

# Pathway to Prosperity:

*Lessons learned from developing and implementing a low-income solar program in Washington, D.C.*





**“I’m thrilled to own a rooftop solar system. Without the Solar for All program, and help from Solar United Neighbors, I would have never been able to start generating my own solar power.”**

**– Anna Butler**

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**WE WENT  
SOLAR!**



## Introduction

There is no denying the environmental and climate benefits of rooftop solar. But more and more communities are now also turning to this technology as a tool to support low- and moderate-income communities and address the very real challenges they face. Solar allows homeowners to reduce energy bills, create local wealth, build community resiliency, and catalyze further progress towards a clean, renewable energy system. However, all programs are not the same.

Over the last three years, Solar United Neighbors has worked tirelessly to design and implement a low- and moderate-income solar program that empowered D.C. residents to benefit from solar. The work was not easy, and we have learned a lot about what it takes to run an effective program. As more and more municipalities and organizations look to develop their own initiatives, we wanted to share our experiences and lessons learned. We hope the following will be a useful resource as you begin this important work.

## Establishing an income-qualified incentive

SUN started in 2007 as a neighborhood group of economically and racially diverse activists in Washington, D.C. We were in the middle of rapid gentrification and a sobering national breakdown in the banking system and looking for a solution to help people pay their electric bills and stay in their homes. Rooftop solar was a real solution that we could implement immediately. It let us invest locally, create good jobs in our community, and bring control of the energy system within our reach. From the beginning, our slogan was that “solar should be affordable and accessible to all.” And, as a result of over a decade of systematic organizing in D.C., we are proud to say the District is on a trajectory to reach that goal.

Specifically, we worked over a decade to organize solar supporters across all eight wards of the city. By doing this we were able to pass two major bills in 2009 and 2011 that created the fundamentals of the D.C. solar market. In 2013 we then worked with D.C.’s community of solar supporters and low-income housing, environment, and community groups to pass legislation to make community solar possible. In D.C., the community solar program is unfettered and the utility technically has no say on how many projects can be developed. Having laid the foundation with these critical policies, in 2016 we were then able to help to increase D.C.’s renewable portfolio standard. The new standard doubled the District’s renewable energy requirement, including the solar carve-out. As a result, D.C. will now be 50 percent renewably-powered by 2032. This policy intervention created a long-term incentive for solar by strengthening the D.C. solar renewable energy credit (SREC) market<sup>1</sup>. In D.C., nearly one-third of the cost of going solar can be covered

<sup>1</sup>[https://www.srectrade.com/markets/rps/srec/district\\_of\\_columbia](https://www.srectrade.com/markets/rps/srec/district_of_columbia)

## WHAT’S AN SREC?

**A SOLAR RENEWABLE ENERGY CREDIT (SREC) REPRESENTS THE “GREEN” VALUE OF YOUR ELECTRICITY. SRECS ARE SOLD SEPARATELY FROM THE PHYSICAL ELECTRICITY THAT YOUR SOLAR PANELS PRODUCE. THINK OF THEM LIKE A “VOUCHER” THAT PROVES THAT THE ELECTRICITY FROM YOUR SOLAR PANELS IS RENEWABLE. YOU EARN ONE SREC FOR EVERY 1,000 KWH (OR 1 MWH) OF ELECTRICITY PRODUCED BY A SOLAR SYSTEM. THESE SREC “VOUCHERS” ARE VALUABLE BECAUSE MANY UTILITIES MUST BUY A CERTAIN NUMBER OF THEM EACH YEAR TO MEET SUSTAINABILITY REQUIREMENTS SET BY THE RENEWABLE PORTFOLIO STANDARD (RPS) IN EACH STATE.**

# WHAT IS A SOLAR CO-OP?

**A SOLAR CO-OP IS A GROUP OF HOMEOWNERS IN A DEFINED GEOGRAPHIC AREA WHO USE THEIR COMBINED PURCHASING POWER TO ENSURE THEY RECEIVE THE MOST COMPETITIVE SOLAR INSTALLATION.**

by the valuable SRECS that the project will create. The legislation we fought for also included provision for a new program known as “Solar for All.” Solar for All used the compliance fees generated from the renewable portfolio standard to create a funding mechanism and mandate for the District government to provide free, locally-produced solar credits to nearly every low-income household in the District. In D.C., that means there is currently an annual fund of nearly \$20 million dollars generated by utility fines to be applied to low-income solar programs. The big challenge, it turns out, has been spending the money, quickly and effectively.

After creating the Solar for All program, the District government sought organizations and contractors interested in helping them deploy the program. We were selected through a competitive bidding process to implement the single-family portion of the program – providing solar to low-income single-family homeowners across the District.

## Program Design

### *Structuring the program*

After being selected by the D.C. Department of Energy and the Environment to implement a single-family Solar for All program, we set off to design a program that deployed rooftop solar. We were charged with creating a program that would:

- » Reduce participants’ electricity bills by at least 50%;
- » Service income-qualified homeowners whose income was 80% or less of area median income (AMI); and
- » Could be implemented in 18 months.

But we wanted to not only design a program that met the District’s requirements, but also advanced our mission of energy equity and inclusion.

What we came up with was a model that adapted our existing solar bulk purchase program model, called a solar co-op. Participants would sign up to join the solar co-op, a bulk buying group in which a single solar contractor services a group of homeowners. By working with a single contractor, participants are able to use their combined purchasing power to get the most competitive solar installation. For income-qualified co-op participants, we used grant money from the D.C. Solar for All program and five years’ worth of Solar Renewable Energy Credits (SRECs) to pay for their solar system upfront. Income-qualified participants owned their solar systems from day one and were able to immediately benefit from their electricity savings.

Why this approach? We’ve outlined several reasons for designing our program in this way:

## Grounded in Energy Democracy

In designing a program to provide solar for low-income residents, we wanted to ensure our program was based on the principals of energy democracy.

Energy democracy offers a new way of thinking about our energy system and who it serves. Instead of a centralized energy system owned by a few big utilities, a democratic energy system is widely distributed and owned by a large number of people. That means regular people are generating their own electricity from a variety of sources. It moves us away from big, expensive power plants and towards a system of widely owned, distributed energy resources. Energy democracy points towards a system governed by democratic principles and managed by a transparent, accountable, and public authority.

The benefit of energy democracy is that, instead of reinforcing existing inequities of race, class, and gender, energy democracy demands an energy system that allows everyone, regardless of background, to access affordable electricity and to invest in clean energy technologies.

By designing with the principles of energy democracy in mind, we made sure our program was designed to not just put solar on roofs, but create local wealth and transform the energy system in the process.

## WHAT IS ENERGY DEMOCRACY?

**A DEMOCRATIC ENERGY SYSTEM THAT DIRECTS BENEFITS AND CONTROL BACK TO LOCAL COMMUNITIES.**

**ENERGY DEMOCRACY DEMANDS AN ENERGY SYSTEM THAT ALLOWS EVERYONE, REGARDLESS OF BACKGROUND, TO ACCESS AFFORDABLE ELECTRICITY AND TO INVEST IN CLEAN ENERGY TECHNOLOGIES.**

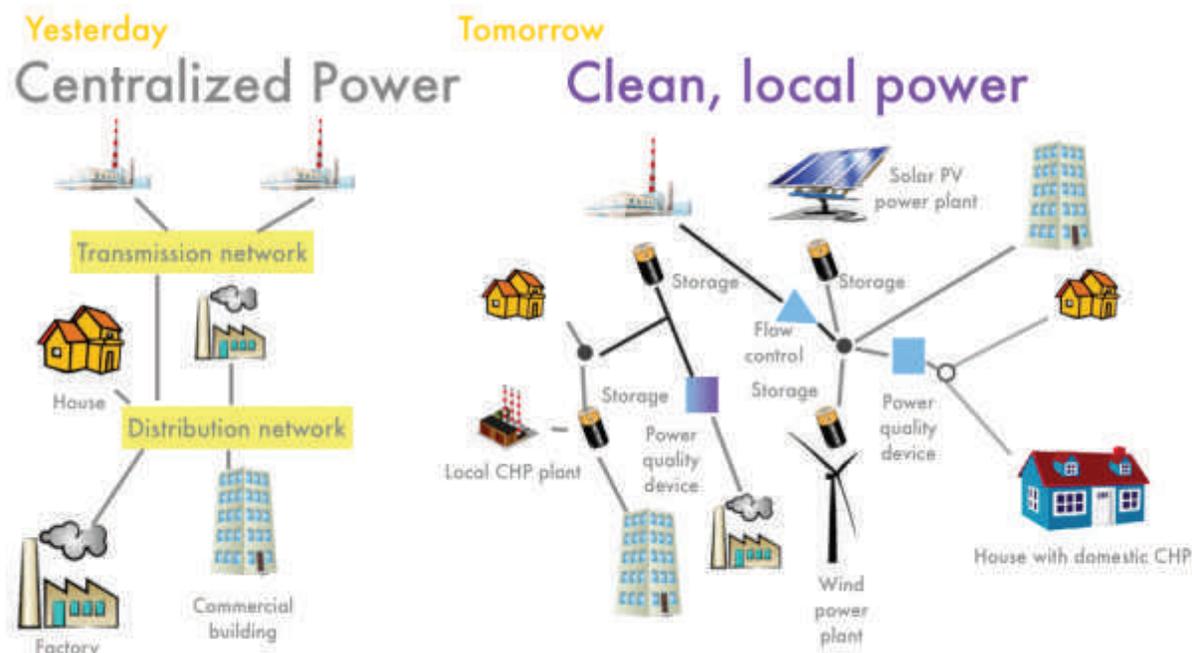


IMAGE THANKS TO INSTITUTE FOR LOCAL SELF RELIANCE [HTTPS://ILSR.ORG/CHALLENGE-RECONCILING-CENTRALIZED-V-DECENTRALIZED-ELECTRICITY-SYSTEM/](https://ILSR.ORG/CHALLENGE-RECONCILING-CENTRALIZED-V-DECENTRALIZED-ELECTRICITY-SYSTEM/)

## WHAT IS A SOLAR LEASE OR POWER PURCHASE AGREEMENT?

**A SOLAR LEASE IS WHEN YOU PAY A FIXED MONTHLY COST FOR THE POWER OF PRODUCED BY A SOLAR SYSTEM ON YOUR ROOF.**

**A POWER PURCHASE AGREEMENT (PPA) IS WHEN YOU PURCHASE THE ELECTRICITY GENERATED BY A SOLAR SYSTEM ON YOUR ROOF. THIS WILL VARY MONTH-TO-MONTH DEPENDING ON HOW MUCH ENERGY THE PANELS PRODUCE.**

**BOTH ARE DEFINED AS “THIRD-PARTY OWNERSHIP” BECAUSE SOMEONE OTHER THAN THE HOMEOWNER OWNS THE SYSTEM.**

### *Program Facilitates Ownership*

We also wanted to ensure that residents would own their solar systems from day one.

