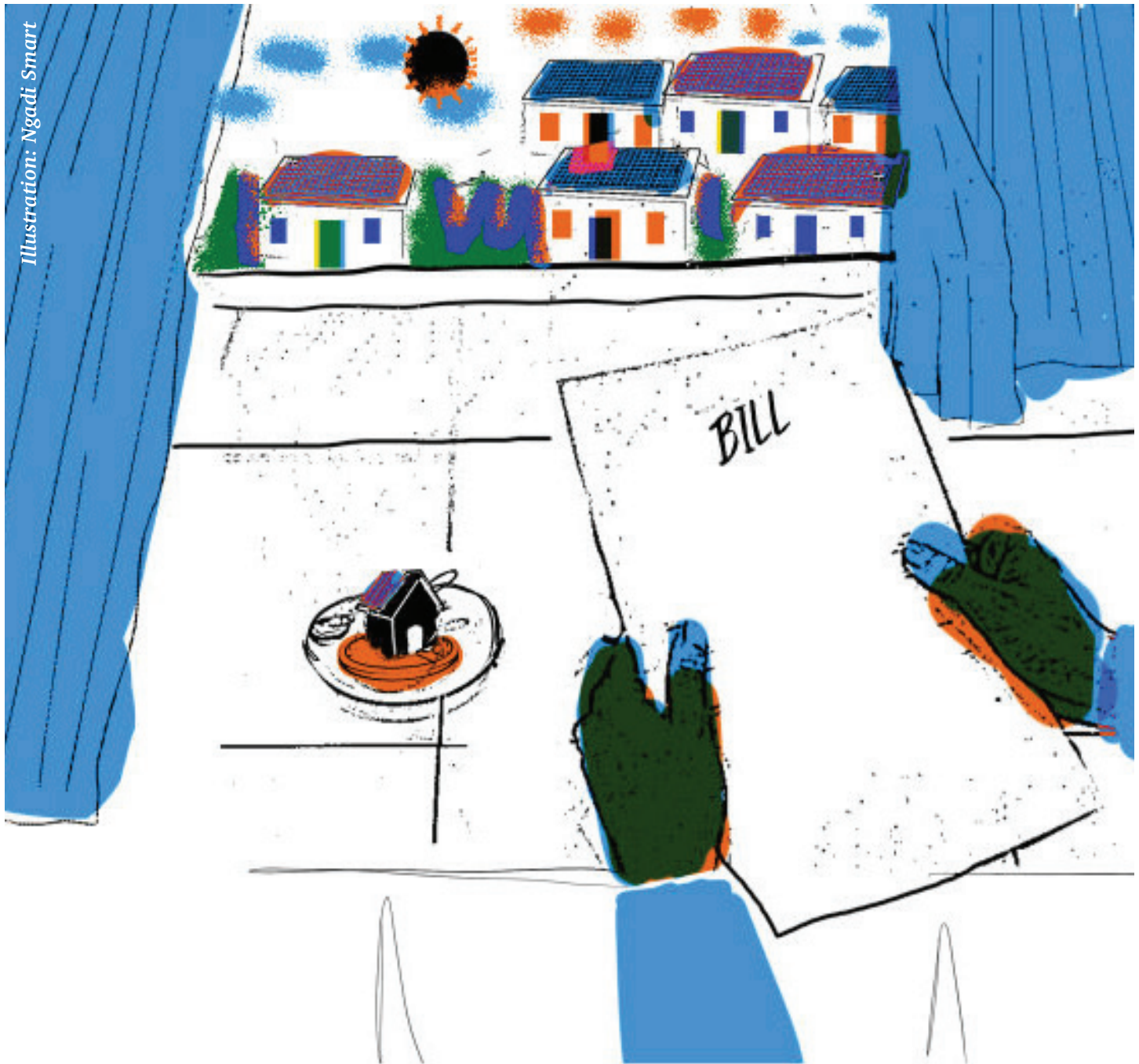


LIFT SOLAR EVERYWHERE

PROJECT FINANCE FOR ACCELERATING LMI SOLAR ACCESS



Research Report: Customer Experience for Low- and Moderate-Income Community Solar Subscribers

JUNE 2022



ELEVATE



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Jake Archbell is an Engineer for Solar Programs at Elevate, a nonprofit organization that designs and implements programs that reduce costs, protect people and the environment, and ensure the benefits of clean and efficient energy use reach those who need them most. He works on solar projects across the organization, leading and assisting research projects, market analysis, data visualization, and program administration. In his role, he performs solar assessments and financial analysis of photovoltaic and battery energy storage systems. He analyzes solar policy at a market level to develop best practices and detailed financial analyses that address barriers to low-income solar adoption. Through his role he liaises with industry experts and professionals in both private and public sectors, including solar developers, other nonprofits, and national labs.

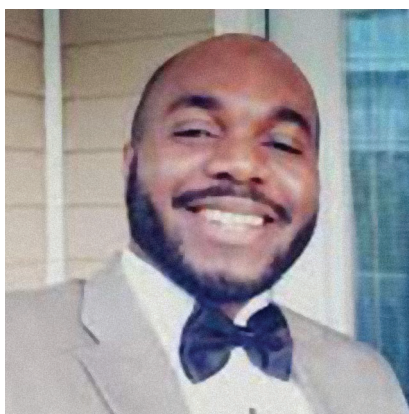


ABOUT THE LIFT SOLAR EVERYWHERE SOLAR FINANCE RESEARCH INITIATIVE

Accelerating Low-Income Financing and Transactions for Solar Access Everywhere (LIFT Solar) is a research effort funded by the U.S. Department of Energy, Solar Energy Technologies Office (SETO) and led by Groundswell in collaboration with Elevate, Clean Energy Works and Southface Institute. LIFT Solar seeks to understand the financial performance and customer experience of community solar projects that serve low- and moderate-income (LMI) customers, with the goal of providing insights, tools, and best practices that accelerate the development of these projects nationwide.

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The LIFT Solar Everywhere Research initiative is led by Dr. Elvis Moleka, VP of Labs and Data Science at Groundswell.



Dr. Elvis Moleka

Dr. Moleka's passionate pursuit of data-based solutions to long-standing issues has uncovered previously unexplored research possibilities in the realm of energy forecasting. He conducts research and analysis on the vertices between sustainable finance, development economics, energy economy, risk management, financial markets, monetary policy, and macroeconomic dynamics. Dr. Moleka has more than 15 years of progressive experience in finance, risk management, data science and quantitative analytics. As a Data Scientist, he leverages statistical analysis and econometrics knowledge to promote model development and data management solutions.

He is a member of the New York Institute of Finance. Before joining Groundswell, Dr. Moleka worked as a Senior Financial Consultant and supported Model Risk Management groups on model validation and audit activities for major Wall Street Banks. He held Lectureship positions at the University of Warwick, University of Bath, London Metropolitan University, and the University of Buea. He earned his Doctor of Philosophy in Economics from the University of Bath, a Master of Science in Business Economics and Finance from London Metropolitan University, and a Bachelor of Science in Economics from the University of Buea. Dr. Moleka is also the Co-Founder and CEO of Leka Research Institute LLC and Chairs the Economic and Development Committee at BACDU USA Inc.

EXECUTIVE SUMMARY

Community solar has grown exponentially since the first project was installed in the U.S. in 2006. Since then, more than five Gigawatt (GW) of cumulative community solar capacity has been installed or is in development, with 273 Megawatt (MW) or just over 5% of capacity specifically serving LMI households.

The LIFT Solar team was assembled to conduct research into the financial performance and the customer experience of community solar projects serving LMI households. Our research identified 455 projects across the country that dedicate some portion of the system capacity to LMI households. 17 of those projects participated in the LIFT Solar Customer Experience research, allowing the LIFT Solar team to survey their customers and gain insight into how LMI subscribers feel about community solar and the programs that serve them. Given that many programs serve both LMI and non-LMI subscribers, we were able to capture opinions from both segments.

Overall, we found subscribers to be happy with their participation, with 63% of all subscribers interviewed being satisfied or very satisfied with their participation. However, we found that most customers who pay a premium (53%) were dissatisfied or very dissatisfied. Savings is still an important issue for subscribers.

