologies we have the opportunity to – literally – bring power to the people.

That fundamental shift in the way we produce and consume power is now underway all across the country. Tracking the Sun, a report published annually by the Lawrence Berkeley National Laboratory finds that solar prices continue to decline rapidly. The

average cost of a solar electric system has dropped by more than half since 2010 alone, putting this once-expensive technology within reach of middle-income Americans and driving a surge in solar adoption. There is fifteen times more solar installed in our country today than there was just six years ago. More renewable energy means less of the air pollution that has burdened underserved communities.

Since the initial launch of the Low-Income Solar Policy Guide in 2016, we have witnessed an increasing commitment to ensuring that the transition to a cleaner energy future is inclusive and delivers the benefits of solar energy to communities that need it the most. California, Colorado, the District of Columbia, and other states continued to invest in effective programming to ensure the development of solar projects for low-income customers. We were excited to see Illinois adopt a legislative package that includes comprehensive low-income solar programming, and we look forward to its implementation in 2017.

However, in much of the country there remains a real need for policies that effectively overcome the unique barriers faced by low-income Americans in order to ensure that our transition to renewables is transformative for both our planet and our communities. By prioritizing equity in solar policy, we can build a just energy system that gives all communities the opportunity to participate not just as consumers but as producers and owners. We can enable low-income families to invest their precious dollars in their own future rather than in ever rising and often volatile energy bills. We can create good career and educational opportunities that are localized for the greatest impacts. And we can invest in communities to build shared wealth.

Whether motivated by these critical justice issues, the climate crisis, or the economic opportunity of a largely untapped solar market sector, there are many reasons to make equity a key pillar of our nation's growing solar economy.

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## LAYING THE FOUNDATION

### A. WHY ACT

The growth of solar in the United States provides a tremendous opportunity to address some of the greatest challenges faced by lower-income communities: the high cost of housing, unemployment, and pollution. Solar can provide long-term financial relief to families struggling with high and unpredictable energy costs, living-wage employment opportunities in an industry adding jobs at a rate of 20 percent per year, and a source of clean, local energy sited in communities that have been disproportionately impacted by traditional power generation.

Interest in large-scale policies to enable solar access for low-income families is increasing across the country, thanks to the success of early policy initiatives in California; national leadership around low-income solar access from the Federal Government; and increased public interest in the unique combination of public policy issues that low-income solar can address. The market opportunity is huge: Over 6 million affordable housing units currently exist in the United States,<sup>(2)</sup> and although precise figures for low-income homeowners are difficult to pinpoint, census and other data suggest that there are around 22 million owner-occupied households with incomes at or below 80 percent of their area median income (The U.S. Department of Housing and Urban Development definition of low-income). Targeted solar policies could open up access for these households on a large scale. Reasons to develop a low-income solar program include:

**Equitable Access.** States like California have recognized that their solar programs are funded by all ratepayers/taxpayers, including low-income, and have worked to provide equitable access to incentives.

**Participation.** Low-income solar programs offer an opportunity to be proactive in ensuring that all communities are participating early and are part of our national transition to clean energy.

**Economic Benefit.** Because low-income families spend a disproportionate amount of their income on utility bills, they receive a proportionally greater economic benefit from solar power.

**Environmental Justice.** Low-income communities bear the brunt of pollution and climate change.

**Jobs.** A low-income solar program engages low-income communities in the emerging solar sector and can provide access to employment opportunities.

**Widespread Adoption.** A low-income solar program can move local solar markets beyond the “early adopter” phase and show that solar is a viable energy solution for all communities.

## B. UNLOCKING LOW-INCOME PARTICIPATION

Federal and state-level support for solar, falling equipment costs, and innovative financing models have made solar more and more accessible to middle income families in recent years. In order to broaden that success to include lower-income families, we need to understand and find ways to address some of the unique barriers to adoption these consumers face. California recently published a study that examines this important topic.<sup>(3)</sup>

### 1. COST

Solar can stabilize families' energy bills and protect against increases in electricity rates. Unfortunately, the investment required to go solar remains a significant barrier for the families who most need relief from rising bills - those who struggle to make ends meet every month. An average four to eight kilowatt (kW) solar electric system on a home will cost homeowners between \$12,000 and \$24,000 including materials, installation, and labor.<sup>(4)</sup> This is no small chunk of change, particularly when we consider that the national median household income was \$53,657 in 2014 for all Americans, but even lower for Latino (\$42,491) and Black (\$35,398) Americans.<sup>(5)</sup>

Existing financing mechanisms, such as leasing or power purchase agreement (PPA) relationships, enable homeowners to install solar with little or no upfront costs. These third-party ownership and financing agreements are widely popular in markets across the country, accounting for 72 percent of U.S. residential solar installations in 2014.<sup>(6)</sup> However, participation in these models generally requires a credit score or debt-to-income ratio minimum that can be a barrier to low-income consumers and people of color who, on average, have lower credit scores. According to a Federal Reserve study of one form of credit score, individuals in low-income areas had an average score 44 percent lower than individuals in high-income areas. At the same time, Black Americans had a score 52 percent lower than non-Latino white individuals and Latino Americans have average scores 29 percent lower than non-Latino white individuals.<sup>(7)</sup> These disparities in credit scores limit access to third-party ownership or financing arrangements for solar for the very populations that could most benefit from the low-upfront cost options. Furthermore, solar leases and PPAs are currently unavailable to customers in some markets.<sup>(8)</sup>

Consumer loans are another increasingly popular way to finance residential solar. These products also require good credit; customers with lower credit scores either fail to qualify or are charged higher interest payments that reduce the benefits of solar ownership.

If credit score issues are surmounted, there remains a need for credit education.<sup>(9)</sup> Many in low-income and communities of color suffer from low credit scores primarily because they have never taken or seldom take out loans. For others, bad experiences with credit cards or student loans may have left them with poor credit history. In either case, there is often anxiety related to taking out new loans or entering new financial arrangements that can be prohibitive in its own right to the process of going solar.

Low-income families looking to purchase solar are also often unable to take advantage of the largest public incentive to making solar affordable, the federal investment tax

credit (ITC). People with lower incomes are typically not in a qualifying tax bracket or otherwise do not have the tax burden needed to make the nonrefundable federal ITC valuable.<sup>(10)</sup> In many jurisdictions, additional local and state tax credit incentives for solar cannot be taken advantage of for similar reasons.

### 2. PHYSICAL BARRIERS AND HOME OWNERSHIP STATUS

A majority of Americans face physical barriers that keep them from installing solar on their own rooftop. A report from the National Renewable Energy Lab and Navigant Consulting found that 73-78 percent of homes cannot host solar due to tree shading, orientation or other factors.<sup>(11)</sup> Moreover, 52 percent of residents nationwide live in multi-unit buildings or homes with shared roofs.<sup>(12)</sup>

Renters have difficulty participating in rooftop solar even if their home is suitable. The sheer diversity of ways in which tenants receive and pay for their electricity makes solar participation complex. Some pay their own utility bills, some share a meter and split payments with other renters, and in other cases the landlord pays for utilities and passes a portion of those costs on to the tenant. In all of these cases, there is a fundamental disconnect between the entity that would benefit most from the utility bill savings of solar (the tenant) and the entity who would need to make or approve the solar investment (the property owner).

These issues are particularly pronounced for low-income households, which are more likely to live in multifamily housing, have unsuitable roofs or rent their homes.<sup>(13)</sup>

### 3. HOUSING CONDITIONS

For those that do own their homes, the history of suburbanization, redlining, and discriminatory housing policies means that people of color and families with low incomes are more likely to live in older homes that need repairs and upgrades. Homes built before 1960, which represent more than 27 percent of the national housing stock, are more likely to have lead paint, water damage that can lead to toxic mold and poor air quality, plumbing issues, and antiquated heating and cooling systems that rely on expensive oil or inefficient furnaces, boilers, and water heaters. Additionally, in more rural communities, predominantly in the South and West, over one third of homes are manufactured housing. These types of homes are typically inefficient, relying on heating systems that drive up electricity costs.<sup>(14)</sup> Addressing these costly issues, which are seen as more closely related to the health, comfort and economic well-being of a family, often takes priority in home improvement decisions.

Roof maintenance issues are another common physical barrier that prevents low-income households from getting solar. Solar installation requires stable roofing material (as opposed to slate, which is common on older homes), roofs that don't leak, and infrastructure strong enough to hold the weight of a solar energy system. Most installers recommend that a roof be at least 10-15 years away from needing major maintenance in order for solar to be installed. Roof replacement is very expensive, averaging \$12,000 according to research by Angie's List, and low-income households often go longer between major retrofits. These additional costs and competing priorities put solar even further out of reach for families on tight budgets.



#### 4. EDUCATION AND OUTREACH

A number of outreach and educational barriers contribute to the challenges involved in extending the benefits of solar to low-income customers. Often the targets of scams, customers in low-income communities may be distrustful of claims relating to energy bill savings and may have concerns about their privacy. Traditional sales teams may not be prepared to discuss solar energy with multilingual and multicultural households. Low-income families may regard solar as a luxury for the wealthy, and so may not believe that they can participate in solar energy at all. These beliefs, in conjunction with the need to prioritize other expenses, underscore the need for meaningful education and outreach in partnership with trusted community organizations.

#### 5. MARKET FORCES

All of these barriers together contribute to another large one: market disinterest. With so many issues to address, successfully serving the low-income solar market requires that a company's marketing, sales and account management activities be focused to that end. The additional effort and investment needed to serve this market has limited the number of companies that are recruiting customers from low-income communities and therefore limited the education of and opportunities available to those communities.

In order to bring low-income participation in solar to scale, the low-income market sector will need to provide competitive and vibrant industry opportunities. This market sector will not develop or scale under the same incentive structures designed for the general market. In fact, without targeted, intentional incentives for investments, the low-income solar market will unlikely develop or scale at all. Solar developers, nonprofits and other partners seeking to drive the low-income solar market will need to find new and innovative ways to structure solar projects to work for low-income communities if it is to be viewed as a viable long-term market.

### C. GUIDING PRINCIPLES

Solar policies and programs can be designed to overcome solar adoption challenges facing low-income families. While there are numerous solutions and their details may vary state to state, all low-income solar programs should adopt the following basic principles:

**Accessibility and Affordability.** An effective low-income solar program combines opportunities to participate with meaningful financial benefits through a combination of deep energy cost savings and direct support to overcome some of the financial and other challenges to access.

**Community Engagement.** A successful program requires partnership with communities through local organizations such as community development corporations, housing organizations or other service providers to ensure that community needs and challenges are addressed and assets utilized. These partners can provide critical outreach, planning support, and engagement with low-income communities. Moreover, many communities desire even more engagement, including an ownership interest in solar projects serving them. Putting communities at the center ensures that programs are responsive and effective and helps maximize participation.

**Consumer Protection.** Programs should not create incentives for predatory lending or exploitation of communities for financial gain. Programs should have adequate consumer protection measures, disclosures, and accountability measures to ensure that financially vulnerable customers are not taken advantage of or otherwise compromised.

**Sustainability and Flexibility.** A successful low-income solar program must encourage long-term market development and be flexible in order to best serve the unique low-income market segment over time and as conditions and circumstances change.

**Compatibility and Integration.** Low-income solar programs and policies should be additive to existing renewable energy and energy efficiency programs, not undermine them. They should also integrate well with synergistic programs, such as low-income energy efficiency, workforce development, healthy home programs and others that address the intersection of equity, energy, and infrastructure.

Public policies or programs that do not include all of the principles are less likely to be successful. For example, community solar programs that include a carve-out for low-income customers but do not include additional incentives may not result in the desired participation of low-income customers. Programs that offer meager savings to customers are also unlikely to succeed. The most effective low-income solar programs include long-term, dedicated funding; cover up-front costs; integrate with energy efficiency offerings; mesh seamlessly with existing energy assistance programs; include direction and funding for community education and engagement; and include job training and placement opportunities.