Previous low-income solar programs in the District were designed around leases and/or PPAs, which meant participants didn't always own the solar systems on their roofs.

A lease or PPA are considered types of third-party ownership. That means a solar company owns and maintains the panels installed on the roof. The homeowner then purchases the power the solar panels produce. They can either buy the electricity as it is produced by the system, which varies over the course of the year (a power purchase agreement). Or, the homeowner can pay a fixed, monthly rate (lease) for the panels and receive all of the energy produced by the solar. Typically, the price of the solar electricity is lower than the standard electricity price.

A PPA or lease contract typically runs 15 to 20 years, and at the end of the agreement the homeowner has the option to purchase the system outright. Ownership does not automatically transfer to the homeowner. PPAs and leases are a way to go solar without any upfront payments, as the system is owned by the installer or a third party. The company that owns the system will take advantage of the federal tax credit and any other available local incentives.

In previous low-income solar programs in the District, program participants were not clearly informed about who owned the systems and what they were receiving in exchange for their participation. There was no concerted effort to educate participants on how these agreements worked and the long-term encumbrances that were placed on their house due to the contracts. Some were under the impression that they owned the system on their roof, and education about D.C.'s valuable SREC market and the opportunity to utilize the federal tax credit was not part of the program. In fact, many had entered into third-party ownership and did not have any ownership. This created frustration when homeowners learned they had to purchase the systems from the third-party owners if they wanted to assume ownership. Homeowners with leases/PPAs were also not able to take advantage of any incentives, which in D.C. represent a significant value over the 25-year lifetime of the solar system. Homeowners with leases/PPAs also often saw minimal savings on their electricity bills because the rates charged for their lease/PPA was not significantly lower than their original electricity bills. In addition, homeowners with a solar lease/PPA have to pay two bills: one to the third-party owner and one to their regular power company. While the combination

of these two bills was lower than the homeowner’s previous electricity bill, it created extra work for the family and it varied depending on the season and amount of solar generated. Collectively, these issues contributed to the perception that solar wasn’t “worth” all the additional hassle for the minimal benefit that homeowners received.

Based on D.C.’s history and a legacy of distrust with previous programs, we believed that we could design a more equitable and beneficial low-income solar program through an ownership model. PPA programs have other advantages, but this choice was based on our unique situation. Our participants would own their systems from day one and immediately see the full, positive impact of solar on their electric bill. In addition, ownership meant they could keep the federal tax credit and local incentives. These incentives are sizable: The tax credit was worth 30% of the system cost (for 2018 & 2019) for those with enough tax liability to use it over one or more tax years. And, the solar renewable energy credits (SRECs) are worth thousands of dollars. Even with the participants giving up the first five years of SRECs to help pay for the system, we estimate that the average combined value of the tax credit, the SRECs, and the electricity savings over the first 20 years is more than \$32,000. We should also note that participants had the choice to use the first five (5) years of their SRECs to help pay for their system or they could choose to pay the difference themselves. The majority chose to sell the first five years, but some participants elected to keep their SRECs and further maximize their system’s value to them. As you will see in the following sections, we made several other choices that increased the cost of the program in order to increase benefits and protections for program participants.

The ownership model is not the cheapest model upfront in terms of program dollars. Through leases and PPAs you can deliver more solar at a lower initial cost by utilizing the federal

<b>Solar for All Average System Size</b>	<b>4.23kW</b>
Average system cost (at \$3.25/Watt)	\$13,748
Solar Renewable Energy Credit (5-year upfront)**	-\$4,653
Solar for All Grant	-\$9,095
<b>Net upfront cost to homeowner</b>	<b>\$0</b>
Tax credit value (one-time)	\$4,124
Estimated year 1 electricity savings*	\$500
Estimated year 15 electricity savings* + SREC value** (cumulative)	\$20,000
Estimated year 20 electricity savings* + SREC value** (cumulative)	\$28,000
<b>Estimated Total Value (electricity savings + SRECs + tax credit)</b>	<b>\$32,000</b>

\* Assumed initial electricity price of \$0.11/kWh with a 2% yearly escalator, SREC values assumes 75% of the alternative compliance payment (ACP) amount

\*\*After year 5 homeowner receives SREC income

investment tax credit. But for our program, ownership had an outsized impact on program acceptance and value delivered to participants over time. Over the 15-year lifetime of the Solar for All program, we estimate that every grant dollar invested in this manner will deliver twice as much value to the participant, excluding the tax credit (even though a third of our participants did in fact have the ability to take the tax credit).

### **Program safeguards**

It was also important that the solar system would not cause an undue financial burden on the families receiving the system. To this end, we built a number of safeguards into the program, including:

#### **1. Independent system inspection**

We conducted a third-party inspection of each system. This was a requirement from the D.C. Department of Energy and the Environment, and meant that an independent contractor went to the customer's home and verified that (1) the system proposed by the solar contractor was the system that was installed, and (2) that all components were installed correctly. We heard feedback from some customers that they appreciated the third-party inspection because it gave them peace of mind knowing that their system was installed properly.

#### **2. Extended warranties on equipment and installation (25 years on panels, 20 years on inverters, and 25 years on installation)**

We required that the installer include extended warranties and an operations and maintenance plan. The warranties provided were some of the best in the industry – with 25 years of protection that covered electricity production, installation, and any problems with the panels or other components, including any labor charges associated with warranty equipment replacement.

#### **3. Maintenance visits for the homeowner**

Every participant received two free inspection visits: the first at the end of their first year and a second visit anytime between the 2<sup>nd</sup> and 15<sup>th</sup> years. This allowed them to ensure their system was working correctly and prompt the installer to make any repairs should they be necessary.

#### **4. Cellular-based monitoring**

We required that the installer provide the homeowner with real-time monitoring of their system. Monitoring showed real-time and historic production data via a webpage or app and can send alerts to the homeowner if any part of their system is not performing well. All monitoring was cellular-based. Requiring cellular-based monitoring (rather than wi-fi-based) was important because we did not want to assume that all low-income homes had a wi-fi connection or consistent access to the internet. Families often have to choose between which bills they will pay and which they can't each month. When times are tight, home-based internet access can be prioritized below more critical monthly bills like rent, electricity, heating, food, and medicine. Cellular-based monitoring allowed the families to monitor their systems production without having to add another bill.

#### **5. One free removal and re-installation of panels within the first 10 years**

We required that the installer provide each participant with one free removal and re-installation of their panels within the first 10 years. Replacing a roof can be one of the most expensive jobs a homeowner undertakes and is often deferred maintenance, particularly with low-income homeowners. Our goal was to install solar on the best roofs possible, but we also had to acknowledge that, when it did come time to replace the

roof, removing the solar array before working on the roof would mean an added expense for the homeowner. To help address this issue, the installer provided one removal and re-installation at no charge to the homeowner. Within the first 10 years of the system's life, should the homeowner need to perform repairs on their roof or replace their roof, the installer will come, un-install the roof-based system components, and then return to re-install and commission them after the roof work is complete.

Collectively, these safeguards meant that homeowners would continue to receive maximum benefits over the lifetime of their solar systems, and the program would not create unintended burdens on families already facing major challenges. These additional benefits did however, increase the cost of the program.

### **Focused on education**

Learning from past versions of the District's previous low-income solar programs, we focused on educating our low- to moderate-income (LMI) participants. Our education strategy was multi-faceted and designed to support the participants throughout the entire lifetime of their systems, not just when they signed up for the program. Education included:

- » **Public information sessions:** We held dozens of hour-long community meetings across the District, focusing in communities with a high LMI population. The presentations used a PowerPoint and handouts to take people through solar basics and how the program worked. We left lots of time for question and discussion, since many residents had heard of previous LMI programs and were skeptical or had misunderstandings about solar that we were able to address in the meetings.
- » **Phone call outreach:** When a customer would sign up for the solar co-op and mentioned that they were interested in Solar for All, we would reach out with a phone call to walk them



*Presenting at community meetings and hosting public information sessions were critical to reaching District residents.*

through the program requirements. We explained how the program worked, what exactly they were receiving, a timeline for the process, their obligations as participants in the program, and how to complete the income qualification. That phone call was followed up by an email or letter recapping everything we had talked about and providing more details on the income verification process.