Subscribers in our sample indicated that the most important issue that motivated them to participate in their program, however, was not *savings* but *helping the environment*. This was true for both LMI and non-LMI subscribers. *Helping the environment* was also the most important issue for LMI subscribers to measure how well their program was working for them. *Saving money* was a close second in terms of importance for LMI subscribers. In fact, 64% of LMI subscribers said *saving money* was important while only 22% of non-LMI subscribers



Figure 1: Ellensburg Community Solar Project
First community solar project in the U.S. 58 KW installed in 2006
City of Ellensburg, WA Photo: Pacific Northwest Smart Grid Demonstration Project

did. This finding was noticeably different than previous research conducted by SEPA and the Shelton Group in 2015¹, which found *saving money* to be the most important issue for subscribers, slightly more important than *helping the environment*.

Communication and messaging also stood out as important to community solar subscribers. 35% of subscribers stated that savings was not clearly communicated to them. This is not surprising in that savings can mean many things. Some definitions represent savings as a percentage of your electricity bill, while others use the per kilowatt hour rate you pay for your subscription.

¹ What the Community Solar Customer Wants, Shelton Group and Smart Electric Power Alliance <https://sheltongrp.com/insights/what-the-community-solar-customer-wants/>

These definitions, however, don't always account for fees or fixed costs in their calculation. Whatever method is used to calculate savings, the definition must be clearly communicated to be understood by and satisfy subscribers.

The "Finance and Investment Performance for Community Solar Serving LMI Households" research conducted by the LIFT Solar team found, not surprisingly, that projects that had higher value stacks performed better financially. Our customer experience research also found that respondents who were served by projects with high value stacks had a greater degree of satisfaction. The learning is that value from community solar programs must be passed on to subscribers to ensure customer satisfaction, and that the value subscribers receive must be defined and communicated clearly.

Finally, our research found that LMI subscribers more often learn about their community solar program through community organizations, program administrators or utilities. This differs from non-LMI subscribers who more often heard about their programs through word of mouth or from advertisements. This suggests that trusted, formal relationships with institutions are more effective in reaching LMI subscribers than informal relationships or passive advertisements. The good news is that LMI community solar continues to grow quickly and LMI subscribers are a viable and accessible part of this growing segment.

Key Findings and Recommendations

Motivating Subscribers

- LMI subscribers indicated that *helping the environment* and *saving money* are the two most important issues that motivate them to participate.

Savings:

- The current industry average subscriber savings is 20%.
- Most subscribers who pay a premium are dissatisfied or very dissatisfied with their program.
- Savings is the most confusing issue for LMI subscribers. Clearly communicating what savings means and how it is measured is critical to customer satisfaction.

Project Financial Performance and Subscriber Satisfaction

- Community solar projects that perform better financially also have significantly higher customer satisfaction.
- Higher bill credit rates correlate significantly with higher subscriber satisfaction.

Outreach and Communication

- Formal relationships with institutions are more effective in reaching LMI subscribers than informal relationships or passive advertisements.

LIFT SOLAR

Accelerating Low-Income Financing and Transactions for Solar Access Everywhere (LIFT Solar) is a research effort funded by the U.S. Department of Energy, Solar Energy Technologies Office (SETO) and led by Groundswell in collaboration with Elevate, Clean Energy Works and Southface Institute. LIFT Solar seeks to understand the financial performance and customer experience of community solar projects that serve LMI customers, with the goal of providing insights, tools, and best practices that accelerate the development of these projects nationwide.

The research was designed to first gather data from developers and financiers of currently operating LMI community solar projects nationally to understand how capital and values stacks affect financial performance for these projects and how designing programs and projects that serve LMI customers impacts projects as an investment. The research also gathered primary customer experience data from LMI and non-LMI community solar subscribers to help understand how project and program design and financial performance correlates with customer experience.

LIFT Solar will publish several reports based on this primary data collection, including this report, *The Growth of Community Solar Serving LMI Households*, as well as *Customer Experience for LMI Community Solar Subscribers*, and *Finance and Investment Performance for Community Solar Serving LMI Households*. LIFT Solar will also deliver a web-based tool kit to share these insights and provide additional resources and tools for project developers, financiers, program designers, utilities, and other stakeholders that will identify best practices and program design considerations.

The aim is to accelerate the growth of this important segment of the solar industry and more rapidly increase the share of community solar subscriptions that serve LMI households.

Data Collection

A significant challenge to this research was data

collection and the proprietary nature of the data being collected. For example, the financial data needed to drive this research includes detailed information about investment capital stacks, profit margins, customer acquisition, and subscriber management performance. This information, as a rule, is not publicly available or often shared. Similarly, access to customers' opinions presented another barrier because the goal of this research was to collect primary research data from subscribers across many programs. These barriers meant that the data collected, while robust, is not fully representative of all community solar projects serving LMI households across the country. The findings, however, are insightful and unique, providing a view of this segment that provides clear best practices and considerations for optimizing project and program design.

In 2021, the National Renewable Energy Laboratory (NREL) collected data on community solar installations across the U.S. for its Sharing the Sun, Community Solar Deployment, Subscription Savings, and Energy Burden Reduction database and report.² The LIFT Solar team coordinated with NREL to share and reconcile data collected on community solar projects nationally. Our definitions for LMI community solar were also reconciled, i.e., defining LMI community solar as any community solar project that is mandated to serve LMI households, whether through income eligibility or carve-out requirement. No specific income definition was used, although most programs determined eligibility based on third-party LMI energy program eligibility, area median income, or HUD-defined poverty levels. One notable difference between LIFT Solar data and NREL data is that LIFT Solar only included data for community solar projects that were allocated funds for specific installations by program administrators. NREL included all stated capacity for community solar programs, even if funds were not yet allocated to specific projects.

Community solar is a method for sharing the value of solar power generated from a single solar photovoltaic system with more than one electricity user. Users of community solar systems are typically called subscribers. By allowing a single, usual-

² Heeter, Xu, and Chan. Sharing the Sun: Community Solar Deployment, Subscription Savings, and Energy Burden Reduction. <https://www.nrel.gov/docs/fy21osti/80246.pdf>.

DEFINING COMMUNITY SOLAR

ly larger, solar array to serve multiple subscribers, community solar expands and accelerates access to renewable energy, especially among renters, those who cannot install solar on their rooftops, or those who cannot afford the upfront costs of solar installation. This represents an important opportunity for LMI households, who may otherwise have no reasonable access to renewable energy. Even with innovative approaches like community solar, however, barriers can still exist, like upfront costs, credit score requirements, or simply understanding the complexity of community solar. While this report and the LIFT Solar initiative are not specifically researching barriers to solar access, they both share learnings that accelerate the adoption of community solar by households with low incomes.

Bill Credits as a Mechanism to Deliver Value

While the benefits and value of community solar can be shared in different ways, our analysis includes projects that specifically use virtual net metering in the form of bill credits as a mechanism for delivering value. This means that projects included in LIFT Solar data and analysis are interconnected directly to the grid and not behind a customer's meter. Some innovative programs (Illinois Solar for All, DC Solar for All), while installed on rooftops of multi-family buildings, have been included because they use bill credits and are not behind the customer's meter.

Community solar subscribers typically enter into an agreement with a community solar provider where they pay a fee in exchange for receiving bill credits on their electricity bills. The value proposition is usually such that the fees for subscribing are less than the bill credits, thereby providing a savings to subscribers. This is not true in all cases. Some programs charge a premium for community solar, where subscribers pay more for their electricity, seeing benefit not in savings but in advancing renewable energy in their state.

The value of the bill credits is often determined by legislative or regulatory requirements, although

some states allow individual utilities to set their own bill credit rates. For example, in Illinois the bill credit rate is set at the energy supply rate, which may differ by supplier because Illinois is a deregulated market. The supply rate is always less than the retail rate of electricity, which includes distribution, transmission, capacity, and other charges per kilowatt hour (kWh). Other states may have requirements that bill credits be set at the retail rate or a value of solar rate (a rate that can include environmental and other value). The price of the subscription must consider not just the subscription costs and fees, but the value of bill credits, to determine subscriber savings.