## THE POLICY TOOLBOX

There are many different policy tools available for supporting solar adoption at large that form the foundation of effective low-income solar programs, as well as tools specifically geared toward the low-income sector. These tools can be combined in multiple ways to create programs that address the unique access issues and policy environments of different states and communities.

### A. COMPENSATION MECHANISMS

#### 1. NET METERING / VIRTUAL NET METERING

*Guiding principles:* Accessibility and Affordability, Sustainability and Flexibility  
*Barriers addressed:* Cost, Physical Barriers and Home Ownership Status

There may be times when a solar energy system produces more energy than the customer needs at that moment. This excess solar power is delivered to the utility grid and used to meet the electricity needs of other customers nearby. Net metering ensures that solar customers receive full credit on their utility bills for this valuable contribution to the utility grid. When customers generate more than they use, they can bank credits. At times when customers need to use more power than what they generate, those banked credits can be applied to their bill to offset costs.

The simplicity of net metering has made it one of the most successful state policies for empowering consumers to use rooftop solar to meet their own electricity needs. A strong net metering policy ensures full retail credit for customer-generated solar power, without excess fees and or arduous restrictions on participation, system size, or customer eligibility, and allows credit rollover or excess credit payouts. Any reduction to the net metering credit or additional fees for solar customers has a higher negative impact on low-income customers.

Forty-five states currently have some form of net metering program.<sup>(15)</sup> Leading states go beyond traditional net metering with programs like virtual net metering that expand access to multi-tenant buildings or clear the way for community shared solar arrangements by allowing customers to receive credit for a designated portion of the power produced by an off-site or shared system.

Net metering policies lay the foundation for many low-income solar programs, and can also be designed to act as an incentive unto themselves. In December 2015, the Mississippi Public Service Commission adopted the state's first net metering standards and included an adder of two cents per kilowatt hour (kWh) to the net metering credit for the first 1,000 qualifying low-income customers who sign up.<sup>(16)</sup>





## SOLAR EMPOWERMENT

In the town of Gardner, Massachusetts, a community solar array on the site of a long-abandoned furniture manufacturing plant is now producing both electricity and energy cost savings for GAAMHA, a nonprofit organization supporting those with disabilities and substance use disorders.

Budgets are tight for this primarily state-funded organization, which provides a combination of housing and other services to empower more than 100 individuals to take control of their lives. GAAMHA's CEO Tracy Hutchinson is quick to emphasize that "anything we can do to help lower expenses is beneficial." That's why when the Mayor approached GAAMHA to participate in the Mill Street Solar Project, a partnership between the City, the Gardner Redevelopment Authority, and the nonprofit Boston Community Capital, they jumped at the chance.

GAAMHA is one of four local organizations currently getting virtual net metering credit from the one-megawatt project. Ms. Hutchinson says that the solar reduced their energy expenses by 38 percent in fiscal year 2015, even though they were only connected for part of that time.

For Ms. Hutchinson, those savings mean being able to dedicate precious resources toward improving lives rather than paying high electricity bills. With their solar savings GAAMHA has been able to purchase IT equipment for residents and provide weekly excursions for individuals to such places as the bowling alley, art museums and the mall, helping them make friends and be part of their broader community.

## 2. COMMUNITY SOLAR

**Guiding principles:** Accessibility and Affordability, Compatibility and Integration, Sustainability and Flexibility

**Barriers addressed:** Cost, Physical Barriers, and Home Ownership Status, Housing Conditions

Shared solar programs, sometimes known as 'community solar' or 'solar gardens,' help address the physical and financial barriers of going solar for those who do not own their home or have a suitable roof, or who live in multifamily housing. Shared solar programs allow multiple energy customers to subscribe or otherwise participate in a solar energy project located somewhere else in their community. Participants receive a credit on their utility bill for their portion of the clean energy produced.

This model can help make solar more attainable for low-income customers for a number of reasons. It provides renewable energy access for those who are renters or otherwise cannot host an onsite system. It can make the most of siting potential in an area to maximize production and lower costs. It can facilitate participation in smaller increments that might not be financially viable as a stand-alone installation, which in turn requires a smaller financial commitment. It can also make securing financing for projects with low-income participants easier due to the easy transfer of subscriptions.

Community shared solar programs are being increasingly adopted by states and forward-looking utilities that want to connect more consumers with clean energy. Today at least 15 states and the District of Columbia have some form of shared solar policy in place, although their policy structures and resulting market impact varies widely.<sup>(17)</sup> These early programs have shown the importance of establishing a bill credit that properly compensates the customer for the long-term value of the clean energy produced. Furthermore, this experience has shown that an explicit policy focus on serving low-income consumers is necessary for successfully expanding program reach to those communities at scale.

Low-income customers are defined as customers whose household income is at or below 200 percent of the federal poverty level, or similar requirement proposed by the electric utility to be approved by the Commission.

State community shared solar policies should achieve the following principles, which are critical for serving the general and low-income markets alike (also check out CCSA's Community Solar Policy Decision Matrix):<sup>(18)</sup>

- a. Shared solar programs should expand access to a broader group of energy consumers than the current solar policies and market allow.
- b. Participants in a shared solar program should receive tangible economic benefits, such as net metering credits, on their utility bills.
- c. Shared solar policies should be flexible enough to allow for different ownership and contract models to meet different consumers' preferences and financial standing, such as an up-front payment model, a leasing agreement or co-op style ownership.
- d. Shared solar policies should be additive to existing renewable energy programs, not undermine them.

In order to effectively serve low-income consumers, shared solar policies should go



farther to address the additional financial and market barriers that these customer face. States should set strong targets for low-income participation and provide adequate support for achieving those targets through programs such as:

- Targeted incentives and credit support to facilitate direct low-income participation and maximize benefits for participants (e.g. subscriptions should be sized and structured to achieve meaningful savings, ideally monthly electricity bill reduction of 50 percent or more);
- Grants and technical assistance for industry and nonprofit partners to facilitate solar project development;
- Policy leadership to guide utilities and developers to identify sites ideal for interconnection, and consideration of preference or targeted support for siting low-income community solar projects (e.g. brownfields, public land, etc.);
- Government procurement or incentives to secure anchor participants to underwrite low-credit participants and mitigate investor risk;
- Funding for pilot projects directed specifically at low-income subscribers;
- Funding for development or acquisition of program management software for LMI community solar projects or programs;
- Tailored program rules to maximize benefits to and encourage participation by affordable housing providers; and
- Collaboration with local communities and organizations on siting to promote visibility and community connection.

States and utilities should exercise caution against adopting shared solar policies that set targets for low-income participation, but that do not provide the additional necessary support and incentives necessary to ensure the achievement of those targets (e.g. meaningful monthly savings for participants). This type of policy that lacks additional incentives is less likely to result in low-income participation and benefit.

## B. DIRECT INCENTIVES

### 1. FEDERAL AND STATE TAX CREDITS

*Guiding principles:* Accessibility and Affordability, Consumer Protection  
*Barriers addressed:* Cost

Tax credits are a common form of incentive program, although one that is limited in its utility to low-income households. The primary federal solar policy is the solar investment tax credit (“ITC”), which provides a 30 percent tax credit for solar systems on residential (under Section 25D) and commercial (under Section 48) properties. Originally set to expire December 31, 2016, the December 2015 passage of an omnibus appropriations bill included a five-year solar ITC extension that steps down over time as follows:

- 2017-2019: 30%
- 2020: 26%
- 2021: 22%
- 2022+: 10% (non-residential and third-party owned residential), or 0% (host-owned residential)<sup>(19)</sup>

Tax credits are also available at the state level; the Database of State Incentives for Renewables & Efficiency (DSIRE)<sup>(20)</sup> has a comprehensive list of solar incentives by state, as well as more information and maps showing solar policies across the United States.

Unfortunately, low-income families are typically unable to leverage tax credits because they are not in a qualifying tax bracket or otherwise do not have the tax burden needed to make the credit valuable. Making tax-based incentives work for low-income consumers requires availability of a refund option or third-party financing entity that can monetize the credit. Strong low-income solar programs should allow alternative ownership/purchasing models so that developers serving low-income families are able to leverage the non-refundable ITC for solar development. Alternative ownership/purchasing models may include leasing or power purchase agreements (PPA) to enable solar customers to install solar with little or no upfront costs.

In 2015, the California Public Utilities Commission approved, among other reforms, a decision to revise the state’s Single-Family Affordable Solar Homes (SASH) Program to allow for third-party project ownership. This has paved the way for the nonprofit program administrator to partner with solar financing firms under a prepaid power purchase agreement model to deliver the benefits of the ITC as well as long-term maintenance coverage to its low-income customers.

### 2. REBATES

*Guiding principles:* Accessibility and Affordability, Sustainability and Flexibility, Compatibility and Integration  
*Barriers addressed:* Cost

Consumers with limited cash reserves cannot afford to make investments with long-term payback periods. State and local rebates have successfully increased solar



adoption in the general market by reducing up-front costs, in turn creating strong solar markets that further drive down prices. Rebate programs with specific focus or carve-outs for low-income participation, usually in the form of a higher rebate amount, have proven successful at expanding solar adoption in those communities as well. Many examples of successful low-income solar upfront rebate programs will be referenced in the single-family models section (e.g. District of Columbia's 2015 Solar Advantage Plus Program and California's Single-Family Affordable Solar Homes Program). These upfront rebates, in combination with proper support for affordable financing, allow installers and developers to structure a product offering that is attractive to low-income participants, generally at no up-front cost.

### 3. SOLAR/RENEWABLE ENERGY CREDITS

*Guiding principles:* Accessibility and Affordability, Sustainability and Flexibility, Compatibility and Integration

*Barriers addressed:* Cost

Some of the primary drivers of renewable energy development across the country, including projects that benefit low-income customers, have been state renewable electricity standards (RES) or renewable portfolio standards (RPS). These policies require that a certain percentage of the electricity consumed by the state's customers come from renewable sources. Some of these policies also have a smaller percentage within the standard requiring a certain amount of solar in particular, often called a solar carve-out. Thirty-seven states have a mandatory or voluntary RES or RPS, with 29 of those and the District of Columbia's being mandatory.

Solar projects benefit from an RPS or RES because the value of their renewable energy production is monetized in the form of renewable energy credits (RECs) that are purchased by electric utilities to meet their standard. If a solar carve-out is in place, solar projects generate solar renewable energy credits (SRECs) that are often more valuable than a generic REC. The generation and sale of credits may provide a financial incentive to solar projects, which could make them more economically beneficial to all customers, including low-income. These incentives can benefit the customer directly or be used by project developers or financial partners to subsidize the cost of financing for low-income customers.

RPS or RES program design can be used to further encourage low-income participation. Some states, like Massachusetts, assigned a higher value credit to projects that serve low-income customers. Depending on certain rubrics, Massachusetts solar projects were able to receive an additional 70-100 percent of the baseline SREC value for power generated by low-income solar projects. This has made serving low-income communities a more financially viable and appealing market for nonprofits and solar developers. At the other end of the spectrum, programs with an overly time consuming and complicated process for qualifying and selling credits can limit the ability for low-income customers, who are often less financially literate,<sup>(21)</sup> to access the benefits. Massachusetts is updating the method it uses to award incentives to projects and will likely continue to award a higher incentive value to projects serving low-income customers.

## C. FINANCING AND INVESTMENTS

Affordable financing options can put solar within reach of low-income customers and help make programs that expand solar access more cost-effective for a government or utility. For some time, governments, nonprofits, and industry have been working to expand financing options in the related field of energy efficiency improvements for low-income households. As a result, there is a wealth of experience to draw from in identifying solutions that can help break down this barrier in expanding access to solar power.

### 1. ON-BILL RECOVERY/ON-BILL FINANCING

*Guiding principles:* Accessibility and Affordability, Compatibility and Integration, Sustainability and Flexibility, Consumer Protection

*Barriers addressed:* Cost

A common tool in the energy efficiency industry, on-bill recovery (OBR) or on-bill financing (OBF) has also been used to support expanded solar access. OBR/OBF allows customers and financial institutions to use their electric bill as a means of repaying an energy-related loan. A customer will apply for a loan for a qualifying energy efficiency or other distributed energy resource and, upon approval, the loan payments are added to the customer's electric bill. This type of program has many benefits to both customers and financial institutions.