- » **Online email “drip” campaign:** Solar for All participants who had an active email address also received an educational email-based series that explained going solar in detail. All participants were encouraged to attend an info session. For those that couldn’t make it to an info session, we had a longer, more detailed call explaining the process of going solar and what it entailed.
- » **Dedicated email and phone “help desk:”** Throughout the program we maintained a dedicated email address and phone number to serve as an on-call “help desk” for participants. Being able to field questions and resolve confusion during the contracting and installation phases was important because some projects took many months and participants were able to periodically reach and confirm next steps with us.
- » **Spanish-language materials:** We translated a significant number of our resource materials into Spanish and made them available to all participants, including a video Spanish information session.
- » **Site visits to participants’ home:** We met one-on-one with most participants – often coming to their home and helping them complete the online paperwork using iPads. These site visits were time intensive but were incredibly important for building trust and meeting participants where they were. During the program many participants needed help completing the online income verification or notarizing their forms. We found it was much faster to assist them directly or bring a notary with us to complete paperwork. It was also an opportunity to provide the participants with an in-depth explanation of the program and answer any questions they might have had.
- » **Proposal review “party:”** After participants received their proposals from the solar installer, we hosted periodic gatherings where participants could get together and review their proposals as a group. This not only allowed us to answer questions that members had about the proposed system but created a sense of community and helped people feel comfortable with the program because they were going through the process with their neighbors.

### ***Integrated with other solar programs in the District***

From the moment we started designing an income-based program we knew we wanted to integrate the low-income participants fully with our market rate participants. We didn’t want to have two groups: one for low-income customers and one for market rate customers. We wanted to treat everyone equally and for LMI participants to have the same experience as our market rate homeowners. As a result, our LMI customers signed up for the co-op the same way as our market rate customers. On the sign-up form we asked if they were interested in the low-income subsidies and, if so, we followed up with them individually. This meant our low-income customers were able to fully participate in all public meetings, selection committees, and proposal review parties without feeling singled out or part of a “low income” group. In fact, we had better low-income participation compared to market-rate homeowners for a number of our events, and they had a similar experience to market-rate homeowners.



*When we started this program we had to work extra hard to build trust with community members. That meant lots of face-to-face meetings and events.*

### **Centered on stakeholder participation**

In the solar co-op process, a group of co-op members will form a selection committee and choose a single installer to provide solar installations for the entire co-op group. We actively sought to include Solar for All participants in the selection committee, in part because we wanted our Solar for All participants to be part of the process. We also wanted them to buy into going solar and feel empowered to become solar advocates. That strategy paid off. By the time we had wrapped up Solar for All, some of our biggest advocates for the program were participants. Furthermore, we added five new board members to our D.C. Advisory Board, all of whom participated in the Solar for All program. The addition of these new board members, along with their perspective and life experiences, will help us shape the future of the D.C. program with equity as a guiding principle. Their pathway to solar ownership has helped strengthen the diversity of our movement.

### **Outreach Strategies**

When designing our outreach strategy to recruit participants, one of the biggest challenges we faced was how do we build trust among LMI communities in the District. As an organization we had been working in the District for ten years, but much of that work has been with homeowners that had the means to go solar. Because we did not have a strong reputation in the community, we reached out to several community organizations that were well known for working with LMI families across the District. These included several housing counseling agencies, as well as social service nonprofits and other District government agencies.

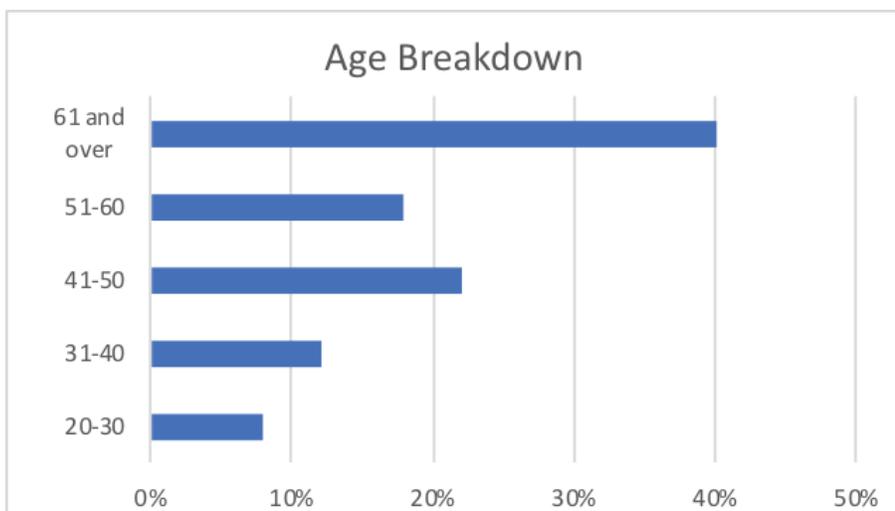
Building trust in the community was key to successfully building a robust pipeline of program participants. Programs like these have been offered in the past and low-income residents are wary of them, mostly because they don't believe that the program is real or that it could deliver on what is promised. When we first reached out to different communities, there was a lot of skepticism. We had many questions on how the program worked, how we were able to offer free solar panels, and how exactly we planned to follow through on our promises. Some of the concerns we heard from the community when we started our outreach included questions like whether or not participants were going to lose their homes because of participation in the program.



**Partnerships were critical**

One of the most successful partnerships we had was with the District’s Office of Aging and Community Living (DCOA). Thanks to this partnership we were able to attend events and educate low-income seniors across D.C.. With senior citizens being a vulnerable population, especially when it came to utility frauds, the fact that we had partnered with and had the support of the DCOA made it easier for us to earn their trust when explaining our Solar for All program. The results of this partnership can be seen in the median age of our Solar for All participants: 56.

Another strategy we implemented was to engage with civic neighborhood associations as well as Advisory Neighborhood Commissions (ANCs). To this purpose we reached out to civic association and ANC commissioners and educated them about the program. We also requested time to present at their meetings and discuss Solar for All with their constituents. Overall, we presented at 35 civic association and ANC meetings across the District. When deciding which ANC or Civic Association meeting to attend we focused on those that were happening before and geographically close to one of our scheduled solar information sessions. That way, when we spoke about Solar for All we were able to follow up by inviting the public to a solar information session where they could learn more about the program.



**Canvassing didn't yield the results we expected**

One of the outreach strategies we were most looking forward to implementing was a canvassing program. We felt that the best approach to reaching our target population would be an in-person solution that allows people to talk with us about Solar for All. We hired a team of canvassers composed of a Canvassing Director, a

Canvassing Supervisor, and two canvassers. The canvassers focused on neighborhoods where we were hosting solar information sessions and went door-to-door handing out flyers and answering questions. We canvassed for a total of three months, between August and October of 2018. We surveyed people on how they had heard about the co-op and realized that canvassing was not as effective as we had hoped. We are still unclear as to why canvassing was not an effective outreach tool



*We were surprised to learn that canvassing was not an effective tool to recruit program participants.*

### **Referral program boosted sign ups**

After our canvassing program failed to yield the results we were looking for, we went back to the drawing board and decided to focus on what we knew worked: word-of-mouth referrals. From the beginning of the program we found that existing program participants were our best recruiters. Once they went through the solar co-op and had solar installed, many were thrilled with their lower electricity bills and were excited to tell friends and neighbors. So, we created a formal referral program where an existing co-op member would receive \$100 for each income-qualified person they referred to the program that ended up also going solar.

The referral program initially wasn't approved by the D.C. government, but when it became clear that this was our best option for scaling up recruitment, they agreed.

All of the co-op participants were welcome to sign up for the referral program, regardless of whether or not they were Solar for All participants. We had 10 people participate in the referral program. This, combined with organic word-of-mouth referrals from neighbors, ended up being the most successful strategy to recruit participants. This was particularly true as the program progressed. Once people saw solar installations actually happening, they were more eager to refer us to their friends, families and neighbors.

### **Challenges**

Implementing a low-income solar program, especially one focused on ownership, was not an easy endeavor. During the 18 plus months of implementing Solar for All we encountered many challenges. Some of these challenges were to be expected, such as a delay in building a robust pipeline of participants, or hesitation from the community while we worked to gain their trust. On the other hand, some of these challenges came from unexpected sources. For example, delays in the income verification protocol came from our government partners seriously hindered the speed at which we were able to move. Over the next few pages we will discuss the different challenges we faced and how they impacted program implementation.



*We used a referral program that gave program participants promotion materials and encouraged them to recruit their friends and neighbors. It was highly successful.*

### ***Building a pipeline***

Building a pipeline of LMI families that could qualify for Solar for All was a larger lift that we had anticipated. The District had offered subsidies in the past for low-income families to go solar, mostly via Power Purchase Agreements (PPA). These programs had created a lot of confusion because they lacked an educational component. Participants were not clear on who owned the system or what savings they would receive from their participation in the program. We had learned about these problems by holding a large community meeting before we launched the program. Residents showed up and shared their experiences and concerns, which were then summarized in a memo sent to the D.C. government.

### ***Creating trust***

We found that many people did not trust solar programs because of past scams or false advertisement. Part of the confusion is the proliferation of advertisements in the D.C. market for alternative retail energy suppliers. During outreach and recruitment, we periodically heard from community members that had also been approached by solar installers in the past. These companies were offering free solar as part of the “District’s programs;” however they were not part of the Solar for All program and were instead wording their materials very carefully to present existing local incentives (SRECs) as a “special” product.