Subscriber Models

The subscriber models offered by community solar programs define how much a subscriber pays for their subscription and how they pay it. How bill credits will be received, meanwhile, is typically determined by the state's legislative or regulatory framework. For example, a subscriber offer may be based on buying a block of kilowatt hours (kWh) at a specified price. The subscriber then receives a bill credit for every kWh they purchase. A provider may offer a Power Purchase Agreement (PPA), where the subscriber agrees to purchase all the electricity from an agreed upon share of the array or number of panels at a fixed cost per kilowatt hour. While the number of kilowatt hours changes each month, the subscriber will receive bill credits for each kWh generated by their share at an agreed upon price per kWh. PPAs are typically contracted for a period of years – sometimes as long as 10- or 20-years. Some subscriber models are based on panel ownership, where a subscriber purchases panels up front or leases them and receives bill credits for all the power generated from those panels for as long as they produce energy (typically 25 years or more).

Savings

Bill credits and subscriber models are important factors in determining the savings a subscriber sees. For example, if community solar bill credits are valued at a supply rate of \$0.06 per kWh, for the subscriber

to realize savings, they must pay less than \$0.06 per kWh for their subscription. If the bill credit is based on a retail rate of \$0.12 per kWh, subscribers can pay significantly more than \$0.06 per kWh and still see savings. Additional costs or fees associated with the subscription outside of energy costs need to be factored into overall savings as well. With different bill credits and subscriber models, and because energy costs vary significantly across the country, understanding the savings for community solar can be difficult and confusing, even where specific levels of savings are stated or mandated. The savings level for subscribers is only indirectly impacted by energy rates, and more directly impacted by the type of bill credit used. For example, a customer that pays \$0.05 per kilowatt hour for a supply rate credit of \$0.06 per kWh is saving less than a customer who pays \$0.08 per kWh for a retail rate bill credit of \$0.12 per kWh – 20% savings versus 33% savings respectively.

The research in this “Customer Experience for Low- and Moderate-Income Community Solar Subscribers” report found that understanding savings was the most confusing aspect of community solar for subscribers. How savings and subscriber models are marketed to potential subscribers is important and often governed by strict consumer protections to ensure whatever is being offered is clearly defined and explained. But clearly conveying the details can still be challenging even with those protections in place.

Participating Projects

LIFT Solar research, in coordination with NREL, identified 455 community solar projects across the country, in operation or under development, that mandate a share of the project’s output to LMI households. The comparisons below look at the ca-

LIFT SOLAR CUSTOMER EXPERIENCE

RESEARCH OF LOW- AND MODERATE-INCOME COMMUNITY SOLAR SUBSCRIBERS

capacity of these projects compared to the capacity of LIFT Solar participating projects by key project characteristics to understand the degree to which our sample represents all LMI community solar currently.

A call for data was issued in May 2019 to developers, investors, utilities, subscriber managers, and other stakeholders of community solar projects that serve LMI households. 17 projects across nine states agreed to allow their customers to participate in the LIFT customer experience survey. 15 of these projects have specific requirements or carve-outs to serve LMI households. Two of the participating projects do not. These projects represent 3,167 subscribers, with 280 of their customers completing customer experience surveys for this research.

Participating projects, while not fully representative of projects nationally, were diverse in ways similar in characteristics. For example, projects participating in LIFT Solar customer experience research and the wider universe of LMI community solar projects both represented about 90% ground-mounted projects and about 85% of projects had a system capacity of 2 MW or more. Most projects from both the universe of all U.S. LMI community solar projects and participating LIFT Solar projects were installed in investor-owned utility (IOU) territory and states with no enabling community solar legislation. See “LIFT Growth of Community Solar Serving Low- and Moderate-income Households” for a more detailed analysis of these projects.

The regulatory structure of LMI community solar projects is one area where LIFT Solar projects are less representative of U.S. LMI community solar projects. 20% of LIFT Solar participating projects

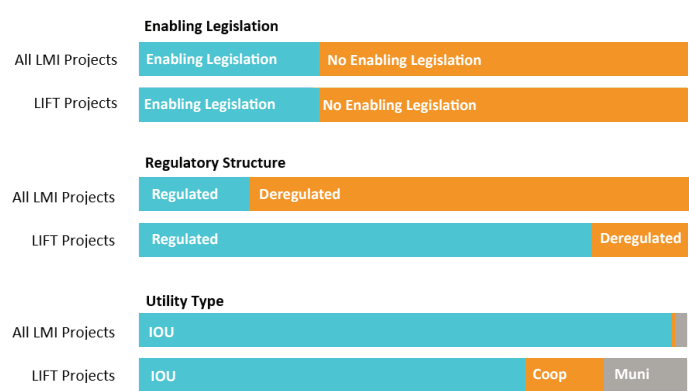


Figure 2: Comparing Regulatory Characteristics
1,570 MW of capacity for all U.S. LMI community solar projects compared to 29 MW of LIFT participating projects.

were in regulated states, while more than 80% of all U.S. LMI community solar projects were in regulated states. However, regulatory structure is an indirect driver of community solar deployment and value in our analysis.

Some value characteristics are more direct drivers of financial performance, bill credit value, renewable energy credits (RECs) and other incentives. These are areas where LIFT Solar projects are

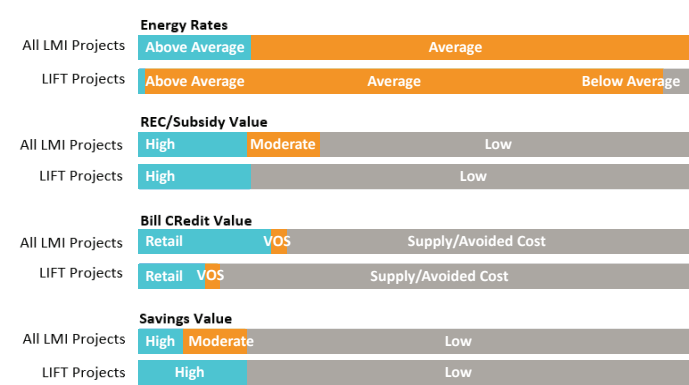


Figure 3: Comparing Value Characteristics
1,570 MW of capacity for all U.S. LMI community solar projects compared to 29 MW of LIFT participating projects.

mostly representative. While this is true, the findings in this analysis may not be fully indicative of the population of U.S. LMI community solar subscribers. As such, we seek to highlight patterns in the data itself, as well as how it sits in conversation with previous research, rather than simply applying these findings across all LMI community solar programs and customers.

20% of both LIFT Solar projects and all LMI projects used high value RECs (>25% of the value stack). LIFT Solar projects used no RECs at an average value (10%-25% of the value stack). Similarly, subscriber savings for participating projects ranged from 100% (free solar) to programs where customers pay a premium. When comparing all of the capacity for community solar projects serving LMI households we found that 81% of both Customer Experience and the wider LMI project universes see a low level of savings (below 20%). Note, however, that these projects often serve both LMI and non-LMI subscribers. When you look at the capacity that serves each, you see that LMI subscribers usually have a different savings than non-LMI subscribers and that savings is noticeably higher. See “LIFT Growth of Community Solar

Serving Low- and Moderate-income Households” for a more detailed analysis.

Survey Methodology

The LIFT Solar team worked with the independent research organization, Three³, to launch and manage a survey among subscribers of community solar programs that serve LMI households. The survey included 15 questions and, on average, took respondents 10 to 12 minutes to complete. The survey was open for responses from January through November of 2020. The survey was conducted during the peak of the Covid pandemic. We believe social and economic conditions from the pandemic impacted overall response rates, which were lower than anticipated for this type of survey.