Easier for customers:

- **Fewer bills.** OBR/OBF allows customers to add a loan and payment program without adding a new bill. Most families or individuals are already paying their energy bill and have a system for paying it.
- **Simple to understand.** OBR/OBF is generally used for technologies like solar that deliver utility bill savings, which offset the added cost of the loan payment. Customers can see a reduced bill and the loan payment side by side and can track the net increase/decrease in their bill.
- **Transferable.** OBR/OBF programs are often tied to the property meter, making it possible for the loan to be transferred to a new homeowner in the event of a sale or move, reducing customer risk.
- **Reduced credit barrier.** In addition to being transferable, OBR/OBF can potentially remove or reduce credit barriers if the OBR/OBF program relies more on bill repayment history than on credit scores.

Cheaper, more reliable for financial institutions:

- **Fewer bills.** OBR/OBF allows financial institutions to use an existing billing system, the electric utility bill, to recover payment of their loans. This reduces overhead costs and defrays the cost of recovering delinquent payments, since the utility is already taking on much of that work.

- **More reliable repayment.** Utility bills tend to have better repayment rates than other bills. There are many likely reasons for this, but a large one is the real or perceived fear of service interruption. This can help to make financing for low- to moderate-income communities more accessible and more affordable by reducing the risk calculation of financial institutions.
- **Transferable.** One risk of loans that are tied to a home is that the transfer of the loan to a new customer adds risk and uncertainty to the loan. While OBR/OBF does not solve that problem, it does allow for easier loan transfer as part of the transfer of utility bill payment.

#### Examples:

a. **Green Jobs-Green New York (GJGNY).** Green Jobs-Green New York, administered by the New York State Energy Research & Development Authority (NYSERDA), provides subsidized loans with on-bill-recovery for energy efficiency and solar projects. The program, created by the legislature in 2009, combines free or low-cost home energy assessments, low-rate loans to homeowners, and resources for community-based organizations to expand access to energy efficiency and solar across the state. By June of 2015, the program had issued more than 8,250 loans with an estimated \$44.2 million of annual energy bill savings, primarily for energy efficiency.<sup>(22)</sup> In October 2015, NYSERDA initiated a pilot program to determine the effectiveness of using GJGNY loans to prepay solar leases and power purchase agreements for projects receiving the Affordable Solar residential added incentive under the NY Sun Initiative. The GJGNY Third Party Owner Pilot ran through 2016 and was limited to 300 projects.<sup>(23)</sup>

b. **Roanoke Electric Cooperative.** The Roanoke Electric Cooperative *Upgrade to \$ave* model has successfully implemented an OBR program based off pilots pioneered in Kentucky and Kansas called PAYS (Pay As You Save). Under the PAYS model, residents pay a voluntary tariff on their utility bill in exchange for energy upgrades in homes and businesses. The tariff and repayment collection are implemented through the current on-bill system, limiting administrative burdens. Currently, Roanoke has a waiting list for participants, who are able to engage in a debt-free financing program. If participants are to relocate or move, the payment remains with the home or business.

## 2. PROPERTY ASSESSED CLEAN ENERGY

*Guiding principles: Accessibility and Affordability, Compatibility and Integration, Sustainability and Flexibility*

*Barrier addressed: Cost*

Property Assessed Clean Energy (PACE) programs allow property owners to use municipal bonds to finance energy efficiency, solar and other qualifying green retrofits, and repay them through a special assessment on their property tax bill. This arrangement spreads the cost of a new solar energy system out across a 20-year

payment plan that is easily transferable to the next property owners. The annual payment is typically less than the power bill savings generated by the improvements. PACE primarily serves property owners but can produce energy savings for tenants if their landlords participate.

Municipalities in more than 20 states and the District of Columbia currently operate PACE programs or have enacted PACE-enabling legislation.<sup>(24)</sup> Residential access to PACE financing has become more widely available within those states following a 2015 order from the Federal Housing Administration that offers clear guidance around payment and transfer of PACE liens to address mortgage lender concerns.<sup>(25)</sup> See HUD guidelines for more on structuring PACE programs.<sup>(26)</sup>

As part of the July 2016 Clean Energy Savings for All Americans Initiative, The Department of Housing and Urban Development and Department of Veterans Affairs announced guidance to unlock residential PACE financing by outlining how properties with PACE assessments can be purchased and refinanced with Federal Housing Administration mortgage insurance and by welcoming the use of PACE financing for Veterans Affairs-insured mortgages. In addition, the Department of Energy released an update of its Best Practices Guidelines for Residential PACE Financing, which includes additional consumer protections for low-income households such as recommendations for structuring PACE financing so that it is cost-effective for low-income participants. Despite DOE's updated guidance, states and local governments should exercise great care in making PACE financing available for this customer group.<sup>(27)</sup> Several consumer protection groups have recommended additional measures such as crafting strong rules to protect homeowners from abusive sales practices, and screening low-income customers to determine if they could benefit from lower-cost or free improvements via other programs before taking a PACE loan.

## 3. COMMUNITY PURCHASE PROGRAMS

*Guiding principles: Accessibility and Affordability, Community Engagement*  
*Barriers addressed: Cost, Market Forces, Education and Outreach*

Also called "Solarize" programs, Community Purchase Programs help multiple homeowners go solar together, making the process easier and more affordable. Typically a third-party administrator (often a nonprofit organization or public agency) helps homeowners pool their purchasing power and navigate the process of issuing a request for proposals, selecting a qualified solar provider, and assessing financing options. This model can result in prices that are 15-20 percent lower than market rates, putting solar within reach of some lower-income homeowners.<sup>(28)</sup> Importantly, low-income customers will still need access to incentives, financing and/or options beyond direct upfront cash purchase for this model to work in this sector. The process of going solar with friends, neighbors and expert guidance also helps overcome the education and marketing barriers that are particularly pronounced in low-income communities.

Community Purchase Programs have been successfully administered to serve specific neighborhoods, employee networks and other affinity groups. A rooftop solar offering could also be combined with a shared solar project to enable participation from renters.





#### 4. COMMUNITY DEVELOPMENT FINANCE AND COMMUNITY REINVESTMENT

*Guiding principles:* Accessibility and Affordability, Compatibility, and Community Engagement

*Barriers addressed:* Cost

Community Development Financial Institutions (CDFI) and Community Development Entities (CDE) are mission-driven financial institutions, corporations, or partnerships that serve and empower economically distressed communities. CDFIs and CDEs have access to and experience with affordable financing, government grants and tax credits, and technical assistance through the CDFI Fund and other government and nonprofit partners. CDFIs have historically led the development of affordable housing and small businesses in low-income communities and communities of color. Within the energy sector, CDFIs have emerged as critical partners and developers.

A notable example is Mountain Association for Community and Economic Development (MACED) in Kentucky. Recognizing a deep need by residents to reduce energy bills, MACED partnered with rural electric cooperatives to create an on-bill finance energy efficiency program that would allow homeowners to retrofit their homes at no cost, and repay the loan through their utility bill with a guaranteed rate of savings. In order to minimize risk, MACED created a loan-loss reserve fund that would provide full insurance to the cooperatives if any customers defaulted on their loans.

Whether providing direct investment dollars or credit enhancements, CDFIs can play a critical role in solar development. Potential incentives for CDFIs and CDEs include:

- a. **The Community Reinvestment Act.** This law requires financial institutions to meet the credit needs of the communities in which they operate. Institutions are reviewed by their regulatory authority to ensure they are supporting their local communities across the income spectrum. This incentivizes banks to offer more affordable loans to people and institutions that might otherwise be seen as higher risk.

- b. **New Markets Tax Credit (NMTC).** This tax credit provides tax savings to equity investors who invest in community development entities that will develop housing, catalyze economic development, and create jobs in low-to-moderate-income neighborhoods. Given that solar creates economic development and opportunities for job creation and vocational training, NMTC can be a critical funding opportunity for shared and low-income solar projects, providing a 39 percent tax credit on projects over a seven-year period. These provide a consistent guaranteed return on investment within the seven years of a project, which can often be the payback period for solar programs. The NMTC is currently expired, however there are continual efforts in Congress to reintroduce it.
- c. **Other.** The CDFI Fund and other government institutions have many programs that offer grants, long-term capital, tax credits, and technical assistance to CDFIs and CDEs.

#### 5. GREEN BANKS

*Guiding principles:* Accessibility and Affordability, Community Engagement, Compatibility and Integration

*Barriers addressed:* Cost

Green banks are fully or partially funded state financial institutions that support affordable financing for clean energy or environmentally beneficial projects. While the structure of green banks differs from one state to another, there is generally a focus on partnering with private institutions on project finance and long-term market development. Leading examples of the green bank concept exist in Connecticut, New York, and Hawaii.

Green banks hold significant potential to expand access to affordable financing for low-income communities and the projects that serve them by providing credit enhancement mechanisms, such as loan guarantees or loan-loss reserves. These credit enhancement mechanisms reduce the risk associated with financing a project that serves customers with lower credit scores or debt-to-income ratios by having the green bank either guarantee the loan itself or provide a fund that financiers can apply to for repayment of defaulted loans.

Green banks can also support low-income solar participation by providing low-interest loans to project developers. This low-cost financing makes the project more financially appealing by reducing total cost of development. The developer may then be able to afford to complete their financing with the more costly financing associated with higher credit risk customers, or take on more risk themselves. The Connecticut Green Bank has successfully used this mechanism to reduce the minimum credit score for some solar financing to 640.<sup>(28)</sup> This is a significant improvement over the 670 or higher minimums most solar financing or power purchase agreement arrangements require, but remains too high for many low-income households.

The Hawaii Green Infrastructure Authority, Hawaii's green bank, partnered with the State Energy Office to establish a Green Energy Market Securitization (GEMS) program aimed at expanding access to affordable financing for clean energy to low-income

populations. The program uses capital raised through issuance of highly rated bonds, guaranteed by the green infrastructure fees assessed to all electric customers, to make loans to customers for solar projects. While there is a relatively low minimum credit score of 600 for these loans, customers with lower credit scores pay higher interest rates. This program is successfully expanding access to financing for more customers, but for many low-income customers it will be a costly form of financing, currently at 9.875 percent for customers with 600-619 credit scores.<sup>(30)</sup>

## 6. GRANTS AND TECHNICAL ASSISTANCE

*Guiding principles: Accessibility and Affordability, Community Engagement, Compatibility and Integration*

*Barriers addressed: Cost, Market Forces, Education and Outreach*

Grants can be used to both directly fund projects developed for the benefit of low-income customers, and provide technical assistance to community-based organizations looking to support solar development, particularly in communities of color, environmental justice communities, and low-income communities.

One source of direct grant funding for projects that already exists nationally is the Community Development Block Grant (CDBG) program, one of the longest-running programs of the U.S. Department of Housing and Urban Development (HUD). CDBG “is a flexible program that provides communities with resources to address a wide range of unique community development needs.”<sup>(31)</sup> HUD has authorized the use of CDBG funding for energy projects, and many cities are already using it for solar.

Investing in community organizations can also facilitate solar projects. Community organizations are often well-situated to support the development of solar in their communities given their relationships, community expertise, and history of doing economic and social development work. However, they tend to be resource-constrained and tasked with tackling a range of issues to meet community needs. Grants and technical assistance can help community-based organizations engage with solar installers, policymakers, and planners; do outreach to support solar adoption; help with project development such as siting, program management software, permitting and other ‘soft cost’ reduction, and resources to support communication efforts with low-income customers.