We even had a handful of cases where participants had been approached by an installer offering free solar, but unbeknownst to the participants they were instead signed up for a loan for solar panels. We spent a significant amount of time referring these participants to the D.C. Office of the People’s Council and helping them extract themselves from these misleading contracts. One participant was able to get out of her contract, avoid the loan, and instead participate in our Solar for All program. As can be imagined, walking participants through Solar for All and convincing them that the program was legitimate was an uphill battle after their experiences with marketing for solar and other energy programs ranging from legitimate to downright misleading.

When we started our recruitment efforts, we noticed that there was a lot of fatigue when it came to emphasizing that the solar systems would be free. The community had heard this promise before and their experience with these programs left a lot to be desired. In fact, some communities had been so inundated with advertising that they were burned out and not interested in us speaking with them about solar. Therefore, our approach was not to advertise Solar for All as a free solar program. Instead our collateral focused on the fact that participants would save at least 50% on their electricity bills, and that the District Department of the Environment (DDOE) had an important role in the program. This framing was better received, especially when we partnered with trusted community organizations to help deliver the message.

### ***Delays and incomplete government promotion of the program***

One unexpected challenge we faced was the length of time required for us to be approved to deploy promotional materials for the program. All collateral and materials related to Solar for All had to go through an extensive process of approval, which often slowed recruitment. For example, it took almost a year for the District to provide us with DDOE specific collateral that would help us in our outreach.

In addition to the materials we developed, the District Department of the Environment was committed to doing additional advertising for the program. We found the District’s ramp up time for advertising was slower than our need to promote the program. This resulted in the District’s

promotional efforts having smaller impact on our pipeline than could have been realized with more aggressive promotion and support. In addition, while the District did begin advertising the program using bus stop ads, we noticed that initially those ads were placed in high-income neighborhoods where eligible homeowners were much less likely to see them. It took several months before the ads appeared in lower-income parts of the District.

Finally, one of biggest missed opportunities for the D.C. government was the lack of internal communication and education about the program. We regularly presented at neighborhood and civic association meetings – and we quickly realized that we were the only group ever discussing the Solar for All program. Representatives from the Mayor’s office, the city council, and the civic associations weren’t familiar with Solar for All, and none had received collateral to advertise the program. This approach did not help quell skepticism from the community, who were understandably wary about a program they weren’t hearing about from their local officials.

Collectively, these factors meant that by the time we had built a robust pipeline it was time to begin closing the recruitment process as our grant period was ending. Because of delays in permitting and interconnection we shutdown recruitment in April of 2019 in order to meet the grant requirement that all projects be operating by September 30<sup>th</sup>, 2019.

### Delays in income verification methods

Another challenge when building the solar pipeline were delays caused by the DDOE over their income verification methods. The District was very slow in finalizing their income verification methods: we began recruitment in November 2017, but it was not until late February 2018 that the District was able to approve participant income. Most of the participants that had signed up before the income verification method was finalized were far less likely to move forward with the program, and if they did they required significant additional outreach in order for them to feel comfortable completing the verification process.

## Thoughts on Solar for All Process

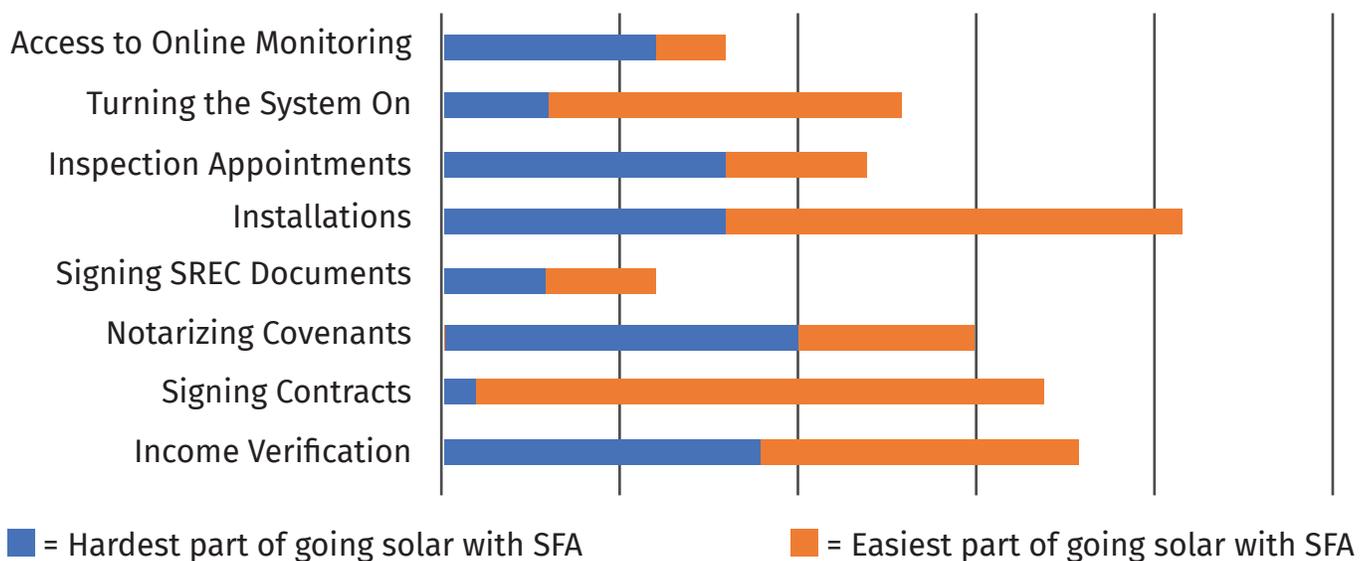


Fig.2 We polled our Solar for All participants at the end of the program and asked them to rank the hardest and easiest parts of going solar through this program. The majority of participants responded that the covenant notarization was the hardest part of the process, closely followed by the income verification. On the opposite end, most participants found that both joining the co-op and signing their solar contract were by far the easiest part of going solar through Solar for All.

Once the District finalized their income verification process, there were often further delays in getting people through the process. The District opted to use the Low-Income Housing Energy Assistance Program (LIHEAP) platform as their means to verify income. As a non-government entity, we did not have access to this platform. We had to spend a significant amount of time sending spreadsheets back and forth between our contact at the District and having a government employee verify if someone was eligible. Because other Solar for All grantees were also using this process, there was a high volume of participants being reviewed and it often took weeks before we received confirmation of a participant's income qualifications.

Another drawback to using the LIHEAP portal as a means of income verification was that the District had stopped accepting paper applications for LIHEAP. Instead, residents were forced to apply online or visit one of two in-person centers. Wait times for an appointment at the in-person application centers was, on average, four months.

Because many of our participants were senior citizens, we found that most were not comfortable using an online application for their income verification. To help, we conducted home site visits and brought iPads to participants that needed help completing their LIHEAP applications. We would call a participant in advance to walk them through the documents they needed, in hopes they had them ready for the site visit. Many times, we had to go back to participants and ask for different documents after the initial site visit. This process added more to the time between sign-up and income qualification, which did not help to alleviate community skepticism.

Over the course of the program, we had 161 people with good roofs for solar express interest in the program. Of those, we were able to get 122 to begin the income verification process. Of the 122 households that began the process, only 105 completed the process and had their income verified. One hundred of those were qualified for inclusion in the program and five were disqualified. From the point of interest in the program through being income qualified we lost close to 38% of our program participants.

### ***Changes in available incentives***

The model we deployed for this program to deliver solar ownership to participants involved a combination of city grant funding and Solar Renewable Energy Credit (SREC) value. Participants signed over 5 years' worth of SREC credits in exchange for a system at no cost that they would own from day one. Our model called for this 5-year SREC "strip" to be sold upfront to an SREC broker. We would use these upfront proceeds to help offset system costs. Between the time we submitted our proposal to DOEE and the time that our grant was awarded, market prices for SREC dropped. This significantly decreased the number of households we could assist with our Solar for All program.



To address this challenge, we partnered with the District of Columbia Sustainable Energy Utility (D.C. SEU). The D.C. SEU works under contract with the city to help residents and businesses use less energy and save money on their utilities. They also have a special focus on supporting the District's LMI residents. The D.C. SEU offered an upfront incentive to program participants who assigned the first five years of their SRECs over to Solar United Neighbors to help cover the installation cost. The incentive amount was based on the value of five years' worth of SRECs from the system if sold on the spot market for SRECs over that time. The D.C. SEU leveraged their own financing and funding to offset the risk of the value of those SRECs fluctuating over time. This allowed them to offer a larger upfront payment than what we could have obtained on the open market. This creative model allowed them to support energy savings for LMI residents and enabled us to more efficiently use the grant funds provided by the District because a larger percentage of the system costs would be covered from SREC value than if we had relied on upfront SREC strip pricing available on the open market.

### **Permitting delays**

One challenge that severely impacted the program was delays at the D.C. Department of Regulatory Affairs (DCRA) for solar building permits. A typical solar permitting process usually takes between three and six weeks. At times during Solar for All, it took three to six months for the solar permits to be approved. The delays were caused in part by the large number of solar permits the District received (the permits doubled from 1000 to 2000) and limited staffing due to unexpected turnover. These delays made it difficult to manage expectations, which did not help with our credibility among participants. For example, we had participants reaching out to the D.C. government concerned that the delays were a sign that the program was a scam as they had originally feared. It also impacted the efficacy of our referral program. Many participants did not refer their friends and families to the program until after the installations had occurred.

We did lose a handful of contracts because of the delays, especially for participants that had longer waiting periods. In one case, it was five months between the participant signing the contract and the permits being issued by DCRA. When the permits were finally issued, we reached out to the participant about signing the covenant and the D.C. SEU incentive paperwork. The participant was having second thoughts about going solar and lost confidence in the program. Both us and the installer reached out to the participant, but she decided not to move forward with Solar for All. It is worth noting that the delays did not affect solely Solar for All permits. Market rate co-op members were also experiencing delays.