The survey used multiple methodologies to encourage participation, including online via web and mobile device, and phone via a toll-free number. Project administrators provided email addresses for 1,634 subscribers (45%), each of which were sent email invitations, as well as email and postcard reminders. 1,981 subscriber records had only

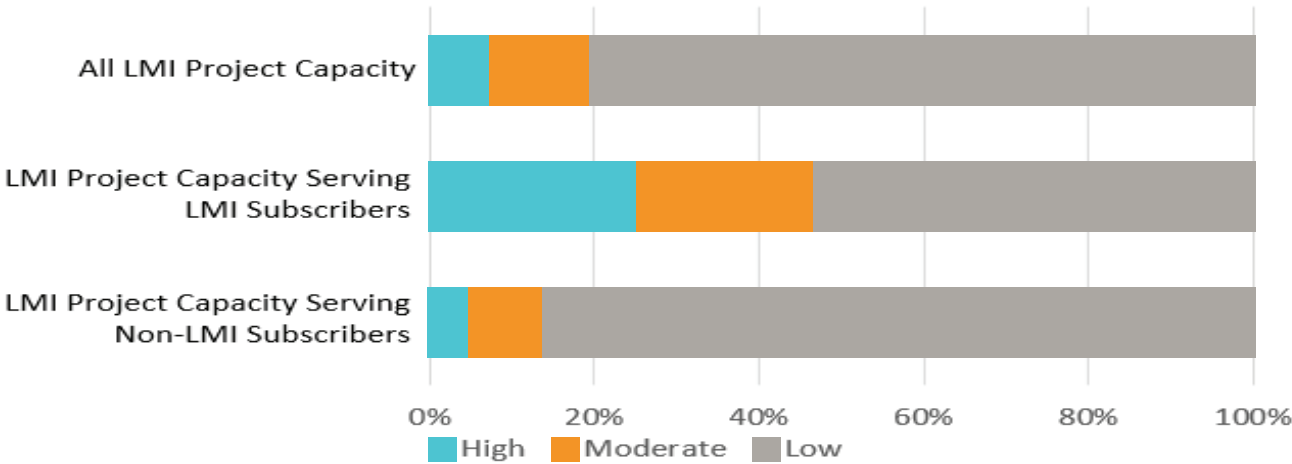


Figure 4: Average Savings Levels for LMI and Non-LMI
1,570 MW of capacity for all U.S. LMI community solar projects, 274 MW of LMI project capacity serving LMI households, 1,296 MW of LMI project capacity serving non-LMI subscribers

3 Chi-square tests were run on the variables, with a standard minimum threshold establishing statistical significance is a p-value of <0.01. This value indicates that there is less than 1% chance that a relationship (positive or negative) was found between variables when in fact no relationship exists. Chi-square and Fisher’s exact tests were used to test the strength of relationship between categorical or binary variables. Fisher’s exact test of independence was used when one or more expected cell counts in the cross-tabulation were less than 5. If the contingency table was larger than a two-by-two matrix, the Fisher-Freeman-Halton exact test was used. One-way Analysis of Variance (ANOVA) was used when calculating and testing the strength of the difference among the means (and medians) of two or more ordinal variables.

street addresses or telephone numbers (55%). These subscribers were sent SMS-text invitations, as well as SMS-text and postcard reminders. A toll-free number was included with all invitations and reminders to allow for respondent questions and feedback, and to allow respondents the option for completing the survey over the phone. 274 respondents completed the survey online and only six respondents called into the toll-free number to complete the survey over the phone.

Data Analysis Methodology

After completion of the survey, Three³ cleaned and aggregated the data and ran cross tabulations to assess the relationships between the different variables. The benefit to running this type of analysis is that it can succinctly show patterns in the data. A chi-square test of significance was then run to show whether variables are statistically related to one another. If no significance was found, it was determined that the two variables were unrelated, or independent of one another.

Three³ prepared a multi-dimensional table with the rows and columns comprised of survey questions and financial segments, respectively. This table included the frequencies of each response, mean and median numbers where appropriate, as well as the frequency of responses within each financial segment category. Additionally, the table includes levels of statistical significance for each pair of relationships. Elevate's Research & Innovation department then performed a quality assurance assessment on this table by running chi-square tests of significance on the relevant pairs of variables used in this report. This cross validation allows us to feel confident in the data and the subsequent findings.

Defining Key Financial Drivers and Data Segments

One of the primary research questions for the LIFT customer experience survey is how customer experience for LMI community solar subscribers correlates with financial performance and investment trends for the projects that serve them. Samples for both the LIFT customer experience survey data

and finance research data were segmented using common financial drivers to allow researchers to identify potential correlations across samples and findings. Most of these segments are classifications at the state level that are considered either direct or indirect drivers of financial performance. For example: bill credit value, energy rates, and REC and incentives value are all considered direct drivers of financial performance. Regulatory structure, enabling legislation, and utility type are considered indirect drivers. Other important segments included in the analysis are customer savings, system capacity, and tax treatment.

While making direct linkages between these financial characteristics and their impact on customer experience is beyond the scope of this research, data, and findings from both the LIFT Customer Experience and Finance reports taken together offer unique insights on the important trends in LMI community solar deployment.

Overall, most subscribers in our research reported that they are satisfied with their participation in their community solar program. 63% of respondents selected either *satisfied* or *very satisfied* with their subscription. Of the customers who claimed to be very satisfied, 68% of them identified as female. Of those customers who claimed they were dissatisfied with the program, 67% were male. Despite high levels of satisfaction overall, 21% of all respondents were either *dissatisfied* or *very dissatisfied* with their subscription, which is a troubling sign for subscriber managers. Our research indicates that 12% of LMI respondents are *dissatisfied* or *very dissatisfied*, while 53% of non-LMI subscribers are dissatisfied or *very dissatisfied*. Looking more closely we found that the same customers in our sample who pay a premium (zero savings) are also categorized as non-LMI. While it cannot be stated definitively, it is more likely that dissatisfaction correlates with a lack of savings rather than higher income levels. As such, we believe there is evidence to show a significant relationship between paying a premium and dissatisfaction.

CUSTOMER SATISFACTION

Value, Savings, and Satisfaction

The value of community solar can be measured as value to the project owner or value to subscribers. Financial value to subscribers is typically delivered via bill credits and seen as savings on their electricity bills. Our research indicates that savings value is not perfectly clear in terms of its relationship to satisfaction. However, those subscribers in our sample who pay a premium for their subscription were more dissatisfied than those that did not.

Subscribers with high bill credits more often reported they were *satisfied* or *very satisfied with their participation in their community solar program*. 34% of respondents who received bill credits at the supply or avoided cost rates are either *dissatisfied* or *very dissatisfied*. Meanwhile, only 12% of respondents whose bill credits are valued at retail, or value-of-solar (VOS) rates are *dissatisfied* or *very dissatisfied*. But bill credit value represents the “opportunity” or “volume” of potential savings. For ex-

Most Subscribers who pay a premium for their subscription are either Dissatisfied or Very Dissatisfied

ample, 100 kilowatt hours credited at a retail rate of \$0.12 per kWh represents a \$12.00 bill credit, and 100 kilowatt hours at a supply rate of \$0.06 per kWh represents a bill credit of \$6.00. A 50% savings can be applied to both scenarios. But the subscriber sees greater value when the same 50% discount is applied to the higher retail rate.

Savings in our analysis is defined as the discount applied to the subscriber payment, whether they pay a fixed rate per kWh or lease or purchase panels. In a simplistic way, it can be considered as the payment divided by the bill credit. Although, community solar subscriptions may include additional fees that can lower the overall savings and value to the subscriber.