Examples of grant programs that can build capacity for community-based organizations to support low-income solar projects include:

**a. U.S. Department of Energy (DOE) Sunshot Initiative Solar Market Pathways<sup>(32)</sup> Cooperative Grants.** In 2015, DOE awarded Cook County, Illinois with a \$1.2 million cooperative grant to support community-based organizations, environmental organizations, solar developers, Cook County, and other stakeholders in their development of a community shared solar program, among other solar market pathways. The grant provides funding for participants to do feasibility studies,<sup>(33)</sup> identify economic models, create a marketplace, and pilot five to seven projects.



**b. New York City Worker Owned Cooperative Development Initiative.** As low-income communities seek to find viable and wealth-building solutions in the energy economy, many communities are exploring the role of cooperative developments as a way to boost ownership and participation. Worker-owned cooperatives like the Energy Solidarity Cooperative in the San Francisco Bay Area and the Pacific Electric Worker-Owned Coop in Los Angeles are two examples of worker-owned cooperative efforts that are investing in low-income and community of color solar projects. These types of efforts can be a key opportunity for low-income solar engagement and can blossom with the right types of grant support. One example of such funding is the New York City (NYC) Worker Owned Cooperative Development Initiative. In FY 2015, NYC allocated \$1.2 million to invest in the development of worker-owned cooperatives. The funding was dedicated to technical assistance efforts to new and current worker-owned cooperatives through legal support, business planning, and start-up seed capital for newly developing cooperatives. While general, it could provide seed money for solar cooperatives in the city.<sup>(34)</sup>

**c. Colorado Energy Office (CEO) Low-income Community Shared Solar Demonstration Project.** In 2015, the CEO launched a low-income community solar demonstration project designed to demonstrate the viability of community solar models that serve low-income households. GRID Alternatives received a \$1.2 million grant in August 2015 to develop and implement a portfolio of projects. For more on this see the community shared solar models section.

**d. Florida Solar and Energy Loan Fund (SELF).** A nonprofit lending institution created by St. Lucie County in 2010, SELF provides low-cost loans to small businesses and residents with credit scores as low as 500 for energy-saving such as efficiency and solar. To give low-income residents an affordable way to achieve energy and financial savings, SELF created the Clean Energy Loan





Program, providing assistance throughout the home energy upgrade process. The fund was initially created with seed money from state and federal grants, and has offered about 300 loans to date with interest rates as low as six percent and terms as long as 15 years. Participants see average energy savings of 22 percent.<sup>(35)</sup>

e. **New York's Affordable Solar and Pre-Development Technical Assistance.** In December 2016, NY-SUN launched its Affordable Solar and Pre-Development Technical Assistance Program, which supports the development of proposed solar projects serving low-to-moderate income (LMI) households through multifamily affordable housing and community solar installations. Eligible applicants include multifamily affordable housing providers, community organizations and service providers working to make solar accessible to LMI communities. Proposals may request funding up to \$200,000 for predevelopment and technical assistance work on a proposed solar project or group of projects.

## 7. PLACE-BASED INVESTMENTS

**Guiding principles:** *Accessibility and Affordability, Community Engagement*

**Barrier addressed:** *Cost, Market Forces, Education and Outreach*

Research continuously shows that local ownership of businesses and infrastructure paired with place-based investments can both build community wealth and facilitate development without displacement. Frontline communities, such as environmental

justice communities and communities of color, are disproportionately subject to fossil fuel development and public disinvestment in infrastructure. When development occurs, low-income residents are often pushed out of the community before they can benefit from innovative solutions. Investment in solar projects sited in low-income communities and developed in close collaboration with community organizations and residents can help meet community-specific needs, create employment opportunities, and build community wealth.

While there are few examples of place-based investments used to advance solar development, there are other models that offer guidance on how low-income solar projects can be supported through this mechanism.

a. **California Green Zones.** California Environmental Justice Alliance (CEJA) has pursued a green zone approach that supports community participation in planning and decision-making processes that can allow for economic and social development including community shared solar. The green zone initiative first identifies neighborhoods that are heavily impacted by pollution, then assesses both the assets and needs that these communities have for project development, pools existing capacity, and directs a range of additional public benefits and programs into those communities.<sup>(36)</sup> While not current policy, green zones are being pursued by community organizations as a conduit to utilize the California Investments funds that are reserved for “disadvantaged communities.” The investment plan for these funds includes dedicated solar development in low-income communities.

b. **Ohio Special Energy Improvement Districts.** In 2009, the Ohio state legislature passed enabling legislation that granted municipalities bonding authority to finance energy efficiency upgrades and renewable energy projects on real property within designated areas known as Special Energy Improvement Districts (SEID). Municipalities have the authority to set the criteria and guidelines for the program and issue bonds. Residents of an SEID can apply for funding to improve their homes through efficiency and renewable energy projects. They pay off the loans through a Property Assessed Clean Energy (PACE) program, which adds an assessment to their property tax bills over a number of years.

Most SEID programs focus on the residential sector, though the City of Cleveland partners with the First Suburbs Development Council to create commercial loans for energy improvements. Churches and local, county, state or federal properties are not allowed to be considered within a SEID unless they are specifically part of the nonprofit corporation or seek acceptance through a formal application process. The definition of an existing qualified nonprofit corporation includes a nonprofit corporation that is providing or assisting others in providing housing for low- or moderate-income persons.

The Ohio SEIDs create an opportunity to leverage PACE programs to focus public financing for efficiency or renewables in specific places. This allows a municipality to better leverage funds or for residents to pool their consumer power to negotiate bulk purchasing of efficiency services or renewable energy installations.

## D. FEDERAL PARTNERSHIPS/BEST PRACTICES SHARING

*Guiding principles: Community Engagement*

*Barriers addressed: Compatibility and Integration, Market Forces*

The White House, as well as federal agencies like the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Department of Housing and Urban Development (HUD), have recognized and voiced the importance and positive impact of low-income solar programs. Dedicated funding from federal sources for low-income solar programs has been largely absent, but a few partnerships have formed to ensure best practices sharing between jurisdictions looking to or in the process of implementing low-income solar programs. Partnerships with federal agencies are very valuable because they help provide impetus at a national level for making state- and local-level solar policies more inclusive of low-income families. Below are a few of the national efforts underway in support of low-income solar programs.

- a. In July 2015, the White House, in partnership with the DOE SunShot Initiative, announced the National Community Solar Partnership to increase access to solar energy for all Americans, in particular low- and moderate- income communities, while expanding opportunities to join the solar workforce.<sup>(37)</sup> In July 2016, the White House announced the Clean Energy Savings for All Americans Initiative, which will work to ensure that every household has options to choose to go solar and put in place additional measures to promote energy efficiency. To continue along this track, the Administration, in collaboration with state agencies, announced a new catalytic goal to bring 1 gigawatt (GW) of solar to low- and moderate-income families by 2020. In late 2016, the DOE SunShot Initiative also launched the “Solar in Your Community Challenge,” a \$5 million contest to support innovative and replicable community-based solar business models and programs that will bring solar to underserved communities.
- b. HUD’s Renew300 initiative provides technical assistance to educate affordable housing owners about the broad benefits and opportunities that solar energy provides.<sup>(37)</sup> With updated commitments made in July 2016<sup>(39)</sup>, the initiative is on track to install 344 MW of solar by 2020, exceeding its goal of 300 megawatts (MW) of solar and other types of renewable energy on federally-subsidized housing.
- c. As part of the DOE’s Better Buildings Challenge to reduce energy consumption by 20 percent by 2020, the Housing Authority of the City and County of Denver partnered with a number of organizations to both develop and finance a project that brought photovoltaic solar to 387 affordable housing buildings throughout the city.<sup>(40)</sup> Announced May 2016, the DOE’s Better Buildings Clean Energy in Low Income Communities Accelerator supports the President’s Climate Action Plan with a goal to accelerate investment in home energy efficiency improvement projects across the country. The focus of the collaboration is to lower energy bills in low-income communities through expanded installation of energy efficiency and distributed renewables. The program will encourage the development of innovative partnerships, best practices and funding models that a state-level agency, local government or utility program could deploy for communities that need it most.

d. DOE and HUD partnered with the U.S. Department of Education in developing STEM, Energy, and Economic Development (SEED): Coalitions for Community Growth, an innovative place-based initiative to create economic opportunity and energy-literate communities. SEED’s focus is on inspiring public housing residents around the country to pursue careers in energy, and preparing them to join its labor force. The SEED initiative links existing federal investments and activities to local coalitions to expand or launch programs based on energy literacy, STEM Education, and job-driven skills training.<sup>(41)</sup>

e. The EPA’s Clean Power Plan (CPP) to regulate greenhouse gas emissions from power plants under the Clean Air Act may be an opportunity for low-income solar programs. Under the CPP, the EPA established new limits on carbon dioxide emissions from the power sector, and requires states to develop their own compliance plans for meeting those standards. In some states, the implementation and planning process may create opportunities for more low-income solar investments over time. Notably, in the Clean Energy Incentive Program (CEIP), the EPA is providing additional incentives to encourage states to invest in programs that make energy efficient property, including solar, more accessible to low-income communities. The CPP and CEIP represent one of the largest opportunities to continue the support and vision to make the clean energy economy more accessible to all families and communities.

f. There is growing interest in using federal energy assistance funding for low-income solar installations, as described in a recent George Washington Solar Institute report.<sup>(42)</sup> In 2010, the California Department of Community Services & Development (CSD) set aside \$14.7 million, a portion of its annual federally-funded Low Income Home Energy Assistance Program (LIHEAP) allocation, under the U.S. Department of Health and Human Services, to fund an innovative pilot program that allowed 1,482 low-income households to receive fully installed solar systems. The California pilot program ended in 2012.

The Department of Energy recently authorized Colorado, through the Colorado Energy Office (CEO), to be the first state to integrate rooftop solar into its Weatherization Assistance Program (WAP). CEO is moving forward in 2017 with a pilot leveraging eligible WAP funding and matching incentives from Xcel Energy Colorado, aiming to comprehensively address energy burden through weatherization and solar for 300 low-income households by 2019.

## E. CONSUMER PROTECTIONS

*Guiding principles: Consumer Protection*

*Barrier addressed: Market Forces*

Entering into a contract for solar, whether under a leasing arrangement, a purchase, or an interest in a community solar project, is an important decision. As with other significant financial transactions, consumers should understand what they are agreeing to and not be subject to unfair, abusive, or deceptive practices. Low-income solar

programs should be designed to protect consumers from financial arrangements that may be too risky, with an eye toward maximizing household savings.

At the outset, low-income program design should recognize the existence of state and federal consumer protection laws, and should emphasize the need for robust enforcement of those existing laws. Additionally, program design should emphasize consumer education, with a requirement for solar providers to engage in a clear review of the substantive terms of the agreement with their customers. Review of key terms should include, among other things, provisions relating to the term of the agreement, Renewable Energy Credit allocation, contract termination, fees, and rate escalators or assumptions.

Depending on program design and need, a low-income solar program may include a process for registering solar providers who have met minimum criteria for program participation. Pre-certification of solar providers may be useful for overcoming customer skepticism, while rewarding providers who have proven to be reliable businesses. If program design does not include pre-certification, consumer protection provisions should encourage customers to fully vet their potential solar providers.

Program design should include robust stakeholder input to identify the specific consumer protection measures required, which may vary by jurisdiction. Some examples of consumer protection measures in program design may be found in these state examples (see <http://www.lowincomesolar.org/toolbox/consumer-protection/> for more detailed information):

- Issued April 7, 2014, the Minnesota Public Utilities Commission (MPUC) Order Rejecting Xcel's Solar-Garden Tariff Filing and Requiring The Company to File a Revised Solar-Garden Plan (pg. 28-30) lists the subscriber-protection measures that the tariff and contract between Xcel and the solar-garden operator must include.
- Issued January 30, 2015, the California Public Utilities Commission (CPUC) instituted minimum consumer protection standards in its *Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues*. The Program Administrator of the Single-Family Affordable Solar Homes (SASH) Program was required to adopt these minimum standards as part of its third-party ownership (TPO) model.
- Effective July 18, 2016, the Maryland Public Service Commission included consumer protection requirements in the state's 3 year Community Solar Energy Generating Systems (CSEGS) pilot program.