The longest delays in permitting occurred in households that were located inside a historic zoning district. In some cases, the installer





*Metal beams that span the width of the home are a common way to mount solar on row homes with flat roofs*

was quick to point out that the participant was inside the historic area and that the likelihood of them receiving a solar permit was low. These participants were disqualified early on in the process and we worked with other Solar for All grantees to refer the participants to a community solar program option so they could still take advantage of Solar for All. For the participants that the installer believed there was a possibility of obtaining a solar permit, we went ahead with the contract and submitted the permit. These participants had to wait on average four to six months. In the end, participants were still denied permits because of historic zoning regulations. In one case, the board did not outright deny the permit, but instead imposed restrictions on the system that diminished its efficiency and increased the cost to the point where it was no longer viable. In another case, the board did not approve the participant's solar installation because of concerns with changing the neighborhood aesthetics, even though the participant was surrounded by houses that were in disrepair. While we eventually referred the participants to a community solar program, it did not negate the fact that they had to wait four to six months only to be denied by the Historic Preservation Board.

### **Poor roof conditions**

One of the challenges we had anticipated when starting the program was the number of LMI families with roofs that were good for solar but also required some repairs. Our grant had allocated funds for minor roof repairs, but overall the District chose not to use Solar for All money for roof repairs.

In one instance, the installer recommended minor roof repairs for a participant's home before proceeding with the solar installation. The installer felt these repairs, at a cost of approximately \$3,000, were necessary to extend the life of her roof and minimize the cost of having to remove the installation for roof repairs afterwards. When we reached out to our DOEE grant manager for permission to cover the cost, as detailed in our grant, we were instructed to have the participant apply to the Department of Housing and Community Development's (DHCD) Single Family Roof Repair program instead of us covering the cost.

The problem with DHCD's roof repair program is that it has a waiting list of two years. We worked with the participant and DOEE to submit her application for the roof repair program. DOEE then worked with DHCD to process her application. The participant's application was denied and DOEE did not authorize us to use the grant funding to cover the roof repairs. Thankfully the participant was able to work a payment plan with the installer to complete the recommended roof repairs and afterwards we were still able to help her go solar through the Solar for All program. But overall this was a serious hurdle to program participation. In our outreach and interactions with the community we noticed that most District residents with roof problems declined to apply to

the program once we informed them that we did not have funding available to complete roof repairs. We have been organizing meeting and advocating a partnership between the DHCD roof repair program and DOEE for more than 10 years. So far, to no avail.

### **Equipment shortages**

One challenge that we did not anticipate was an equipment shortage. The company that was producing the parapet-to-parapet beams used in the majority of the flat roof installations went out of business in the fall of 2018. This caused a region-wide shortage that affected all installers in D.C. Our installer scrambled to find a comparable alternative and initially settled for a Chinese company. However, between placing their order and the product being shipped, the Trump Administration imposed tariffs. These tariffs added significant additional costs and the installer had to find a different supplier. While they eventually settled with a U.S. based manufacturer, the high demand of parapets meant that there were significant delays in obtaining the necessary equipment to proceed with the majority of the installations.

### **Consistent communications**

One challenge that proved to be particularly difficult was communication with the Solar for All participants. During our normal co-op process, we provided customers with regular communications via email. When a customer signs up for a co-op, they receive a series of emails that explain the solar installation process. These not only educate the participant but help set their expectations for the process. In addition to the educational emails we also send regular updates via email to keep customers engaged in the process. The challenge for us with Solar for All participants was that many participants did not have email addresses, and for those that did, email was not always a reliable method of communication.

We tried to use phone calls as an alternative, but this method also proved difficult. Many of our Solar for All participants were reluctant to answer phone calls, especially if they did not recognize the number. Even when the participants were used to answering our calls, this still presented a challenge when other parties had to communicate with the participants. In those cases, we would have to reach out to the participants and inform them to expect a call from another party (installer, third-party inspector) and provide them with the name and phone number of the person that would be reaching out to them. This added a significant amount of additional work to ensure participants were well informed throughout the process.

### **Complicated concepts**

Another communications problem we faced was explaining several of the concepts involved in the solar installation. The details of the program, including explaining the concept of SRECs and the participant's commitment to maintaining the system on their roofs for 15 years, were nuanced. We found it was most effective to individually call each participant as they signed up and provide them with the equivalent of a mini-information session about the program. Even after discussing these concepts during their welcome call and following up with a letter we found that we had to revisit these key concepts several times during the process. Many participants were nervous when they received their covenant (commitment to keep the solar system on their home for 15 years) and SREC incentive paperwork. Some participants expressed concerns over the language of the covenant and were afraid that the District was going to take away their homes if they signed it. Each of the interactions to answer questions, allay concerns, and explain key concepts were an important part of building trust in us and the program. They also represent a cost to administer the program in materials development and staff time.



Regular phone calls with participants were an important part of ensuring they were comfortable with many of the complex details of the program and solar.

## Program Impacts and Highlights

While we encountered a number of challenges in implementing the program, the end result was a real, measurable improvement in the lives of 73 low-income families in D.C.

### Participant Demographics

- » 73 households
- » Amount solar installed: 312 kW
- » Average solar per home: ~4.23 kW
- » Median age: 57
- » Median income: \$37,716
- » Estimated value of solar systems: \$20,000 over the next 15 years (includes savings and SREC income but excludes tax credit value)

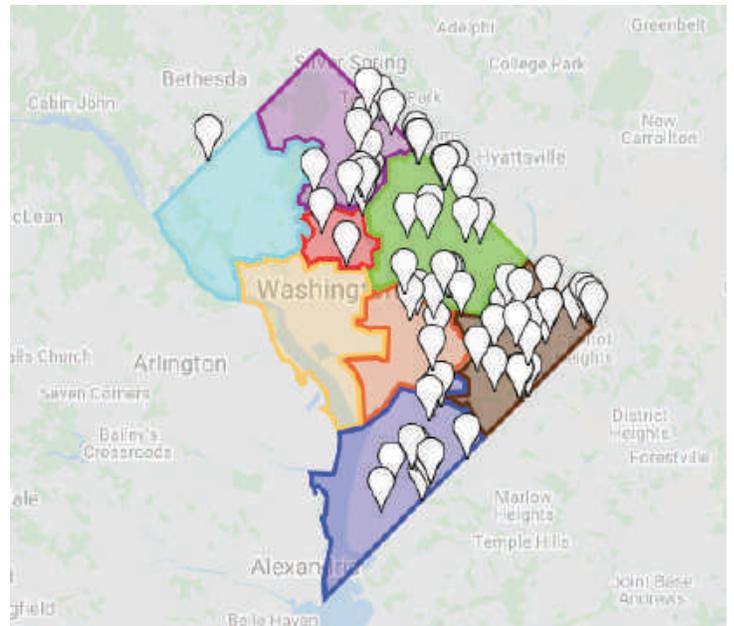


Fig. 4 Solar for All installations by Ward. Our Solar for All participants were spread throughout the District. The bulk of the installations occurred in Wards 7 and 8, the areas of the District with the most low-income residents

## Program Impacts

### Financial benefits

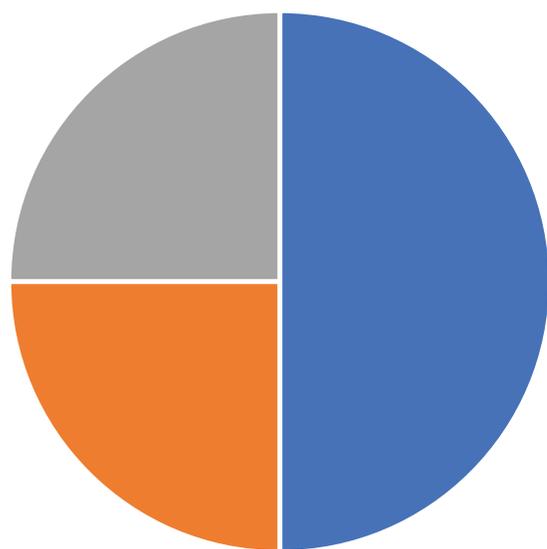
In surveys of Solar for All participants, we consistently found that going solar had a measurably positive impact on families. An overwhelming majority of participants saw a decrease in their energy bill (fig. 5) and over 70% reported that their bill decreased by 50% or more. One enthusiastic participant expressed that he had not paid an electric bill for almost five months due to the energy bring produced by the solar system.

Arguably even more meaningful was the impact that these bill savings had on participants. A majority reported that savings from going solar allowed them to cover basic necessities (fig. 7). A few also cited the ability to pay medical expenses or reduce their debt, as well as the health benefit of reduced stress thanks to lower bills. For families living in poverty, having an opportunity to reduce or eliminate a monthly bill provides measurable relief – particularly when a typical low-income household pays 7.2% of their income on utilities compared to higher income households that only pay 2.3% (ACEEE, 2016).

### Impact of ownership

The reason we focus on an ownership model instead of power purchase agreements was because we wanted to ensure our homeowners receive the most value from their solar systems - and that that value stays in the community. This is a core part of our approach to solar equity. It's not enough to increase equity of access to solar; we must also maximize access to the benefits that solar provides.

One of those benefits is claiming the solar Investment Tax Credit. One of the most common misconceptions when it comes to LMI homeowners is the assumption that these homeowners will not have a tax burden. That view comes from conflating low- and moderate-income earners as one group. With the income threshold for participating in Solar for All set at 80% AMI, income earners making close to 80% AMI had enough of a tax burden to be able to claim the tax credit.