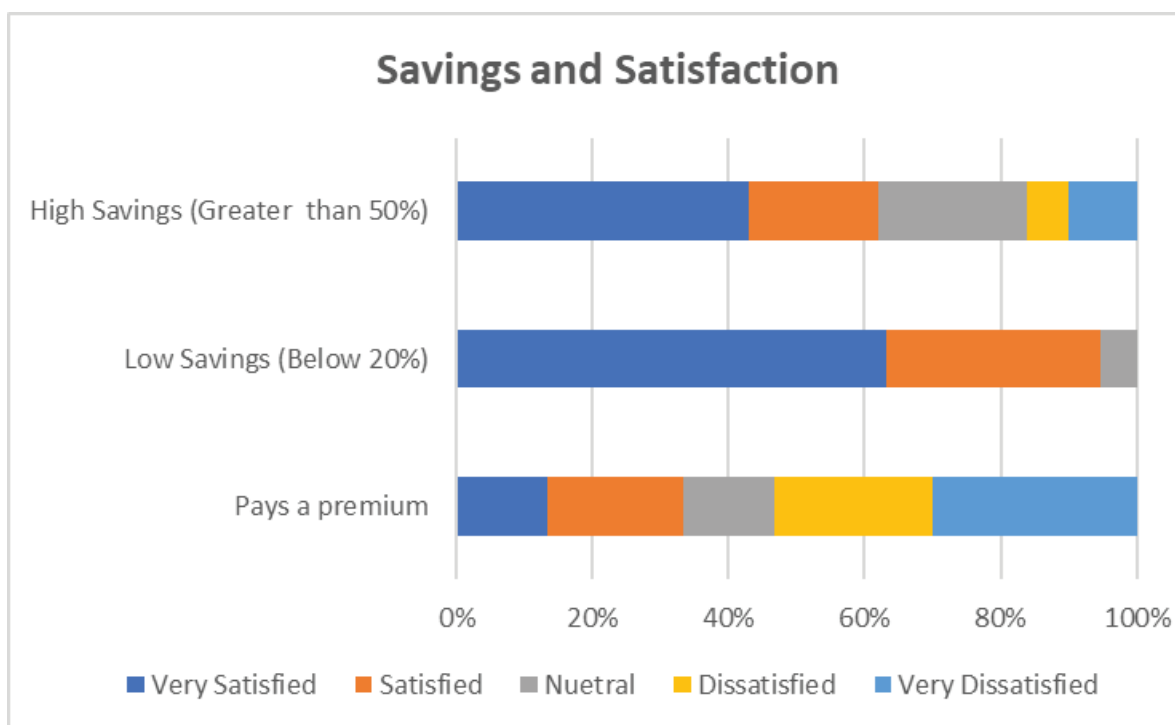


Figure 5: Average Savings Levels and Customer Satisfaction
All respondents, including LMI and Non-LMI.

Interestingly, the relationship between savings and satisfaction is not perfectly linear. For example, 62% of respondents who have a high level of savings (greater than 20% savings) are either *satisfied* or *very satisfied with their participation*, while 95% of respondents that have a low level of savings (more than zero but less than 20% savings) are either *satisfied* or *very satisfied*. On the other hand, only 33% of respondents who pay a premium are either *satisfied* or *very satisfied*. Clearly, the days of subscribers paying a premium are over. Even when subscribers see the environment as the most important issue, they must see savings to be satisfied.

Value for project owners is measured by financial performance, like return on investment and other metrics. LIFT Solar finance research, conducted separately from this survey found, not surprisingly, that the healthier the value stack, the better the financial performance. For example, projects with the highest value of renewable energy credits (RECs) or incentives had the best financial performance. Our customer survey found that there is a significant relationship between the value stack and customer satisfaction levels.

Subscribers who participated in projects with higher RECs and incentives were more often *satisfied* or *very satisfied* with their subscription. This is likely because project developers have greater ability to pass that value on to subscribers in the form of savings.

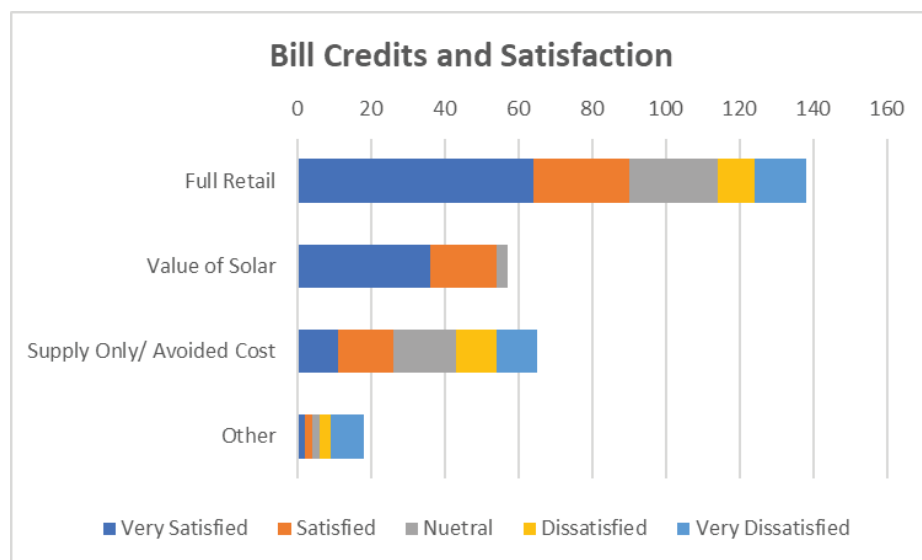


Figure 6: Customer Satisfaction by Bill Credit Type
All respondents, including LMI and Non-LMI.

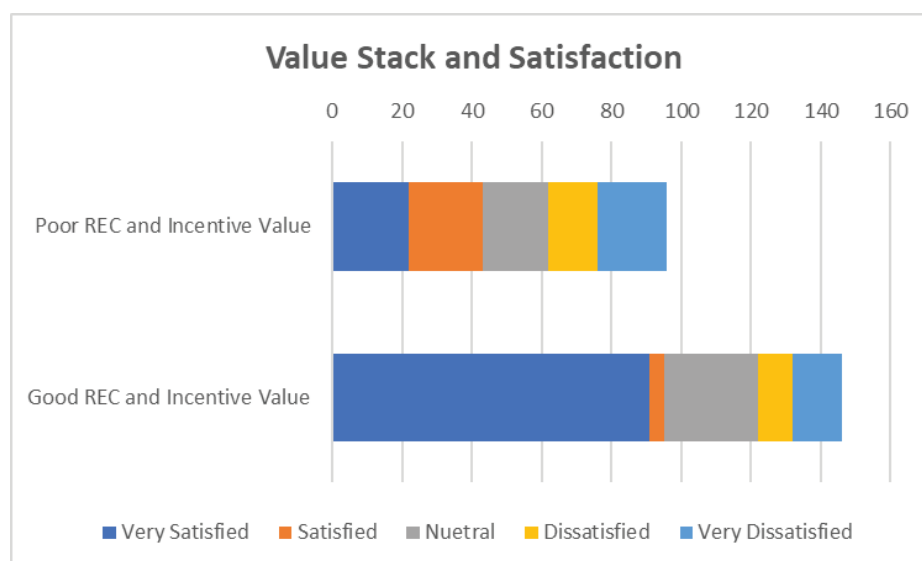


Figure 7: Customer Satisfaction and the Value Stack
Poor REC/Incentive value is less than 25% of the value stack; good is 25% or more of the value stack.

CUSTOMER ACQUISITION BEHAVIOR

Motivation to Participate

The LIFT Solar customer experience survey asked subscribers what motivated them to participate in their community solar program. Respondents were given five high level motivations and selected *Yes*, *No*, or *NA/Don't Know* for each. Both LMI and non-LMI respondents said *Yes* to “*It would help the environment*” as a motivation more than any other option.

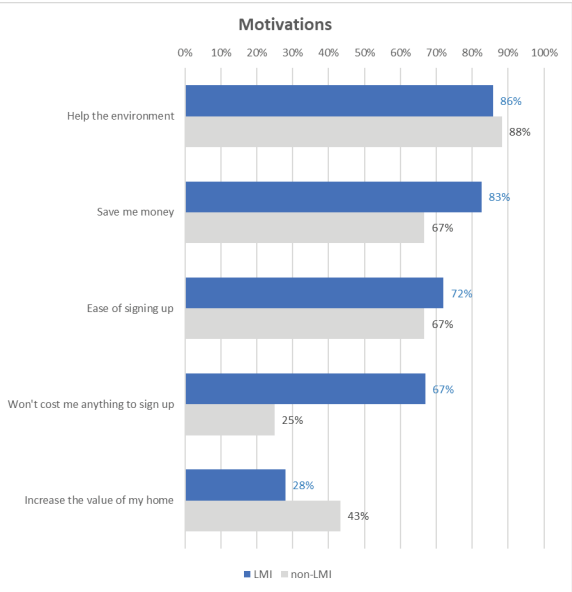


Figure 8: Subscriber Motivations
LMI versus non-LMI subscribers.

“*It would save me money*” was the next most common motivation for LMI subscribers, whereas saving money and ease of signing up were equally next most important for non-LMI subscribers. This was noticeably different from earlier research among community solar subscribers conducted by the Shelton Group and SEPA in 2015, in which 65% of subscribers said “*I want to have lower monthly energy costs*” to describe why they were most interested in a community solar program, while only 38% said “*I want to help the environment*”.⁴ Most LMI respondents agreed that survey choices for “*It would be easy to sign up*” and “*It would not cost me anything to join*” were important motivations.