Organizations like the Interstate Renewable Energy Council (IREC) and the Solar Energy Industries Association (SEIA) provide additional guidance and resources related to consumer protection. The Better Business Bureau and state or city contracting boards are good resources for information about local providers.

## ON-THE-GROUND HIGHLIGHT



## INSPIRING INTEGRATION

An exciting “first” is happening on the Leech Lake Band of Ojibwe Reservation in northern Minnesota: the integration of community solar with an energy assistance program to facilitate customer outreach, education, and enrollment.

With the assistance of a \$490,000 grant from the Minnesota Environment and Natural Resources Trust Fund, the Leech Lake Band is working with the Rural Renewable Energy Alliance (RREAL) to install a 200 kW community solar garden at a local community center. The local LIHEAP provider, Leech Lake Energy Assistance Program, will identify 100 low-income households per year to receive the electricity from the community solar garden. As a result, participating customers will see a reduction in their utility bills, which will decrease their need for energy assistance support.

“This is an opportunity to provide a social service while also making sure the energy economy is inclusive,” comments Jason Edens, the director of RREAL. “Going forward, integrating solar into energy assistance will be a more fiscally responsible way to use energy assistance funding, because it has a return on investment for the taxpayer.”

Integrating solar into the Leech Lake Energy Assistance Program is spurring further efforts by the Band to explore increased clean energy use on the reservation. In the meantime, the Band's community solar garden is an exciting start toward fully integrating solar into energy assistance programming across the nation.





LOW-INCOME SOLAR POLICY GUIDE

## SUCCESSFUL LOW-INCOME SOLAR PROGRAM MODELS

### SINGLE-FAMILY SOLAR POLICY TOOLBOX

- Consumer Protections
  - • •
- Community Development Finance and Community Reinvestment
  - • •
- Community Purchase Programs
  - • •
- Federal and State Tax Credits
  - • •
- Federal Partnerships/ Best Practices Sharing
  - • •
- Grants and Technical Assistance
  - • •
- Green Banks
  - • •
- Net Metering/Virtual Net Metering
  - • •
- On-Bill Recovery/ On-Bill Financing
  - • •
- Place-Based Investments
  - • •
- Property Assessed Clean Energy
  - • •
- Rebates
  - • •
- Solar/Renewable Energy Certificates

A low-income solar program may leverage a varied combination of the policy tools and initiatives described in the previous section. This section describes a number of programs targeting different consumer sectors that have had success in broadening solar access and increasing adoption. This is not meant to be a comprehensive list of all low-income solar programs nationally, but rather highlight successful elements of a few programs.

### A. SINGLE-FAMILY ROOFTOP

Homeowners across the country have typically participated in the solar market by installing solar directly on their property to meet a portion of their own energy needs. Coupling the core policies used to develop a strong rooftop solar market with specific provisions for ensuring low-income participation can effectively expand solar access among single-family homeowners. A low-income solar program for single-family homes provides significantly reduced- to no-cost solar electric systems to households that qualify as low-income. The definition of low-income varies by location but is typically defined as 80 percent of the area median income (AMI). The cost of the solar electric system is covered by a variety of sources, again based on

location. Federal, state, and local incentives may be used to cover the cost, as well as philanthropic funds and equipment donations.

What makes these low-income single family solar policies successful? They all take advantage of net metering, have adequate dedicated funding sources, and incorporate some or all of the guiding principles of a low-income solar program laid out in Section I.

In a snapshot:

- DC's recent programs included a direct incentive (\$2.70/watt rebate). At no upfront cost to the homeowners, the installations were financed using a combination of SRECs, federal tax incentives, local incentives, and contractor financing.
- CA's SASH Program includes a direct incentive (\$3.00/watt rebate); gap financing provided by the program administrator; and comprehensive programming (energy efficiency requirement and workforce development).
- CA's GoSolarSF includes a direct incentive (residential incentive and supplemental low-income incentive).
- CA's Richmond R3 Program included a direct incentive (state and local rebates) and indirect incentives.
- MA's Solar Carve-Out II/SREC II includes a direct incentive (solar generation serving low-income customers eligible for the highest SREC multiplier available).
- MA's Solar Loan Program includes financing (cash-flow positive loans).

New York's single family low-income solar program demonstrates why higher incentive levels are necessary to move low-income solar access forward in a scalable manner. The Green Jobs-Green New York program (Green Jobs-Green New York Act of 2009) provides residential solar incentives and financing options for customers via the NY-Sun Initiative, as well as workforce development opportunities. Through NY-Sun, the state provides rebates and affordable financing for the installation of approved, grid-connected solar systems. NY-Sun's Affordable Solar Program provides double the standard incentive amount for households earning less than 80 percent of the area or state median income, whichever is greater. Via a pilot program, NY-Sun also offered low-income customers low-interest loans to pay for solar installations, which were repaid on the customer's utility bill, up to \$6,000. Customers with credit scores above 540 were eligible, among other loan approval criteria. The program ran through 2016 and was limited to 300 projects.

Despite these incentives, NYSEDA reports that, during the second quarter of 2016, six solar installations were completed under the Affordable Solar program, and applications for 16 installations were approved.<sup>(43)</sup> During the same period, under the non-low-income incentive program, 5,506 installations were completed and NYSEDA received applications for 4,108 projects.<sup>(44)</sup> These numbers corroborate accounts by installers who would like to serve low-income customers in New York, but who cannot leverage a double incentive to overcome the many barriers they and their customers face. Hopefully, as REV moves forward and various aspects of the solar market are addressed, low-income solar access will be further incentivized to produce scalable results (see Community Shared Solar - New York, page 49).

## 1. CALIFORNIA

In California, the Single-Family Affordable Solar Homes (SASH) Program launched in 2009 along with its sister program, the Multifamily Affordable Solar Housing (MASH) Program (see the MASH Program description under Multifamily Affordable Housing).



The programs were financed using 10 percent of the overall \$2.2 billion budget from the ratepayer-funded California Solar Initiative (CSI), California's unprecedented investment in solar market transformation that started in 2006. SASH and MASH are the first-of-their kind programs in the nation. Prior to SASH/MASH, there had not been dedicated low-income solar programs of this size and scope in any state.<sup>(45)</sup>

The nonprofit organization GRID Alternatives was selected by the California Public Utilities Commission (CPUC) as the program administrator for SASH. The program provides qualified low-income homeowners fixed, up-front, capacity-based rebates to help offset the cost of a solar electric system. Currently, the SASH program offers one incentive level of three dollars per watt. Eligible applicants must have a household income that is 80 percent or below the area median income, own and live in their home, receive electrical service from one of three investor owned utilities (PG&E, SCE, or SDG&E), and live in a home defined as "affordable housing" by California Public Utilities Code 2852.<sup>(46)</sup>

### Additional program elements include:

- Gap funding from GRID Alternatives to cover the entire cost of the system;
- Multilingual marketing and outreach to educate and establish trust in low-income communities;
- Energy efficiency education and training for all participants;
- Workforce development and job training initiatives that are incorporated into every installation; and
- A focus on volunteerism and broad community engagement with solar in low-income communities.

Although the California Solar Initiative is scheduled to sunset in 2016, SASH/MASH were reauthorized by Assembly Bill 217 (Bradford, 2013), which extended funding until 2021 or until incentives are encumbered, whichever occurs first. By reauthorizing SASH, the California Legislature recognized that despite reduced solar equipment pricing,





low-income families will continue to remain on the sidelines of the clean energy economy without continued price support and incentives. Under AB 217 (the Equitable Access to Solar Energy Act), implemented in January 2015, the SASH Program now also allows a “families-first” third-party ownership model that brings the benefits of the federal ITC to participating households. By increasing low-income households’ access to solar, the SASH program helps ensure that all ratepayers who contribute to solar programs also have the opportunity to access the benefits of the programs. The success of SASH has supported research demonstrating the strong return on investment of low-income solar programs, such as this 2014 study from Vanderbilt University and Sandia National Laboratories.<sup>(47)</sup>

Additionally, in 2015 the state allocated California Climate Investments funds (funds generated by its cap-and-trade program) for low-income solar projects through the California Department of Community Services and Development’s Low-income Weatherization Program (LIWP). SB 535, passed in 2012, required that 25 percent of the cap-and-trade funds be used to benefit environmentally and economically disadvantaged communities. Using a similar structure to the SASH program, this program provides up-front rebates to qualifying residents, and can be used in tandem with SASH incentives for residents who qualify for both. The LIWP Program, includes a direct incentive (\$4.75/watt to \$1.75/watt rebate, based on eligibility for other funding programs); gap financing provided by the program administrator; and comprehensive programming (direct energy efficiency coordination and workforce development requirements).

Additionally, in 2015 the state allocated California Climate Investments funds (funds generated by its cap-and-trade program) for low-income solar projects through the California Department of Community Services and Development’s Low-income Weatherization Program (LIWP). SB 535, passed in 2012, required that 25 percent of the cap-and-trade funds be used to benefit environmentally and economically disadvantaged communities. Using a similar structure to the SASH program, this program provides up-front rebates to qualifying residents, and can be used in tandem

with SASH incentives for residents who qualify for both. The LIWP Program, includes a direct incentive (\$4.75/watt to \$1.75/watt rebate, based on eligibility for other funding programs); gap financing provided by the program administrator; and comprehensive programming (direct energy efficiency coordination and workforce development requirements).

## 2. MASSACHUSETTS

The Massachusetts Green Communities Act of 2008 created a carve-out in the Renewable Portfolio Standard to support distributed solar. Referred to as Solar Carve-Out II / SREC II, solar installations serving low-income customers received a higher ratio of Solar Renewable Energy Credits (SRECs) for each megawatt hour produced from the solar installation compared to other customer installations.<sup>(48)</sup> In other words, solar generation serving low-income customers got more SRECs per unit of energy produced, providing a larger cost offset.<sup>(49)</sup> Massachusetts is in the process of updating the method by which incentives are awarded, and it is expected that a new model will continue to award higher incentives to projects serving low-income customers.

The Department of Energy Resources (DOER) and the Massachusetts Clean Energy Center (MassCEC) have also developed the \$30 million Massachusetts Solar Loan program, a low-income solar loan program through which the state will provide interest rate buy-downs and loan guarantees. The goal of the program is to provide loans that are cash-flow positive from day one, and provide risk protection for lenders who offer these loans to homeowners with lower credit ratings. The Solar Loan Program applies to homeowners, owner-occupied multifamily homes with three or fewer units, or residents interested in purchasing a share in a shared solar project.<sup>(50)</sup> The Mass Solar Loan program launched December 2015.

## 3. DISTRICT OF COLUMBIA

In Washington, D.C., the 2008 Clean and Affordable Energy Act established a Sustainable Energy Trust Fund (SETF) and created a “Sustainable Energy Utility.”<sup>(51)</sup> The SETF is funded by a surcharge to all electric and natural gas ratepayers in the District of Columbia. In 2012, the D.C. Sustainable Energy Utility (DCSEU) launched a Small-Scale Solar Initiative, a pilot for low-income residents in Wards 7 and 8, which resulted in 54 photovoltaic installations to reduce their energy costs. At no upfront cost to the homeowners, the installations were financed using a combination of SRECs, federal tax incentives, DCSEU incentives, and contractor financing.<sup>(52)</sup>

The successful Small-Scale Solar Initiative evolved into the 2015 Solar Advantage Plus Program, which provided rebates to authorized solar installers for installing solar panels on income-qualified homes across every Ward in the District. Funded by the District of Columbia’s Department of Energy and Environment (DOEE), and implemented by the DCSEU, the Solar Advantage Plus Program covered the full cost to install solar panels on single-family homes owned or rented by income-qualified District residents. Authorized solar installers received a maximum rebate of \$10,000 per system. The 2015 Solar Advantage Plus Program operated on a first-come, first-served basis and rebate





## PROTECTED PLACE IN THE SUN

In Southern California, where solar installation is a thriving economic engine, the Mesa Grande Band of Mission Indians took advantage of a state low-income solar program to build a tribally owned solar company that will create opportunity for tribal members for years to come.