### Installations by Income Level

- Very Low (0 - 30% AMI)
- Low (30 - 50% AMI)
- Moderate (50 - 80% AMI)

*Fig. 3 Breakdown of income levels of our Solar for All participants. The area median income (AMI) is determined using Department of Housing and Urban Development Standards for the Washington, DC area. Very low-income (0-30%) limit for a family of 4 in 2019 was \$36,400. The income limits for a low-income (30-50% AMI) family of 4 in 2019 was \$60,650. The moderate-income (50-80% AMI) limit for a family of 4 was \$77,600.*

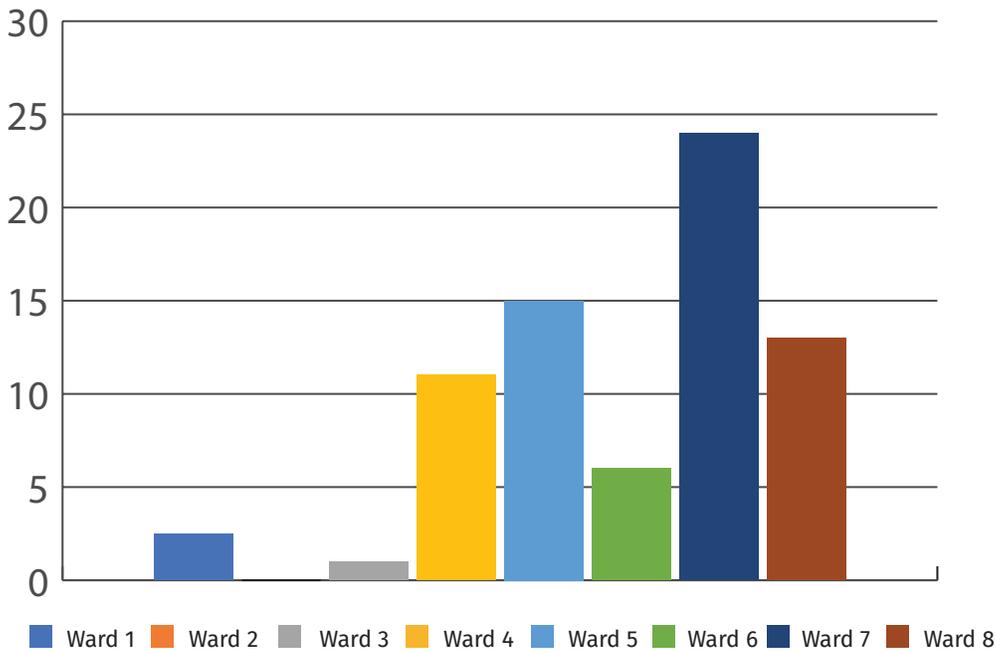


Fig. 3 Solar for All installations by ward. Our Solar for all participants were spread throughout the District. The bulk of the installations occurred in Wards 7 and 8.

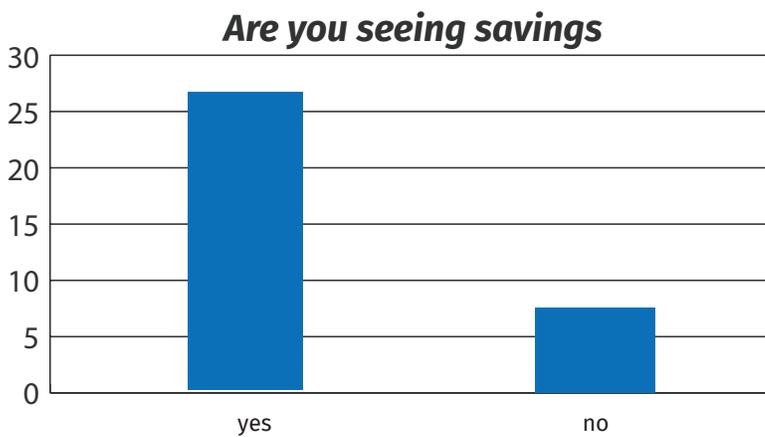


Fig. 5. Are you seeing savings? Participants were asked if they had savings on their electric bill after the installation of their solar system. The survey was sent to participants after or close to when they obtained Permission to Operate from the utility, some may not have seen their first bill after turning their systems on.

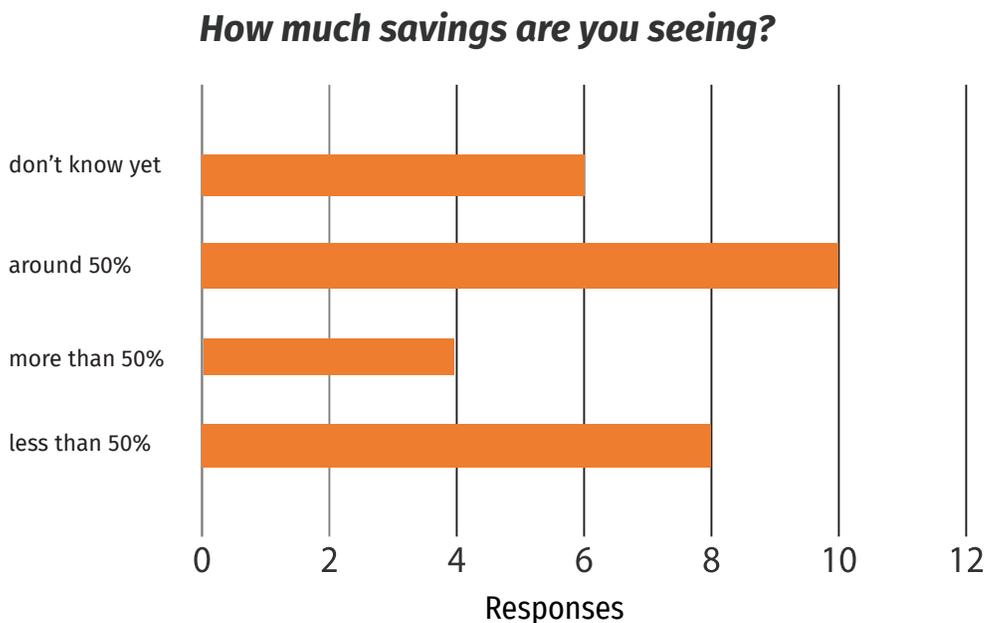


Fig. 6. How much savings are you seeing? Participants were asked how much they were saving on their electric bill once their systems were turned on. The majority of participants experienced a decrease of around 50% on their energy bill.

### How are the savings from solar going to help you?

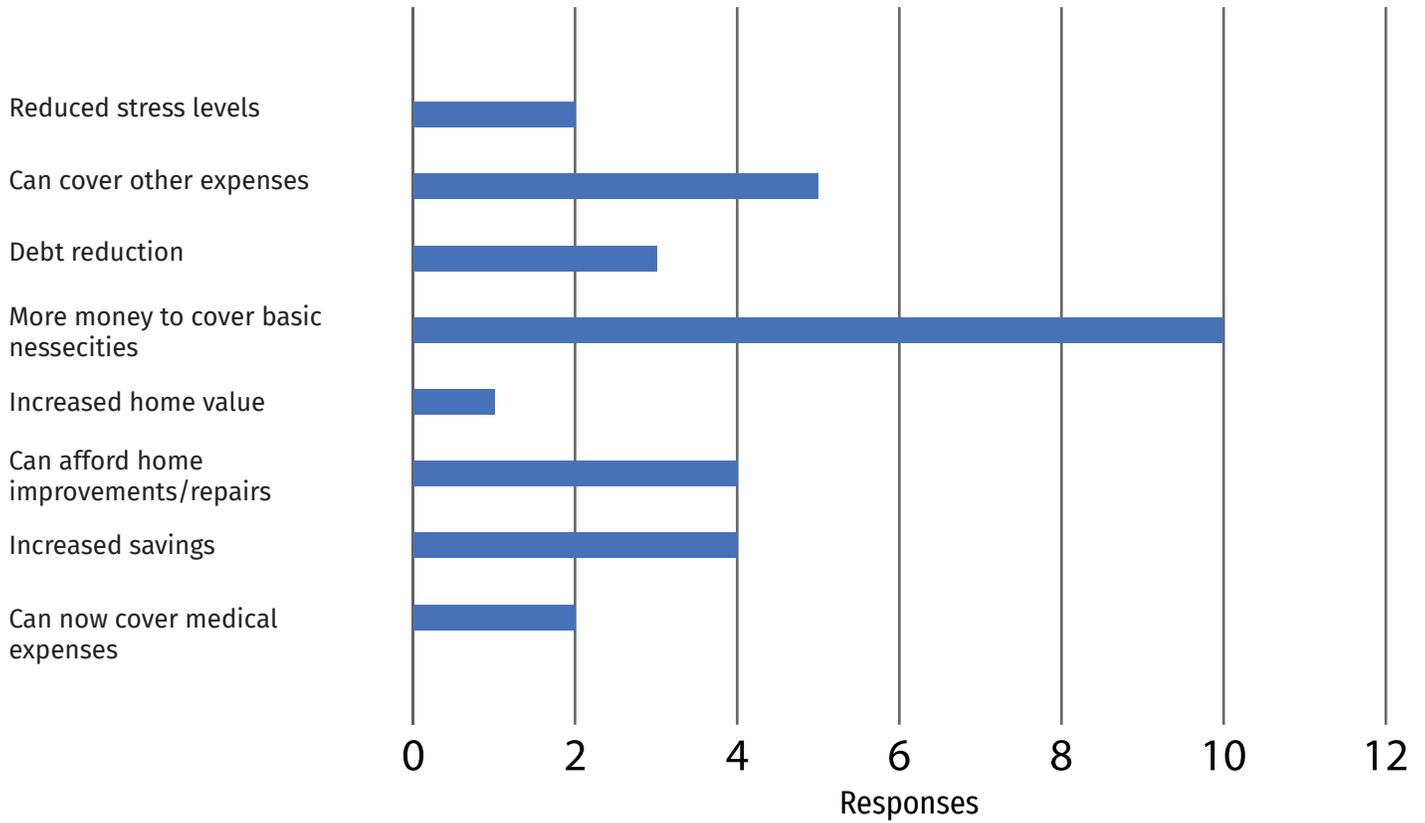


Fig. 7. How are the savings from going solar helping you? Participants were asked to explain how their savings were helping them. A majority of participants felt that because of the savings they now had more money to cover basic necessities.