For both LMI and non-LMI subscribers, “Helping the Environment” was the most important influencing factor in people's decision to subscribe.

Meeting Expectations

Respondents were then asked to describe how well the program worked for them. Respondents were asked a similar list of statements as the question regarding motivations and allowed to say *Yes*, *No*, *Don't Know/Not Applicable* to each. For LMI subscribers, “*Helping the Environment*” was both an influencing factor in people's decision to join the program, as well as an indication that the program is working. Of customers who cited “*Helping the Environment*” as one of the reasons they joined, 90% of them claimed that this is one of the reasons the program is working for them. “*It was easy to signup*” was the next most important reason the program was working for subscribers.

Surprisingly, “*The program has saved me money*” was not as commonly mentioned as a reason the program was working for them, with only 64% of LMI subscribers and 22% of non-LMI subscribers saying yes. Most customers cited the fact that “*it didn't cost anything to join*” as a determining factor for starting the program and stated that this was something still working for them. This is also true for “*ease of signing up*.”

4 What the Community Solar Customer Wants, Shelton Group and Smart Electric Power Alliance

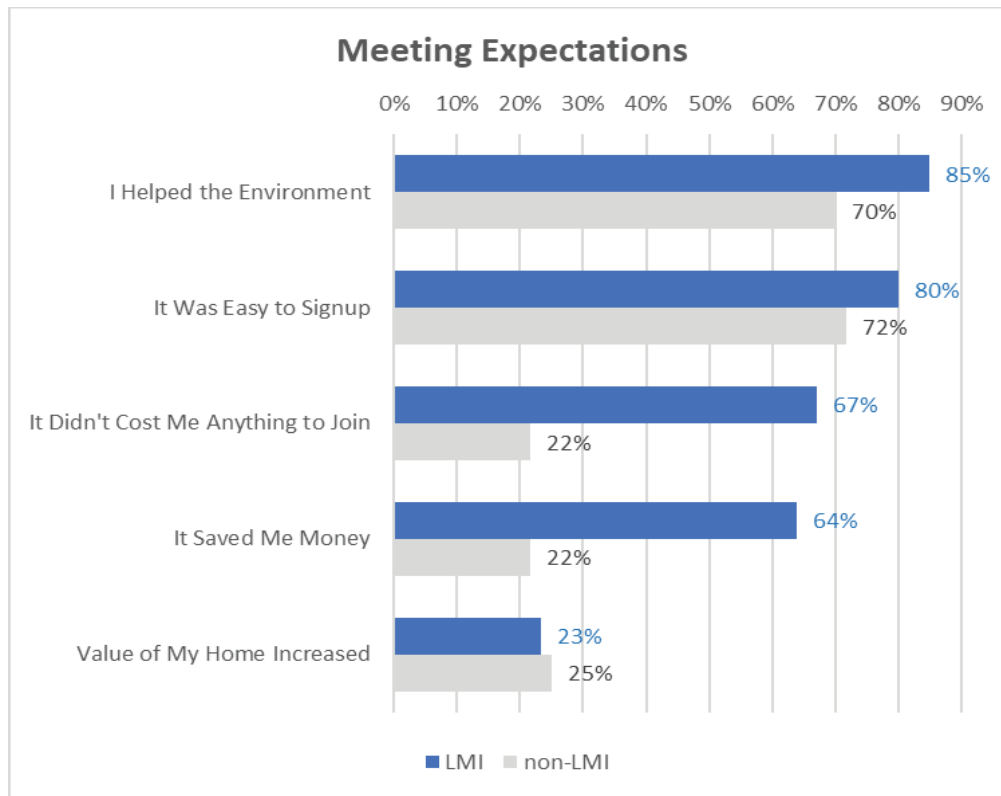


Figure 9: Meeting Subscriber Expectations
LMI versus non-LMI subscribers.

Choosing Not to Participate

Out of the 278 respondents who took the customer experience survey, 35 of them were not current subscribers: more specifically, 27 of these respondents had chosen not to participate in the community solar programs at all, while eight had decided to cancel their subscription. This group of respondents was asked what influenced their decision not to enroll or to cancel their subscription. Only about one in three respondents (37%) stated any specific reason. Further, one out of six respondents answered one of three reasons equally as often: “*It was too confusing,*” “*The savings were lower than expected,*” and “*I did not want to pay the upfront costs.*”

In fact, most non-subscribers answered, “*Don’t know*” or “*Not Applicable*” more than any specific response. This represents a striking amount of uncertainty or unwillingness to share their reasoning. In future research it may be helpful to survey a bigger group of non-subscribers to learn more about their decision-making.



MESSAGING AND COMMUNICATION

Respondents were asked where they initially heard about the community solar program they subscribed to. The results were very different for LMI subscribers and non-LMI subscribers. For LMI subscribers in our sample, 25% heard about the program from a community organization (more than from any other source), while only 2% of non-LMI subscribers did.

LMI subscribers also heard about their community solar program through other program administrators (energy efficiency, LIHEAP, etc.), with 12% of LMI subscribers hearing about the program from these sources and only 7% of non-LMI. This means that the majority of LMI subscribers (54%) first heard about their community solar program through critical organizations or institutions (community organizations, program administrators, and utilities).

Non-LMI subscribers heard about their program from a variety of other sources. For instance, 23% of non-LMI customers heard about their program from a friend, family member, or coworker, while 25% of them heard about it via an advertisement.

In addition to asking how they heard about their programs, respondents were also asked about the clarity of the program's key elements: namely the sign-up process, description costs and savings, customer payments, the contract, etc.

Communicating savings stands out as the most difficult aspect of community solar programming for program administrators to manage successfully. 35% of respondents said that savings component was unclear. This is not surprising in that savings can refer to many things, i.e., savings against subscriber payments, savings on the per kilowatt hour rate or savings as compared to utility bills. However, 27% of respondents also indicated the entire program was unclear, which may indicate that community solar conceptually is still difficult to understand for most consumers.

It's important to note that many respondents indicated that these statements were simply not relevant to them (i.e., they selected "NA" or "Neither Clear or Unclear"). This may support the idea that community solar is difficult to understand generally.

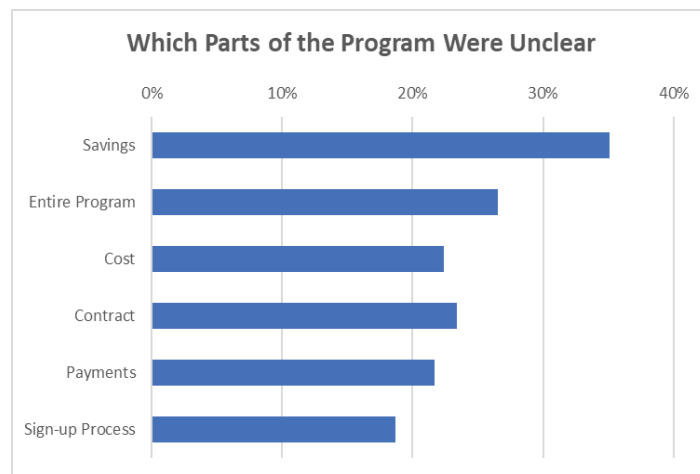
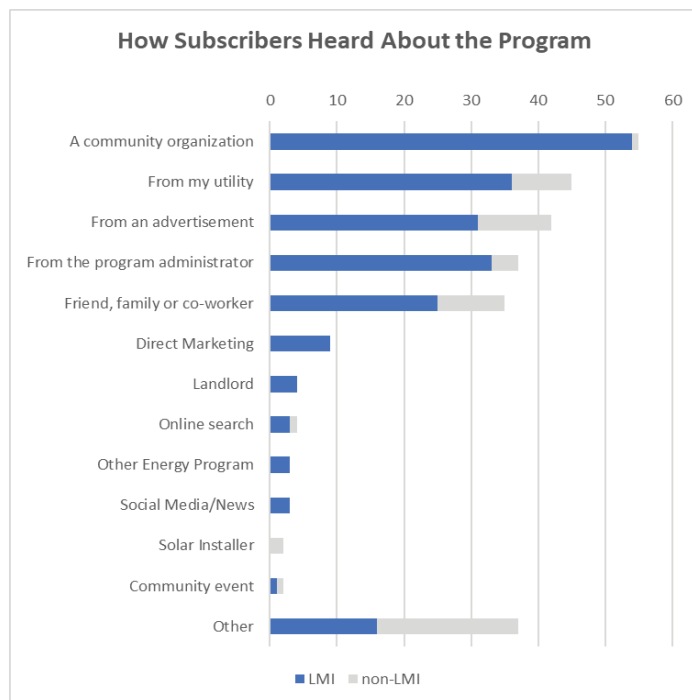


Figure 11: Program Aspects Not Communicated Clearly
All respondents.