In 2014, two individual Mesa Grande members had rooftop solar installed on their homes through California's Single-family Affordable Solar Homes program (SASH). Tribal leaders recognized the potential benefits for the community and worked with SASH program administrator GRID Alternatives to sign up other households for the program. With additional solar installations came workforce training opportunities for tribal members, learning to install on homes in their own community. The tribe decided to leverage the opportunity to start a business, and recruited a core group of 10 founding members from Mesa Grande and neighboring tribes.

Within a year, they had gained enough experience to strike out on their own, and Tekamuk Energy was born. "A spark was ignited by these volunteers. They could see something greater than just learning the trade and getting a job," said Mesa Grande Band Vice Chairman Curtis La Chusa noting that Tekamuk means "protected place in the sun." "They saw they could create a company that would last many years and provide opportunities to not only Mesa Grande but for other communities. They kept that spark and grew it into a fire."

In September 2016, the tribe teamed up with two neighboring tribes to secure a U.S. Department of Energy cost-share grant that will leverage SASH funding for 42 installations in the three communities. Tekamuk will install a portion these projects as a SASH program subcontractor, a status it won in late 2016.

Mesa Grande officials hope their efforts will encourage other tribes to embrace solar. "We've taken this thing and built on it to create an economic opportunity for folks in their home," said La Chusa. "Hopefully this will be a start for tribes around the nation to work together in bringing clean energy to their reservations."

fulfillment was dependent on funding availability.

In 2016, demand for the program (called the Affordable Solar Program) was very high and the DCSEU was funded to serve 140 homes in fiscal year 2016. To date, the DCSEU, working with a number of local contractors, has installed over 500 solar PV systems through its income-qualified solar programming.

In July 2016, DC Mayor Muriel Bowser signed into a law the Renewable Portfolio Standard Expansion Amendment Act of 2016 (B21-0650), setting the stage for a significant expansion of the District's investment in low-income solar. The Act requires the District to set the following goals:

- Increase the amount of energy to be consumed from renewable sources to 50% by 2032;
- Increase the amount of locally generated solar energy from 2.5% in 2023 to 5% by 2032; and
- Establish the "Solar for All Program" to increase access to solar power benefits (includes rooftop, multifamily, and community solar models) to seniors, small local businesses, nonprofits and low-income households, with the goal of reducing electric bills of at least 100,000 district low-income households by at least 50% by 2032.

## 4. RICHMOND, CA

The Richmond Recovery Rebate (R3) Program was created with American Reinvestment and Recovery Act (ARRA) funding to provide home energy efficiency upgrades, solar installations and job training to city residents. Because the R3 program was funded by a one-time federal stimulus grant (Energy Efficiency and Conservation Block Grant (EECBG)), it is no longer accepting applications; however, the success of the program for the City of Richmond, California is a strong example of turning a grant from the federal government into a direct incentive for city residents, especially low-income residents.

The R3 program was created to meet the following principles established by EECBG: reduce fossil fuel emissions, reduce the total energy use of the eligible entities, improve energy efficiency, and create and retain jobs. The program offered general market rebates, as well as no-cost solar installations for income-qualifying homeowners. The general market rebate was set at \$1.50 per watt for solar, with the average homeowner receiving \$4,686.<sup>(53)</sup> Pairing this rebate with federal tax credits and California CSI rebates allowed these homeowners to receive around a 50 percent incentive of the total project cost for a new solar installation, opening up solar opportunities for middle-to-lower income families. For families that qualified for SASH, the R3 program covered the gap to bring the total installation cost to zero. Additionally, integrating workforce development requirements (minimum percentage of on-site work was completed by graduates of the city's green jobs academy, Richmond Build) guaranteed that local residents benefited from the completed work and Richmond dollars were reinvested into the local economy.<sup>(54)</sup>

In 2015, the City of Richmond committed an additional \$500,000 of funding from Chevron refinery upgrade fees to provide gap funding for 130 SASH- and LIWP-qualified families to go solar.



## 5. SAN FRANCISCO, CA

City and County of San Francisco offers rebates for local solar electric projects through a program called GoSolarSF, administered by the San Francisco Public Utilities Commission (SFPUC) Power Enterprise. The program is based on the Solar Energy Incentive Program ordinance, which outlines a 10-year program with a budget objective of \$2 million to \$5 million annually.<sup>(55)</sup>

Under the program, low-income households are eligible to receive supplemental incentives at varying levels depending on their income and where they live (incentive adders are available for systems installed in an environmental justice area).<sup>(56)</sup> GoSolarSF complements the state's SASH program by helping fill in the funding gap, and also provides a higher incentive level to city residents who do not meet the SASH income qualification but meet the city's definition of low-income (at or below AMI), are PG&E CARE ratepayers, or are CalHome loan participants.

In order for homeowners to receive a GoSolarSF Incentive, they are required to use a GoSolarSF Certified Contractor. Exemptions to this requirement include using a nonprofit contractor, or a contractor headquartered in San Francisco with three or fewer employees. To obtain GoSolarSF certification, contractors are required to provide one or more entry-level job opportunities to San Francisco-based workers.

GoSolarSF's focus on empowering low-income and underserved members of the community to participate in and benefit from the city's growing solar economy has proven successful. As of April 2014, 37 percent of the program's residential capacity (kW) was installed on qualifying low-income single-family and multifamily homes. Furthermore, workers of color represented the largest populations served by the workforce development program with 40 percent Black and 22 percent Latino job placements.<sup>(57)</sup>







## B. MULTIFAMILY AFFORDABLE HOUSING

### MULTIFAMILY SOLAR POLICY TOOLBOX

Community Development Finance  
and Community Reinvestment  
...

Community Purchase Programs  
...

Community Shared Solar  
...

Consumer Protections  
...

Federal and State Tax Credits  
...

Federal Partnerships  
Best Practices Sharing  
...

Grants and Technical Assistance  
...

Green Banks  
...

Net Metering/Virtual Net Metering  
...

On-Bill Recovery/  
On-Bill Financing  
...

Place-Based Investments  
...

Property Assessed Clean Energy  
...

Rebates  
...

Solar/Renewable  
Energy Certificates

A low-income multifamily solar program is a great way to help affordable housing providers, building owners, or large apartment complexes install solar for the direct or indirect benefit of the tenants. Utility bills are usually the largest and most volatile portion of an affordable housing development's budget. Stabilizing utility bills through solar and other measures makes it easier to maintain operating budgets, retain tenant services and avoid raising rents.

A multifamily solar electric system may be on the roof or ground mounted. The system may be designed to offset electricity use for common areas or to offset tenant electricity usage, and be hooked up via a master meter, individual meters, or virtual net energy metering (VNEM). Regardless of how the system is structured, the savings can help the housing authority or building owner better maintain the building, provide new tenant services, and/or reduce individual tenants' electricity bills.

What makes the low-income multifamily solar programs described here successful? They take advantage of net metering or virtual net metering, have adequate funding sources and incorporate some or all of the guiding principles of a low-income solar program outlined in Section I.

### 1. CALIFORNIA

In California, the Multifamily Affordable Solar Housing (MASH) Program launched in 2009 along with its sister program, the Single-Family Affordable Solar Homes (SASH) Program (see SASH Program's description under Single-Family Rooftop). MASH/SASH were financed using 10 percent of the overall \$2.2 million budget from the ratepayer-funded California Solar Initiative. The MASH program provides fixed, up-front, capacity-based incentives for qualifying solar energy systems on affordable multifamily dwellings. The goals of the MASH program are to<sup>(58)</sup>:

- Stimulate the adoption of solar power in the affordable housing sector;
- Improve energy utilization and overall quality of affordable housing through the application of solar and energy efficiency technologies;
- Decrease electricity use and costs without increasing monthly household expenses for affordable housing building occupants;



- Increase awareness and appreciation of the benefits of solar among affordable housing occupants and developers;
- Maximize the overall benefit to ratepayers;
- Enroll eligible participants in the Energy Savings Assistance (ESA) program; and
- Provide job training and employment opportunities in the solar energy and energy efficiency sectors of the economy.

Assembly Bill 217 (Bradford, 2013) extended the funding for MASH/SASH until 2021 or until incentives are encumbered, whichever occurs first. Under AB 217, the extended MASH Program includes new requirements for workforce development and energy efficiency starting in July 2015. A higher MASH incentive is available for projects that offset tenant energy use and provide direct tenant benefit, as opposed to a lower incentive for projects that only offset common load and typically benefit the building owner/operator.

California's Virtual Net Energy Metering (VNM) program was piloted in MASH as a mechanism to provide direct tenant benefit with the key parameter that all meters being offset must be served by a single "service delivery point." VNM allows for energy credits to be allocated among individual units as well as to common area load. Even with VNM, it can be challenging to pass on a net monthly benefit to participating households that are in HUD subsidized housing due to the utility allowance structure. In HUD subsidized housing, rent plus utilities paid by tenants is adjusted to total less than 30 percent of their income. In some cases, the proportion of rent paid by the tenant will increase when utility costs decrease, rendering no net financial benefit to the household at the end of the month.

In 2015, Assembly Bill 693 (Eggman, 2015) established a new Multifamily Affordable Housing Solar Roofs Program (MAHSRP) to extend low-income multifamily solar options beyond the existing MASH program. Similar to MASH, the MAHSRP uses up-front rebates to reduce the cost of installing solar, but requires that the systems provide direct economic benefits to tenants. It is funded by the California Climate Investments fund (cap-and-trade revenues). The Multifamily Affordable Housing Solar Roofs Program - the largest dollar investment for low-income multifamily solar to date<sup>(59)</sup> - is being implemented starting in 2016 with California Public Utilities Commission oversight. The program will be up and running no later than June 30, 2017 and will provide incentives up to December 31, 2030 for qualified deed-restricted multifamily properties.

In addition, the California Department of Community Services and Development received an allocation of California Climate Investments funding (revenue from the state's cap-and-trade program) for energy efficiency and renewable energy benefits to populations located within Disadvantaged Communities (DAC), of which \$24 million has been committed to large multifamily properties. The Low-Income Weatherization Program - Large Multifamily (LIWP-LMF) brings together energy efficiency, solar thermal, and solar PV upgrade opportunities under a single program offering to support owners and residents in lowering utility costs, saving energy and reducing greenhouse gas emissions. Incentives cover approximately 30-80 percent of energy efficiency upgrades and 50-100 percent of solar installations.

## 2. MASSACHUSETTS

Launched in December 2015, the \$30 million Massachusetts Solar Loan program is a low-income solar loan program through which the state will provide interest rate buy-downs and loan guarantees. The goal of the program is to provide loans that are cash-flow positive from day one, and provide risk protection for lenders who offer these loans to homeowners with lower credit ratings. Massachusetts Solar Loan program is applicable to homeowners, owner-occupied multifamily homes with three or fewer units, or residents interested in purchasing a share in a community shared solar project.