### Did you take or are you planning on taking advantage of the federal tax credit?

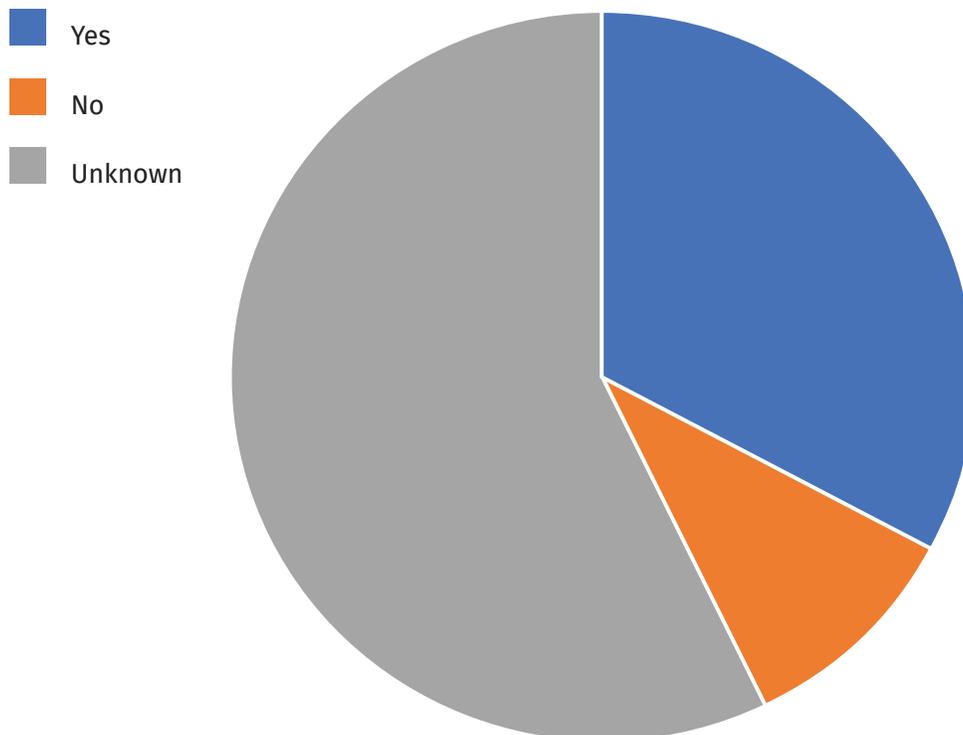
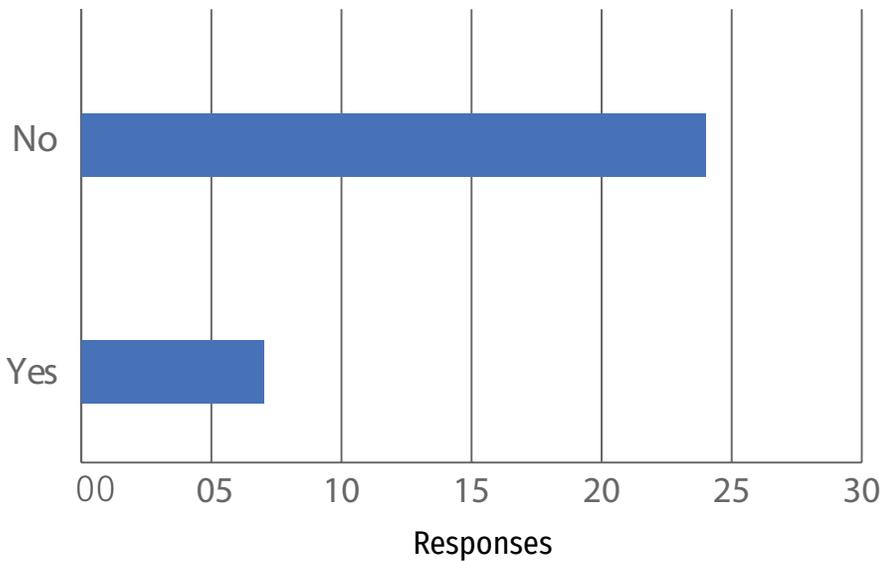


Fig. 8. Did you take or are planning on taking advantage of the Federal Tax Credit? Participants were asked if they had claimed or were planning on claiming the federal tax credit as a result of going solar. A third of the participants responded that they had claimed or were in the process of claiming that credit.

## Would you have gone solar without Solar for All?



*Fig. 9 Would you have gone solar without Solar for All? Participants were asked if they would have installed a solar system without the Solar for All subsidy. The majority of participants answered that they would not have gone solar without the subsidy.*

For example, under the Solar for All income guidelines, a family of four will qualify for the program as long as their income does not exceed \$97,050 a year. The average federal income tax burden would be around \$14,295 for a family at that income level. The average system size was 4.23 kW with an average cost of \$13,748. At the 30% tax credit rate applicable for 2018 and 2019 the tax credit for this average system was \$4,124 which can be spread out over five years.

To date 24 out of 73 of our Solar for All participants (33%) have indicated they will be claiming their tax credit. This is a significant additional benefit for these homeowners, and one that is often overlooked when designing LMI programming.

Another benefit of owning solar on a home is that it can increase the home's value. PPAs or leases do not provide a similar bump in equity and can in fact hinder the sale of a home as the lease is an encumbrance. Participants were required by the city to sign a covenant stating that they would keep the solar panels on their roof for 15 years. The covenant did not limit when and to whom they could sell the house; the homeowner only had to notify the District if a new owner purchased the home. That new owner would then be required to follow the covenant and keep the solar panels installed for the rest of the 15-year term. We did have one participant sell her house after participating in the program. The process of selling her home was not complicated by her being a Solar for All participant: she easily changed ownership and, because she owned the system, there was no lien affecting the sale of her property.

The ability to sell the home or transfer it to heirs was another important aspect of the program for many of our Solar for All participants. With the median age of 56, many participants wanted to ensure they could leave their home to their heirs in case they passed away before the 15-year covenant expired. All of them were relieved when they learned that neither their participation in the program nor the covenant would affect their ability to leave their property to their heirs. This was key in recruiting some of the more elderly participants.

### **Cultivating Solar Supporters**

Building strong networks of solar supporters is what we do, and this was another strong positive outcome of our Solar for All program.

Our inclusive, community-focused solar co-op model is a critical component to building a network of solar supporters. These solar owners, become excellent advocates for increasing access to solar and improving solar policies and energy equity in their communities. When we designed our Solar for All program, we wanted to encourage our participants to be part of the entire process from selection committee to recruitment. Our goal was to empower them to become long-term, active energy advocates Here's how we did it:

1. For each of our selection committees we made a commitment to actively recruit Solar for All participants. For the first selection committee we had four members that were eligible for Solar for All and for the second selection committee more than half of the members were Solar for All participants.

2. We did not want to have Solar for All participation end with the selection committee. Under our theory of change we have shown that word-of-mouth is the number one factor when people consider going solar. Our Solar for All participants were crucial to building the pipeline of participants and spreading the word. In addition to organic, word-of-mouth referrals amongst neighbors, friends, and family, we were able to set up a referral program where participants would receive a \$100 referral fee for every Solar for All participant they referred that went solar with us through the program. We had ten Solar for All participants participate in the referral program and collectively recruit eight additional participants to go solar. An additional 30 participants were referred by friends outside of the paid referral program.

3. We expanded our Advisory Board and added five Solar for All participants to our board. As Advisory Board members, these Solar for All participants will have a say in the growth and direction of Solar United Neighbors moving forward. They also actively participated in advocacy and education work throughout the year. For example, some of our Solar for All Advisory Board members served on a panel on the myths of solar homeownership for our 2019 Solar Congress (an annual meeting of our network). The panelists shared their experience with the Solar for All program and how going solar has changed the way they view energy consumption. One spoke about how she now monitors her energy consumption and production, and how having solar changed her energy use habits to reduce her consumption. She even bought an electric vehicle when she was forced to replace her old car.



**“I see a win-win with the Solar for All program. I recommend that everyone make the choice...If it wasn't for Solar for All, I likely would have thought going solar was out of my reach....What's even better is that my children understand this lifestyle and its benefits. They will likely live the same way.**

**That's exciting!” — Latoya Smith**

4. We made a concerted effort to recruit Solar for All participants to participate in the 2019 National Solar Tour. The Tour, a national weekend of solar open houses across the country, is an opportunity for neighbors to meet one another and learn about solar from solar owners who open their homes for solar tours and open houses. More than half of the D.C. area stops for the 2019 National Solar Tour were Solar for All participants. It required effort to recruit Solar for All participants, as it is not an easy to ask someone to open up their house to strangers and take time off to host a solar open house. But the Solar for All participants who hosted an open house were not only able to share their solar stories but serve as local ambassadors for solar and the Solar for All program.