Figure 10: Initial Contact with Their Community Solar Program
LMI versus non-LMI subscribers.

RESPONDENT DEMOGRAPHICS

While respondents participating in LIFT Customer Experience research may not be fully representative of all LMI community solar subscribers nationally, categorizing our sample demographically offers some interesting insights – especially comparing LMI to non-LMI subscribers.

280 subscribers completed surveys for this research. 59% of all respondents were 55 years or older. This skew towards older subscribers is interesting. Older households are more likely to be on fixed incomes and motivated by saving money. However, the primary motivation indicated by subscribers in our research was *helping the environment*. A recent Gallup poll showed that 70% of Americans aged 18 to 34 worries about global warming, compared with 62% of those 35 to 54 and 56% who are 55 or older.

58% of respondents were women. However, while LMI respondents are 66% women, only 22% of non-LMI respondents are women. Most respondents were Black women (32%). While white respondents were evenly divided by gender (48% female, 51% male), Black respondents were split 76% female, 24% male. Finally, most respondents were homeowners (72%) versus renters, and non-LMI respondents were more likely to own their own home (93%) than LMI respondents (66%).

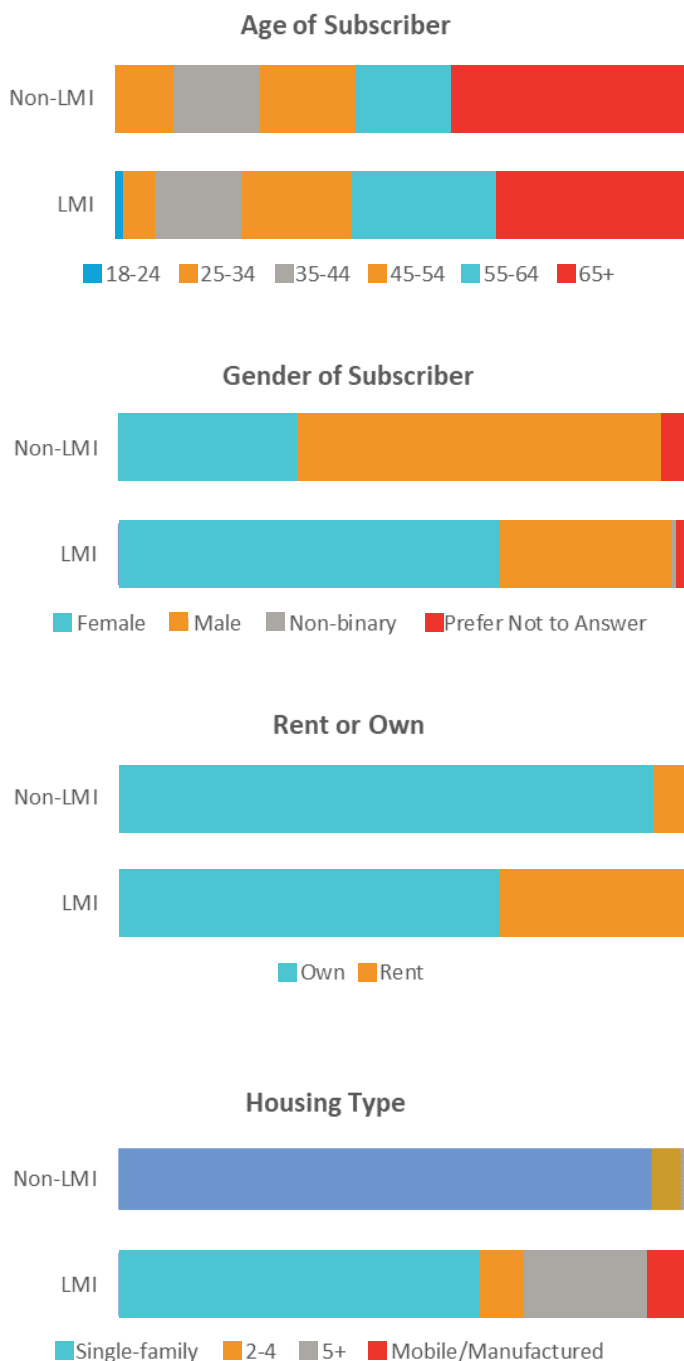


Figure 12: Demographics of Participating Households
LMI versus non-LMI subscribers.

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APPENDIX 1: QUESTIONNAIRE

LIFT SOLAR CUSTOMER EXPERIENCE QUESTIONNAIRE

December 2020

Survey and Project Data

Customer ID (c1-c9)

□□□-□-□□□□□□

Date Survey Completed (c10-c17)

□□/□□/□□□□

Survey Status (c18)

1. Completed Survey
2. Partial/Suspended
3. Incomplete Survey

Customer Status (c19)

1. Active Customer
2. Canceled
3. Chose Not to Participate

Project Type (c20)

- Community Solar
- Rooftop Solar (behind the meter)

Customer Contract Type (c21)

1. Purchase
2. Lease
3. PPA

(c22-c29 blank)

Quotas:

Utility Type (c30)

1. Investor-Owned Utility (IOU)
2. Cooperative
3. Municipally Owned Utility

Regulatory Structure (c31)

1. Regulated
2. De-regulated

Region (c32)

1. Northeast
2. Southeast
3. Midwest
4. Northwest
5. Southwest

Internal Rate of Return (IRR) (c33)

1. Low
2. Average
3. High

REC Use (c34)

1. No RECs used
2. Less than 25% of Capital Stack
3. 25% or more of Capital Stack

Subsidies (Non-REC) (c35)

1. No Subsidies used
2. Less than 25% of Capital Stack
3. 25% or more of Capital Stack

Tax Treatment (c36)

1. Accessed Tax Benefits
2. No Access to Tax Benefits

Net Metering (c37)

1. No Net Metering
2. High Net Metering (Retail, VOS)
3. Low Net Metering (Avoided Cost, Supply)

Energy Rates (c38)

1. Below National Average
2. At or Above National Average

Customer Savings (c39)

1. Low
2. Average
3. High

(c40-c49 blank)

Participating Program:

Program Name:	(c50) up to 60 characters
Program ID:	<input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> (c51-c54)

Address:	(c55) up to 40 characters
City	(c56) up to 40 characters
State	(c57) up to 40 characters
Zip	(c58-c62)
Census Block	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (c63-c77)
LMI Status	(c78) 1 = Admin Provided, 2 = HUD QCT, 3 = Unknown

(c79-c99 blank)

INTRODUCTION:

Hello {FirstName}{LastName},

On behalf of \${PROGRAM NAME} I'd like to thank you for taking this quick customer survey. We are following up with all program participants to find out about your experience with the program, whether or not you chose to get solar to power your home. Your feedback is very important in helping us make our program be the best it can be. It is very important for us to hear your opinions. There are no right or wrong answers. The survey should take about 10 minutes to complete.

If you feel uncomfortable answering any questions, you can withdraw from the survey at any point. If you have questions at any time about the survey, you may contact [Name of Survey Researcher] at [Phone Number] or by email at the email address specified below. Thank you very much for your time and support. Please start the survey now by clicking Next.

PROGRAM ASSESSMENT: These questions are about your experience and satisfaction with \${PROGRAM NAME}.

These first questions are about your overall experience with the solar program you participated in.

Q1a – Program Satisfaction Rating.

Overall, how satisfied are you with [PROGRAM NAME]? Please use a 5-point scale, where 5 means Very Satisfied and 1 means Very Dissatisfied.

➤ *Select one response.*

➤ *Ask all respondents.*

(c100)

5. Very Satisfied
4. Satisfied
3. Neither Satisfied nor Dissatisfied
2. Dissatisfied
1. Very Dissatisfied

Q1b – Program Satisfaction Comment

Please help us understand why you gave that rating.