Solar providers in Massachusetts have also successfully used existing federal and state incentives like the Investment Tax Credit and New Markets Tax Credit to develop affordable multifamily solar. Boston Community Capital (BCC), a Community Development Finance Institution, offers an example of this. Since 2008, BCC has developed more than four megawatts of both rooftop and ground-mounted solar in Massachusetts. Two thirds of those four megawatts serve affordable, multifamily housing and typically meet 100 percent of common area electricity needs and occasionally directly meet tenants needs as well. BCC provides the upfront capital and captures the available incentives, including tax credits, to bring these benefits directly to multifamily housing. BCC owns the solar systems and as a result monetizes both the ITC and NMTC and thus offers the housing developments savings with no up-front costs. BCC also maintains the solar systems at no cost to the housing development.<sup>(60)</sup>

## 3. DISTRICT OF COLUMBIA

The District of Columbia Sustainable Energy Utility (DCSEU) (see Single-Family Rooftop section for more on this) offers technical assistance and rebates to multifamily housing developers and property managers who work with the DCSEU to incorporate energy efficiency measures, including solar thermal hot water heating systems for gas heated central hot water systems, in the new development, redevelopment, or substantial rehabilitation of multifamily housing in the District. As noted by DCSEU, the greatest opportunities for cost-effective energy savings present themselves at the time of new construction or major rehabilitation. Applicants must have substantial funding commitments in place and for income-qualified enhanced rebates at least 66 percent of the residential units per building must be designated for or inhabited by households with incomes at or below 60 percent AMI.<sup>(61)</sup>

The National Housing Trust (NHT) provides an on-the-ground example for their multifamily affordable buildings in Washington, D.C. Referred to as the NHT/Enterprise venture, more than 20 buildings in D.C. will be equipped with solar thermal panels for hot water and photovoltaic systems for space heat and other electricity uses.<sup>(62)</sup>



### C. COMMUNITY SHARED SOLAR

COMMUNITY SOLAR POLICY TOOLBOX
Consumer Protections • • •
Community Development Finance and Community Reinvestment • • •
Community Purchase Programs • • •
Community Shared Solar • • •
Federal and State Tax Credits • • •
Federal Partnerships/ Best Practices Sharing • • •
Grants and Technical Assistance • • •
Green Banks • • •
Net Metering/Virtual Net Metering • • •
On-Bill Recovery/ On-Bill Financing • • •
Place-Based Investments • • •
Rebates • • •
Solar/Renewable Energy Certificates

States and utilities across the country are exploring shared renewables as an additional pathway to connect consumers at the community-wide scale with the clean energy they want. Because the model is still relatively new, states, utilities,<sup>(63)</sup> and organizations like Interstate Renewable Energy Council (IREC)<sup>(64)</sup> and the Coalition for Community Solar Access (CCSA)<sup>(65)</sup>, and are testing different policy paths to help their consumers plug into shared solar.

As with single- and multifamily solar programs, shared solar compensation and finance mechanisms should enable broad community participation and have additional provisions to reduce barriers and increase benefits for low-income consumers. Strong programs will adhere to the guiding principles laid out in Section I and the program guidelines identified in Section II.

#### 1. COLORADO

In 2010, Colorado became the first in the nation to pass statewide shared renewables legislation, the Community Solar Gardens Act. Five years later, Colorado expanded the program further with HB 15-1284.

The Community Solar Gardens Act included direction on a number of design elements that make shared renewables work for utilities, developers and consumers alike. Colorado defines solar gardens as projects between 10 kilowatts (kW) and two megawatts (MW) in size located in or near the same community as the customers being served. These shared solar systems should serve at least 10 subscribing customers. The owner of the system can be either the utility or a third-party operator that contracts with the utility for the solar power production, creating diverse opportunities for market participation. Care was taken to make sure that all of these new megawatts of local solar power add to rather than detract from the state’s other successful clean energy policies like net metering.

Community solar garden subscribers receive full retail credit for their portion of the power produced, minus a reasonable charge to cover the utility’s costs of delivering the electricity from the garden to the customer. Similar to net metering, this bill credit can be carried forward if it exceeds the customer’s electricity use in any given billing period.



## BROWNFIELD TO GREENFIELD

Contaminated former industrial sites and landfills, often referred to as brownfields, can pose a challenge for many communities, but for renewable energy development, they might just be an opportunity.

In December, 2016 workers put the finishing touches on a community solar array atop a former landfill in San Miguel County that will significantly lower the electric bills of qualified low-income residents. The project, a collaboration between the San Miguel Power Association (SMPA), the county, the Colorado Energy Office (CEO) and GRID Alternatives, is part of a statewide initiative to reduce energy costs for utilities' highest need customers.

Undaunted by sub-freezing temperatures and snowy weather, community members volunteers traveled from across the state to help GRID install the array over the course of two weeks. Project participants included members of local environmental groups, community organizations, and local college students.

Representatives from the Department of Energy and Environmental Protection Agency were also onsite to see the project come together. "When we see projects like this, we are filled with optimism," said Sandy Stavnes, Acting Assistant Regional Administrator for the EPA. "With this project, community partners came together to turn property that had limited reuse potential into something that will provide energy to community members in need as well as significant environmental benefits."

This was the sixth low-income community solar demonstration project developed in partnership with local utilities through a \$1.2 million grant GRID received from CEO in August 2015. Each project piloted a slight variation on the low-income community solar model to address the unique needs of rural utility service areas and their customers.

To comply with language in the statute<sup>(66)</sup>, the rulemaking provided for five percent of new shared solar projects to be reserved for low-income customers.<sup>(67)</sup> This has resulted in partnerships like the one between developer Clean Energy Collective and the Denver Housing Authority (DHA), in which a portion of the power produced by three shared solar facilities is dedicated to offsetting the electricity bills for approximately 35 families living in DHA facilities. The arrangement is expected to save participants hundreds of thousands of dollars over twenty years. Colorado has since built on this policy leadership to offer additional community solar programs and incentives for low-income customers.

In 2015, the Colorado Energy Office (CEO) launched a low-income community solar demonstration project designed to demonstrate the viability of community solar models that serve low-income households. GRID Alternatives received a \$1.2 million CEO grant in August 2015 to develop and implement a portfolio of projects in partnership with rural utilities. The demonstration will include at least five projects totaling over one megawatt of installed solar capacity to serve at least 300 low-income families. The CEO investment is leveraged with utility investment for each project, at a ratio of two dollars for each dollar of CEO grant funding invested. In-kind contributions may also be included in the leveraged ratio. While the details will vary project by project, each project will result in significant savings to low-income subscribers. The community solar installations will also provide an estimated 2,000 hours of hands-on solar job training to local workers.<sup>(68)</sup>

In November 2016, Colorado took another step to advance low-income solar policy, through PUC approval of a settlement<sup>(69)</sup> agreement for Xcel Energy that includes one of the most comprehensive low-income solar programs in the country. Over the three year agreement period from 2017-19, low-income Xcel customers will be guaranteed access to up to 20 MW of new solar capacity, including 4.5 MW of dedicated community solar annually; up to 5.25 MW of additional utility-offered low-income community solar; and up to 300 kW of rooftop solar systems. The rooftop solar program will be implemented by the Colorado Energy Office under the first pilot program to utilize DOE weatherization dollars for solar. These low-income solar investments will reach around 5,000 families and include auxiliary provisions like workforce training for residents.

## 2. NEW YORK

In 2015, the New York Public Service Commission established a new Community Distributed Generation Program to expand consumer access to local solar power, particularly among low- and moderate-income New Yorkers.

The Community Distributed Generation (DG) Program projects fall under the state's net metering policy and are subject to the same rules including project size and credit rate. The July 17, 2015 Order sought to achieve broad community participation through special requirements, such as a 10-customer minimum per project and a limit on the percentage of output that any one customer can represent. Project sponsors may be an energy service company, municipal entity, business, nonprofit, LLC, partnership, or other form of business or civic association so that communities have flexibility to pursue a development and ownership structure of their choosing.





The Order also established a two-phase process for program roll-out and refinement. In Phase 1 (October 19, 2015 - April 30, 2016), priority was given to projects that met one of two stipulations:

- Located in a Community DG Opportunity Zone – Identified by utilities, presented through an interactive mapping platform and comprising at least 40 percent of a utility’s service territory; or
- Low-income participation – Membership includes at least 20 percent low-income customers, defined as a customer participating in a state or utility low-income discount program

Unfortunately, Phase 1 did not result in any projects. In Phase 2 (beginning May 1, 2016), the entire utility service territory was opened to shared renewables projects. This long-term program design was informed through a Low-Income Customer Collaborative process with NYSERDA and low-income community organizers, utilities, and other interested stakeholders. This collaborative was tasked with creating mechanisms for removing obstacles to participation and devising demonstration projects for maximum low-income participation. On August 15, 2016, Department of Public Service Staff issued a report on the Collaborative Regarding Community Distributed Generation for Low-Income Residential Customers.<sup>(70)</sup>

Ways to improve New York’s Community DG program and ensure low-income participation are currently being explored through a number of different Reforming the Energy Vision (REV) proceedings and public stakeholder processes. Some of the identified solutions include waiving the 10-member minimum requirement for projects located on properties with multiple units<sup>(71)</sup> and increasing incentive levels and/or creating new incentives to support low-income access to solar.

## D. WORKFORCE DEVELOPMENT

### WORKFORCE DEVELOPMENT POLICY TOOLBOX

Community Shared Solar  
...  
Federal Partnerships/  
Best Practices Sharing  
...  
Grants and  
Technical Assistance  
...  
Place-Based Investments  
...  
Rebates

Low-income solar programs provide a great opportunity for states and municipalities to incorporate workforce development requirements that provide job training opportunities in solar for local workers. Solar is a rapidly expanding industry, with a sustained 20 percent year over year job growth rate for the last two years, and it is a strong employer of minorities and veterans. Low-income solar programs with a workforce development component should include the following components:

- Outreach to community colleges, job training organizations, housing authorities and other entities that serve lower-income and minority populations;
- Hands-on training opportunities that prepare individuals for jobs in the industry; and
- Partnerships with the industry to promote hiring.

### 1. CALIFORNIA

Workforce development is integral to California’s single- and multifamily solar programs. GRID Alternatives, the Program Administrator for SASH, reserves approximately 20 percent of all SASH installations for solar-installer job trainees, and recruits job training partners and individual trainees from the same communities that the SASH program aims to serve. For SASH projects installed by GRID Alternatives subcontractors through the SASH Sub-contractor Partnership Program, contracting companies commit to hiring at least one eligible job trainee. Many of those companies go on to hire the trainees to full-time positions.<sup>(72)</sup> When SASH was extended in 2015, workforce development provisions were formerly incorporated into program rules. Under MASH, in order to be eligible for an incentive the contractor agrees to hire at least one student or graduate of a job training program for at least one full paid day (8 hours) of work for each 10 kilowatts (kW) of system size up to 50kW.<sup>(73)</sup>

### 2. NEW YORK

New York recognized that a growing solar industry is an opportunity to provide workforce development. Green Jobs-Green New York provides workforce development opportunities through local, community-based organizations across the state to encourage the development of a skilled clean-energy workforce that supports energy efficiency and the installation of clean technologies, solar included. The program combines a number of incentives, financing options and grants to the community-based organizations to create these opportunities.



## COLLABORATE WITH US

This guide is meant to be a resource to help policymakers and local leaders create low-income solar policies and programs that work for low-income communities. Its primary medium is online at [www.lowincomesolar.org](http://www.lowincomesolar.org), so that it can be a living document as new issues and new models emerge. We encourage you to visit the site to provide feedback, updates and other relevant information that can help make this the best resource it can be.

To learn more about the partners in this endeavor or contact us individually, visit [www.gridalternatives.org](http://www.gridalternatives.org), [www.votesolar.org](http://www.votesolar.org) and [www.centerforsocialinclusion.org](http://www.centerforsocialinclusion.org).