5. To help participants further identify as solar champions and to support them for the long haul, we provided each new Solar for All homeowner with a lifetime membership to Solar United Neighbors. We've provided them with literature that explains their warranties and what to do in case of a problem. The membership also helps them as solar homeowners should any problems arise with their systems. Participants can also reach out to us with questions about their energy production, tax credits, SREC income, or even to inquire about referring a friend or neighbor. Long-term their lifetime membership will also connect them to the ongoing story of D.C. energy policy through regular updates, blog posts, continuing education, opportunities to attend and influence policy, and digital action alerts.

## Recommendations for Other Jurisdictions

### *Deciding which type of program you can offer*

There are several different ways to create an income-qualified solar program. Our Solar for All program focused on ownership, which allowed participants to benefit equitably from all available incentives. As discussed in our review, this method can be more costly than a PPA or a subsidized loan program.

We understand that many jurisdictions will not have the financial capacity to offer a solar program focused on ownership. The program you design can still be equitable if it offers all market options to participants and doesn't force them into a particular financing type. This could be straight ownership or loan-financed ownership alongside third-party ownership. Consumer education will be key, as participants must understand all of their options and the implications of a purchased vs. a leased system.



## STEPS TO BUILDING A PIPELINE

- **REPETITION**
- **SHOWCASE REAL EXAMPLES OF EARLY ADOPTERS**
- **WORK ACROSS GOVERNMENT AGENCIES**

### ***Building an effective pipeline***

Jurisdictions considering creating a solar program for under-resourced communities need to understand that building a pipeline for the program is a heavy lift. Even when offered free solar, residents will be hesitant to believe that the program will benefit them. Overcoming that barrier to build a robust pipeline will take time and those efforts should not be squandered with short-term programs that only last for a year or two. It took us almost a year to build a robust pipeline and it required us to be out in the community on a weekly basis. This added significantly to the dollars/watt costs of the program because in the end we got less solar installed for the investment in time and staff it took to build the program.

A strong pipeline will not only require a consistent presence in communities, it will also require well-coordinated messaging strategies in order to break through the noise and show residents that the program is real, trustworthy, and one from which they can benefit. Find individual and organizational partners with trust and credibility in the communities you want to reach. Test for messages that resonate. Quickly scale up what works and jettison what doesn't.

### ***Community Engagement***

A key to building trust with the community was our constant presence in the community. For 18 months we attended civic meetings and community events several times a week. We also presented a solar information session at least once a month. Engaging regularly with key community institutions is critical to build trust and demonstrate a presence.

### ***Facilitate inter-agency cooperation***

The biggest hurdle at the beginning of the process was getting the residents we met to believe that the program was a legitimate government program. If the program will be sponsored or subsidized through a government entity, it is imperative that the entire government understand the program and serve as a referral. Before program launch and during implementation, all government agencies in direct contact with the public should have the same materials, messaging, and training on how to identify someone who could qualify for the program and direct them to the right intake channel.

Key government decisions governing the program such as income qualification criteria and responsible agencies also need to be made in advance. And if a resident is deemed qualified for other income-based government programs, such as home repairs subsidies or loans, they should be able to enroll and automatically qualify for the solar program. Our program could have been much bigger, cheaper, and more successful if just this one criteria were met.

### ***Focus on education***

Education is a key factor in building a pipeline and a successful program for under-resourced households. In order to overcome consumer wariness and turn participants into advocates for the program it is important to educate the consumers upfront and all throughout. Once we explained the program to our participants and helped them feel comfortable with the terms they often became our biggest champions. The program participants were really interested in the big picture and they cared about the reasons why D.C. was investing in clean energy as much as market rate solar customers.

### ***Simplification is key***

Every step in the process is another step where people can get discouraged and exit the pipeline. A successful program will be simple enough that it will not place undue burdens on the participants, while being thorough enough to safeguard taxpayers' money.

### ***Communication options***

When addressing the community, the jurisdiction must be flexible and creative in the way they reach out to their residents. You cannot use only online communications or even phone; for example, for seniors it was important that the documents be mailed and printed in a way that made it accessible to them. You also need to create leave-behind materials and warranty documents so that homeowners know what's happening and how to manage their systems.



### ***Start small and then scale up***

We recommend starting with pilot programs first and taking a smaller subset of homeowners solar. This allows you to learn, develop local political and program champions, and iron out difficulties before launching a full-fledged program. Your learning from the pilot will allow you to more effectively scale and ensure a much smoother experience for all. It is better to take five houses solar quickly than spend years planning in a vacuum.

### ***Customer service and relationship building***

Providing excellent customer service to participants is critical and time-consuming. Installing solar can take time and there are numerous steps involved. Poor communication, slow responses, incorrect information, and delays all negatively impact the customer experience and, by extension, their willingness to refer others to the program. Because referrals are often the most significant source of new participants, it's crucial that the program is something participants are excited to share with their friends, family, and neighbors. For our program we designated a single individual as the contact person for all participants if they needed anything. If someone contacted the government agency who sponsored our program, they referred them to her. If someone contacted our organization, we connected the participant to that same person. This provided the participant with a single point of contact for their project and built trust. Scaling this type of relationship management and trust building comes at a cost in terms of personnel time, but it is a highly effective way to build a solid foundation for long-term program success. And, depending on the size of the program and workforce development goals, some homeowners who go through the program could be groomed to join the team as paid "service navigators" helping other homeowners go solar. A key to success here is to build solid record keeping and information management systems. We were building on a strong backbone of systems meant to track and manage customers. This work isn't for ad hoc start-ups.

## Conclusion and Recommendations for Success

When we embarked on this work in 2017, we knew that it was going to be difficult. And our lessons learned over two and a half years confirmed this. But it is important work. Beyond helping to address climate change, this work is acknowledging the systemic racism and injustice inherent in our current energy system and seeking to address the real burdens being faced by low and middle-income families. The burden of this current system is real: on average, LMI households pay 7.2% of their income on utilities—higher income households only pay 2.3% (ACEEE, 2016). To reverse centuries of disinvestment in low-income communities and communities of color, we need to actively catalyze a better system. And solar, which provides significant direct benefits to its owners and the surrounding community by creating local jobs, is a critical tool in catalyzing this system.

We encourage other organizations and municipalities to take on this work. Developing and deploying an LMI solar program has tremendous benefits for the community, both immediately and long-term. From creating local wealth to cultivating strong clean energy supporters, a well-designed program has the potential to measurably move the needle for residents in your community.

As you embark on this work, we encourage you to keep the following in mind:

- » The structure of the program, including the requirements for income verification and how funds can be used (for example, allowing some funding to be available for minor roof repairs), has the greatest impact on whether the initiative will be successful. It's important when designing the program to really understand the implications of requirements and the impacts they will have on the participants' experience as well as the programs timelines and costs. We found that government delays in releasing funding, approving income verification methods, burdensome requirements and shifting standards added huge costs and restricted our pipeline of participants once we had the program up and running.
- » Government needs to be flexible and fully engaged in promoting the program across all public-facing agencies. Siloing communications about a program to only one department not only makes it significantly more difficult to build a pipeline of participants, but it actively erodes trust in the program as potential participants are wary of offerings they do not learn about via their trusted elected officials or local government agencies.
- » Your solar market needs to have the basic building blocks in place for market-rate customers in order for an LMI program to be successful. That means having multiple good solar installation companies, a regular supply chain of solar components, reasonable permitting, clear and consistent interconnection rules, and economics that allow projects to pencil out for market-rate participants. If any of these aspects of a strong market are missing, it will be significantly more difficult to implement an LMI program, and we strongly recommend addressing these issues first.
- » Many moderate-income participants have a tax burden and can access federal and state tax incentives – it's important to not assume that all LMI participants cannot benefit from tax incentives. In general, be 100% transparent about the true benefits to the program participants.

- » Customer education is as important as the number of installations you accomplish. A solar program that put systems on roofs but fails to educate participants about those systems will be much more likely to fail and have much fewer ancillary benefits. After all, we are working toward a complete transition of our energy system – this project is just one important stop along the way. Participants need to be fully engaged and educated as part of the process –this allows participants to take an active role in their energy future and encourage others to do the same.
- » The digital divide is real – programs need to have multiple avenues of communication with participants, including phone calls and printed, mailed materials. Relying only on email communication and online applications/portals will exclude many eligible participants.
- » When evaluating the efficacy of a potential program, it’s important to not just look at the model with the lowest cost per solar system installed. These low-cost models may lack the economic benefits, education or community engagement components necessary for the program to be high-impact over the long-term.
- » Customers must be empowered, provide program feedback, and help lead the initiative. We were able to build a strong pipeline and real community buy-in by having Solar for All participants host events, provide testimonials, refer friends and family, serve on the bid selection committee evaluating bids and choosing installers, and serve long term on our organization’s Advisory Board. This not only helped with the success of our program, but has expanded the breadth and depth of solar advocates in the District.

Although it may seem daunting at times to develop and implement a solar program for under-resourced communities, we can’t stress enough that it’s a worthwhile endeavor for any municipality or nonprofit organization. Solar, when done right, can become an asset that increases the value of the home, protects the life of the roof, lowers energy burden, decreases monthly costs, and creates stability for families in need. What’s even more important is that these real, measurable benefits compound over the 25+ year lifetime of the solar installation. Few interventions promise such long-term benefits, and we are excited that more and more communities are turning to solar to address their needs. It can be challenging at times but we can assure you that it’s very much worth it. We’re cheering you on along every step of the process!



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