➤ *Open-ended text.*

➤ *Ask all respondents.*

(c101) up to 500 characters

Q2 – Net Promoter

How likely is it that you will recommend [PROGRAM NAME] to a friend or family member?

- *Select one response.*
- *Ask all respondents.*

(c102-103)

Not at all likely

Extremely likely

0 1 2 3 4 5 6 7 8 9 10

(c104-105-c29 blank)

Q3 – Motivations – Reasons for Participating

Please indicate whether each of the following statements was something that influenced your decision about whether or not to participate in [PROGRAM NAME]. I'll read a statement and you can tell me "Yes" or "No."

- *One response per statement.*
- *Ask all respondents.*

	Yes	No	Don't Know / NA	
It would save me money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c106)
It would help the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c107)
It would increase the value of my home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c108)
It would not cost me anything to join	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c109)
It would be easy to sign up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c110)
Other (Please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c111)

(c112 blank)

Q4 – Meeting Expectations – Which Items Were Satisfied by Program

Thinking of the same statements, which describe how the program worked for you? I'll read a statement and you can tell me "Yes" or "No."

- One response for each statement.
- Ask respondents that installed or subscribed to solar only (c19 ^ 1).

	Yes	No	Don't Know / NA	
The program has saved me money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c113)
I feel good knowing I am helping save the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c114)
I believe the value of my home has/will increase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c115)
It didn't cost me anything to join	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c116)
It was easy to sign up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c117)
Other (Please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c118)

(c119 blank)

Q5 – Reasons for Not Participating Rating

Please tell us if each of the following statements describes why you cancelled or did not participate in the {PROGRAM NAME}. I'll read a statement and you tell me "Yes" or "No." There can be more than one reason you didn't participate.

- One response for each statement.
- Ask only respondents that canceled or did not install or subscribe to solar (c19 ^ 2,3).

	Yes	No	Don't Know / NA	
The cost of solar was too expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c120)
The savings were lower than expected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c121)
I didn't believe the savings would be that good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c122)
It was too confusing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c123)
I did not want to pay the upfront costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c124)
Other (Please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c125)

(c126-c129 blank)

UNDERSTANDING AND MESSAGING:

The next few questions will tell us how well you understood different parts of the program.

Q6 – Assessing Clarity – Clarity of Understanding for Key Elements

In your opinion, how clear were each of the following. Say “Yes” if you feel it was clear and “No” if you feel it was not.

➤ *Provide one answer only for each statement.*

➤ *Ask all respondents.*

	Clear	Unclear	Neither Clear or Unclear/ NA	
The Sign-up Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c130)
The Costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c131)
The Savings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c132)
My Payments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c133)
The Contract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c134)
The Entire Program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	(c135)

(c136 blank)

Q7 – First Contact – How Participants Heard about the Program

How did you first hear about the program?

➤ *Select all that apply.*

➤ *Ask all respondents.*

(c137)

- 1) Friend, family or co-worker
- 2) A community organization
- 3) From my utility
- 4) From the program administrator
- 5) From an advertisement
- 6) Other, please specify: _____
(c138) up to 200 characters

(c138-c139 blank)

DEMOGRAPHICS:

Our final questions are for classification purposes only. These questions help us better understand how well we serve people across the community. Your answers are only looked at with everyone else's and never attributed directly to you.

Q8 – Demographics - Ethnicity

Which of the following best describes you?

- *Choose all that apply.*
- *Ask all respondents.*

(c140)

- 1) Non-Hispanic White or Euro-American
- 2) Black, Afro-Caribbean, or African American
- 3) LatinX or Hispanic American
- 4) East Asian or Asian American
- 5) South Asian or Indian American
- 6) Middle Eastern or Arab American
- 7) Native American or Alaskan Native
- 8) Other
- 9) Prefer not to answer

Q9 – Demographics – Language Spoken

Which of the following languages is primarily spoken at home?

- *Select one response.*
- *Ask all respondents.*

(c141)

- 1) English
- 2) Spanish
- 3) Chinese (Cantonese, Mandarin, etc.)
- 4) French or French Creole
- 5) Tagalog
- 6) Vietnamese
- 7) Other, please specify: _____

(c142) (Up to 50 characters)

Q10 – Demographics – Gender

- *Select one response.*
- *Ask all respondents.*

(c142)

- 1) Identify as Male
- 2) Identify as Female
- 3) Non-binary
- 4) Prefer not to say

Q11 – Demographics – Age

Which of the following does your age fall within?

- *Select one response.*
- *Ask all respondents*

(c143)

- 1) 18-24
- 2) 25-34
- 3) 35-44
- 4) 45-54
- 5) 55-64
- 6) 65 or older

Q12 – Household Size

How many people live in your household, including you and other adults and children?

- *Open-end, numerical response.*
- *Ask all respondents.*

(c144)

Q13 – Ownership

Which of the following best represents you?

- *Select one response.*
- *Ask all respondents.*

(c145)

1. I own my home
2. I rent my home

Q14 – Housing Type

Which of the following best where you live?

- *Select one response.*
- *Ask all respondents.*

(c146)

1. Single family home
2. 2-4 unit building
3. 5+ unit building
4. Mobile/Manufactured home
5. Other housing type
6. Don't Know

(c147 blank)

Q15 – Additional Comments (Optional)

Is there anything else you'd like to share about your experience with the program?

- *Open-end, text response.*
 - *Ask all respondents*
- (c148) Up to 500 characters

CLOSE:

Thank you again for participating in the program and for taking the time to share your opinions. Your willingness to share will help make solar more accessible for everyone.

APPENDIX 2: LIST OF PARTICIPATING PROJECTS IN CUSTOMER EXPERIENCE SURVEY

Installation Name	Program Name	City	State	Size (KWdc)	Utility Name	Developer	Year energized
2nd Street NE	DC Solar for All	Washington	DC	170	Pepco DC	Flywheel Development	2020
Berlin Hilltop Solar	Middlebury CSA	Rutland	VT	100	Green Mountain Power	Green Mountain Power	2012
Central Virginia EMC Solar Share - Palmer Installation	Central Virginia EMC Solar Share	Palmer	VA	4,000	Central Virginia EMC	Coronal Energy	2018
Chattanooga (EPB) Solar Share Installation	Chattanooga (EPB) Solar Share	Chattanooga	TN	1,370	Chattanooga (EPB)	TVAEnergy LLC	2016
Clark's Grove	Cooperative Energy Futures	Clark's Grove	NC	330	Xcel Energy	Cooperative Energy Futures	2019
Colleton Solar Farm	Santee Cooper Solar Share	Walterboro	SC	3,000	Santee Cooper	TIG Sun Energy	2014
DuPont Park Apartments Community Solar Project	DC Solar for All	Washington	DC	100	Pepco DC	Groundswell	2019
DuPont Park Church and School Community Solar Project	DC Solar for All	Washington	DC	168	Pepco DC	Groundswell	2019
Friars Community Solar Project	SharePower	Washington	DC	150	Pepco DC	Groundswell	2019
ILSFA: 1400 Twombly Rd. DeKalb IL	Illinois Solar for All	DeKalb	IL	2,000	ComEd	SA Energy	2021
Orlando Utilities Commission - Community Solar Program	OU Community Solar	Orlando	FL	13,400	Orlando Utilities Commission	Orlando Utilities Commission	2020
Orlando Utilities Commission - New Horizons	New Horizons	Orlando	FL	1,000	Orlando Utilities Commission	Orlando Utilities Commission	2020
Oxon Run	DC Solar for All	Washington	DC	2,650	Pepco DC	Grid Alternatives	2020
Roanoke Electric Cooperative Solar Installation	Roanoke SolarShare	Aulander	NC	100	Roanoke Electric Cooperative	The Roanoke Center	2015
Savoy Court	DC Solar for All	Washington	DC	170	Pepco DC	Flywheel Development	2016
Southeastern Vermont Community Action CS - SEVCA	Community Solar for Community Act Westminster	Westminster	VT	200	Green Mountain Power	RReal for SEVCA	2019
St. Luke Baptist Church Community Solar Project	DC Solar for All	Washington	DC	60	Pepco DC	Groundswell	2019