1. NAACP's Just Energy Policies Report available at <http://www.naacp.org/pages/just-energy-policies-report>
2. National Housing Preservation Database - Summary Reporting available at <http://www.preservationdatabase.org/summaryreport.php>
3. [http://www.energy.ca.gov/sb350/barriers\\_report/](http://www.energy.ca.gov/sb350/barriers_report/)
4. GTM research - U.S. Solar Market Insight Report
5. DeNavas-Walt, Carmen and Bernadette D. Proctor, U.S. Census Bureau, Current Population Reports, P60-252, Income and Poverty in the United States: 2014, U.S. Government Printing Office, Washington, DC, 2015 available at <https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf>
6. GTM research - U.S. Solar Market Insight Report
7. The Federal Reserve Board's Tables for Findings on Loan Performance and Credit Availability and Affordability. Table 14 available at [http://www.federalreserve.gov/boarddocs/rptcongress/creditscore/performance\\_tables.htm#table15a](http://www.federalreserve.gov/boarddocs/rptcongress/creditscore/performance_tables.htm#table15a)
8. DSIRE and DOE 3rd Party Solar PV Power Purchase Agreement (PPA) (March 2015) available at [http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/01/3rd-Party-PPA\\_0302015.pdf](http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2015/01/3rd-Party-PPA_0302015.pdf)
9. Empowering low income and economically vulnerable consumers (2013); Consumer Financial Protection Bureau available at [http://files.consumerfinance.gov/f/201311\\_cfpb\\_report\\_empowering-economically-vulnerable-consumers.pdf](http://files.consumerfinance.gov/f/201311_cfpb_report_empowering-economically-vulnerable-consumers.pdf)
10. The Distributional Effects of U.S. Clean Energy Tax Credits (October 2015) available at <http://www.nber.org/chapters/c13692>
11. Rooftop Photovoltaics Market Penetration Scenarios (2008) available at <http://www.nrel.gov/docs/fy08osti/42306.pdf>
12. National Multifamily Housing Council's Quick Facts: Resident Demographics available at <http://nmhc.org/Content.aspx?id=4708>
13. National Multifamily Housing Council's Quick Facts: Resident Demographics available at <http://nmhc.org/Content.aspx?id=4708>
14. Manufactured Housing and Consumer Finance; Consumer Financial Protection Bureau. Available at [http://files.consumerfinance.gov/f/201409\\_cfpb\\_report\\_manufactured-housing.pdf](http://files.consumerfinance.gov/f/201409_cfpb_report_manufactured-housing.pdf)
15. More information available at <http://freeingthegrid.org/>
16. Mississippi Public Service Commission, In re: Order Establishing Docket to Investigate the Development and Implementation of Net Metering Programs and Standards, Docket No. 2011-AD-2, at 16 (Dec. 2015). Low-income customers are defined as customers whose household income is at or below 200 percent of the federal poverty level, or similar requirement proposed by the electric utility to be approved by the Commission.
17. More information available at <http://www.sharedrenewables.org/>
18. <http://www.communitysolaraccess.org/wp-content/uploads/2016/03/CCSA-Policy-Decision-Matrix-Final-11-15-2016.pdf>
19. SEIA Solar Investment Tax Credit available at <http://www.seia.org/policy/finance-tax/solar-investment-tax-credit>
20. More information available at <http://www.dsireusa.org/>
21. Anderson, Steven G, Min Zhan, and Jeff Scott. 2004. "Targeting Financial Management Training at Low-Income Audiences: Bits, Briefs, and Applications." *Journal of Consumer Affairs* 38(1): -177, June 22.
22. Green Jobs-Green New York 2015 Annual Report (2015); available at <http://www.nyserda.ny.gov/About/Green-Jobs-Green-New-York/GJGNY-Advisory-Council-Reports>

23. NYSEDA NY-Sun Initiative Residential/Small Commercial <200kW Solar Electric Systems Program Manual (January 2016) available at <http://ny-sun.ny.gov/For-Installers/Forms-Manuals-Tools>
24. PACENation available at <http://www.pacenation.us/>
25. PACE Doesn't Put Lenders at Risk, Study Finds (November 23, 2015) available at <https://www.greentechmedia.com/articles/read/pace-doesnt-put-lenders-at-risk-study-finds>
26. <http://portal.hud.gov/hudportal/documents/huddoc?id=FTDO.pdf>
27. <https://www.nclc.org/media-center/pace-energy-efficiency-still-risky.html>
28. Vote Solar Group Energy program data: 2014-2015
29. Connecticut Green Bank Providing Easy Access to Affordable Capital (February 11, 2015) available at [http://www.ctpower.org/wp-content/uploads/2015/02/Connecticut-Green-Bank\\_CPES\\_021115.pdf](http://www.ctpower.org/wp-content/uploads/2015/02/Connecticut-Green-Bank_CPES_021115.pdf)
30. Hawaii State Energy Office Department of Business, Economic Development and Tourism: GEMS available at <http://energy.hawaii.gov/testbeds-initiatives/gems>
31. U.S. Department of Housing and Urban Development's Community Development Block Grant Program (CDBG) available at [http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/comm\\_planning/communitydevelopment/programs](http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs)
32. Solar Market Pathways available at <http://solarmarketpathways.org>
33. U.S. Energy Department Award Will Enable Cook County, Partners To Identify Opportunities for Advancing Solar Power (January 29, 2015) available at <http://blog.cookcountyil.gov/sustainability/2015/01/29/u-s-energy-department-award-will-enable-cook-county-partners-to-identify-opportunities-for-advancing-solar-power/>
34. City Council Will Fund New Worker Cooperative Business Initiative (July 21, 2014) available at <http://www.nywf.org/2014/07/city-council-will-fund-new-worker-cooperative-business-initiative/>
35. Solar and Energy Loan Fund available at <http://cleanenergyloanprogram.org/how-it-works/homeowners>
36. Green Zones for Economic and Environmental Sustainability: A Concept Paper from the California Environmental Justice Alliance available at [http://caleja.org/wp-content/uploads/2011/06/2010\\_0000\\_green\\_zones.pdf](http://caleja.org/wp-content/uploads/2011/06/2010_0000_green_zones.pdf)
37. White House Fact Sheets (July 7, 2015 and November 17, 2015) available at <https://www.whitehouse.gov/the-press-office/2015/07/07/fact-sheet-administration-announces-new-initiative-increase-solar-access> and <https://www.whitehouse.gov/the-press-office/2015/11/17/fact-sheet-administration-announces-68-cities-states-and-businesses-are>
38. U.S. Department of Housing and Urban Development's RENEW300 Initiative available at <http://portal.hud.gov/idc/groups/public/documents/document/renew300.pdf.pdf>
39. <https://www.whitehouse.gov/the-press-office/2016/07/19/fact-sheet-obama-administration-announces-clean-energy-savings-all>
40. Unique, Powerful Partnership Brings Clean, Renewable Energy to the Denver Housing Authority (July 19, 2012) available at <http://www.denverhousing.org/aboutus/newsrelease/Documents/PPA%20Media%20Packet%20PR%20Fact%20Sheet.pdf>
41. U.S. Department of Housing and Urban Development's STEM, Energy, Economic (SEED): Coalitions for Community Growth available at [http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/public\\_indian\\_housing/seed](http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/seed)
42. <http://solar.gwu.edu/research/can-electricity-rate-subsidies-be-reallocated-boost-low-income-solar>
43. NYSEDA, NY-Sun Initiative Quarterly Performance Report to the Public Service Commission, Quarter Ending June 30, 2016 (Aug. 2016), at <https://www.nyserda.ny.gov/-/media/Files/Programs/NYSun/2016-Q2-Quarterly-Report.pdf>
44. See Open NY Database, at <https://data.ny.gov/Energy-Environment/Statewide-200kW-or-Less-ResidentialNon-Residential/3x8r-34rs>
45. California Solar Initiative SASH and MASH Low-Income Evaluation available at <http://www.cpuc.ca.gov/General.aspx?id=5434>
46. CSI Single-Family Affordable Solar Homes (SASH) Program available at <http://www.cpuc.ca.gov/General.aspx?id=3043>
47. Solar Carve-Out II / SREC II available at <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/rps-solar-carve-out-2/>
48. 225 CMR 14.00; MA DOER, SREC Factor Guideline available at [www.mass.gov/eea/docs/doer/rps-aps/srec-factor-guideline.pdf](http://www.mass.gov/eea/docs/doer/rps-aps/srec-factor-guideline.pdf)
49. Massachusetts Solar Loan Program available at <http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/residential-solar-loan-program.html> and <http://www.masssolarloan.com/>
50. Clean and Affordable Energy Act of 2008 available at [http://doee.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/CAEA\\_of\\_2008\\_B17-0492.pdf](http://doee.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/CAEA_of_2008_B17-0492.pdf)
51. About the DCSEU available at <https://www.dcseu.com/about-dcseu>
52. R3 : Richmond Recovery Rebates available at <http://www.ci.richmond.ca.us/2495/R3-Richmond-Recovery-Rebates>
53. Visit the City of Richmond's final report on the success of the R3 program: <http://www.ci.richmond.ca.us/DocumentCenter/View/26827>
54. GoSolarSF Program Handbook Fiscal Year 2015-2016 available at <http://sfwater.org/index.aspx?page=133>
55. City of San Francisco - Solar Energy Incentive Program available at <http://programs.dsireusa.org/system/program/detail/2888>
56. GoSolarSF Progress Report (April 2014) available at <http://votesolar.org/2014/06/23/gosolar-sf-progress-report-economic-environmental-benefits-of-san-franciscos-solar-program/>
57. CSI Multifamily Affordable Solar Housing (MASH) Program available at <http://www.cpuc.ca.gov/General.aspx?id=3752>
58. AB 693 commits \$100 million annually, or 10 percent of the available funds from the greenhouse gas allowance revenue received by electrical corporations set aside for clean energy and efficiency projects, whichever is less, for fiscal years 2016-2020 to provide incentives from 2017 up to 2030 for qualified multifamily affordable properties. [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201520160AB693](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB693)
59. Boston Community Capital Sustainability Initiatives available at <http://www.bostoncommunitycapital.org/programs-services/sustainability-initiatives>
60. DCSEU's New Construction and Major Rehabilitation available at <https://www.dcseu.com/for-my-business/multifamily-housing/new-construction-and-major-rehabilitation>
61. Setting a New Standard for Multifamily Solar Energy (2015) available at <https://www.dcseu.com/for-my-business/business-success-stories/success-story-list/setting-a-new-standard-for-multi-family-solar-energy>
62. <http://www.irecusa.org/publications/shared-renewable-energy-for-low-to-moderate-income-consumers-policy-guidelines-and-model-provisions/>
63. HOUSE BILL 10-1342 Colorado Community Solar Gardens Act available at <http://www.solargardens.org/legislation-news-2/colorado-community-solar-gardens-act/>
64. <http://www.communitysolaraccess.org/wp-content/uploads/2016/03/CCSA-Policy-Decision-Matrix-Final-11-15-2016.pdf>
65. [https://www.southernenvironment.org/uploads/publications/CommSolar\\_Utility\\_Best\\_Practices.PDF](https://www.southernenvironment.org/uploads/publications/CommSolar_Utility_Best_Practices.PDF)
66. Colorado Department of Regulatory Agencies Public Utilities Commission Code of Colorado Regulations (CCR) 723-3 Part 3 Rules Regulating Electric Utilities available at <http://www.solargardens.org/ColoradoRules091211.pdf>
67. Colorado Energy Office awards \$1.2 million grant funding (August 17, 2015) available at <https://www.colorado.gov/pacific/sites/default/files/atoms/files/CEO%20Grant%20to%20GRID%20Alternatives%20for%20Low-income%20Solar%20Project.pdf>
68. Non-Unanimous Comprehensive Settlement Agreement. available at [https://www.dora.state.co.us/pls/efi/EFI.Show\\_Filing?p\\_session\\_id=&p\\_fil=G\\_678020](https://www.dora.state.co.us/pls/efi/EFI.Show_Filing?p_session_id=&p_fil=G_678020)
69. Case No. 15-E-0082, Joint Request of the City of New York, Solar One, GRID Alternatives, NRDC, the Association for Energy Affordability, and EDF to Waive the Minimum Membership Requirement for Community Distributed Generation Projects Sited at Properties with Multiple Residential Units (Sept. 1, 2016).
70. <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-E-0082&submit=Search+by+Case+Number>
71. Keep up to date with the success of this workforce development program at <http://www.gridalternatives.org/what-we-do/solar-programs/single-family-solar/sash/reports>
72. Multifamily Affordable Solar Housing Program Handbook First Edition (2015) available at [http://www.gosolarcalifornia.ca.gov/documents/MASH\\_Handbook.pdf](http://www.gosolarcalifornia.ca.gov/documents/MASH_Handbook.pdf)



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