# Bright Beginnings: Lessons from Evaluating a Statewide Solar for All Program

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## ABSTRACT

In 2024, the Environmental Protection Agency (EPA) awarded $7 billion to 60 grantees to fund Solar for All (SFA) programs. Despite uncertainties around continued federal funding, many grantees are moving forward with the planning, development, and launch of these SFA programs. The goal of SFA programs is to make the benefits of solar available to income qualified residents. For many grant recipients, the funds will support creating the first SFA programs in their area or greatly expanding existing programs. Launched in 2017, the Illinois Solar for All (ILSFA) program is one of the first SFA programs. The program administrator has invested in robust evaluation for each program year, generating numerous lessons learned and important considerations for design and evaluability of other SFA programs, as well as other program models delivering new benefits to customers.

This paper focuses on two key lessons learned from the ILSFA program evaluation, spanning ILSFA program year 4 (PY4) through program year 6 (PY6). The first lesson learned is the importance of a participatory evaluation approach in building participant and stakeholder trust in the program and ensuring the evaluation focus, findings, and recommendations are responsive to the needs of the various individuals and organizations who benefit from and help implement the program. The second lesson relates to the evaluability of a complex program, and includes considerations related to tracking data compiled from multiple program actors, developing consistent analytical approaches to assess energy and bill impacts, and defining participation for multi-phase projects.

## Introduction

### Background

In 2024, the Environmental Protection Agency (EPA) awarded $7 billion to 49 states and 11 other entities to fund Solar for All (SFA) programs. The goal of SFA programs is to make the benefits of solar available to income qualified households and communities. For many grant recipients, the funds will support creating the first SFA programs in their area or greatly expanding existing programs.

Grantees face ongoing uncertainty about the distribution of these funds, due to changing directives at the federal level freezing and unfreezing disbursement of funds.[1] Despite this uncertainty, some grantees have received partial disbursements of funds and are moving forward with planning, development, and launch of their SFA programs. Many grantees are using 2025 for program planning and development, including engagement of stakeholders, and are planning to launch their offerings mid-2025 or early 2026. Rollouts for each awardee's offering should occur no more than one year after they received the award (Nolette 2025).

Launched in 2017, Illinois Solar for All (ILSFA) is one of the first SFA programs. This program was created as part of the Future Energy Jobs Act (FEJA) and expanded under the Climate and Equitable Jobs Act (CEJA) and so is largely a state-funded initiative, although the program additionally received federal SFA funding from the EPA in 2024. ILSFA offers solar for no or low up-front cost with 50% guaranteed bill

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[1] The Trump administration announced in August 2025 that it intends to rescind all 60 grants awarded under the Solar for All program.

savings for households whose gross income does not exceed 80% area median income (AMI), as well as non-profit and public facilities operating in income eligible communities.

ILSFA is administered as four subprograms: Residential (Small), Residential (Large), Community Solar, and Non-Profit/Public Facilities. Program Approved Vendors (AVs) install or develop solar generation for participants. The program enables AVs to sell 15 years of renewable energy certificates (RECs) for qualifying projects. RECs are market-based instruments that represent the environmental benefits of 1 megawatt-hour (MWh) of renewable energy generation (EPA 2025). ILSFA allows vendors to receive higher value RECs than they would receive for market rate solar. The higher REC values allow vendors to deliver solar at low to no upfront cost to income-eligible customers. In addition to installing solar, ILSFA's program-enabling legislation also includes workforce development requirements that AVs hire from qualifying job training programs, as well as grassroots education funding to enable community-based organizations to raise awareness of solar and the program.

The implementation of ILSFA involves a broad range of stakeholders beyond the program administrator and implementers. These stakeholders interact in a variety of ways to enable the program to deliver benefits to participants. Stakeholders involved with ILSFA include:

- **Program participants:** households, property managers, non-profits, and public facilities who directly benefit from the program
- **Approved Vendors (AVs):** the vendors and designees[2] who are responsible for recruiting participants, financing and installing projects, and submitting application paperwork to the program
- **Grassroots educators:** community-based organizations who are competitively selected and receive grant funding from the program to educate communities about solar and ILSFA
- **Job trainees:** workers who complete qualified job training programs and are employed by AVs to help develop and install solar projects
- **Job training administrators:** organizations who provide qualified job training programs for job trainees
- **Additional stakeholders:** non-profits, solar industry organizations, community action agencies, financing entities, utilities, advocacy groups, and other governmental agencies that may also engage with the program through partnerships, webinars, or community education

ILSFA is currently entering its eighth year of implementation. The program implementer, the Illinois Power Agency (IPA), has invested in robust evaluation for each program year including impact and process evaluation. These multi-year evaluations provide numerous lessons learned and important considerations for both other SFA programs, as well as other programs engaging multiple stakeholders, communicating new benefits, or seeking to engage historically underserved customer segments. The key lessons learned include practical considerations for solar program development and evaluation including communication and building trust with customers, establishing repeatable evaluation methods, and engaging stakeholders.

**Scope**

This paper covers key lessons learned about SFA evaluation approaches, drawing on findings and evaluability considerations of the program year four (PY4) to program year six (PY6) evaluations. First, we will review the participatory evaluation approach used for the evaluation. Early in the evaluation cycle we

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[2] Designees are companies that provide services within ILSFA on behalf of an Approved Vendor and that interact directly with participants. This includes installers, entities that perform maintenance and repair, warranty holders, marketing firms, lead generators, and sales organizations.

established processes for engaging stakeholders including community-based organizations (CBOs), Community Action Agencies (CAAs), solar vendors, and advocacy groups, and provided opportunities for collecting ongoing feedback. Through these engagement opportunities, stakeholders influenced research questions, key metrics included in the evaluation, and approaches to communicating impacts. Given the complexity of the program and barriers to participation, CBOs and grassroots educators play a vital role in bringing the program to prospective customers and provide valuable insight into making the evaluation meaningful for all audiences. The success of ILSFA also depends on the engagement and coordination of a diverse array of stakeholders, including vendors who are responsible for customer acquisition and installation of solar arrays. Our evaluation approach collected input and incorporated insights from these groups to inform program findings and recommendations. While participatory evaluation approaches have been used in the public health, education, and international development sectors, this approach has not been widely utilized within the clean energy sector. However, other evaluations have documented similar challenges that may benefit from a participatory evaluation approach, including customer trust and the need to coordinate multiple funding streams to address barriers like solar readiness (Evergreen Economics and BrightLine Group 2023a).

Second, the paper summarizes key lessons learned regarding the evaluability of this complex program. While energy efficiency evaluation methods and best practices are well established, evaluation methods for Low-to-Medium income (LMI) solar programs are more nascent. In a 2021 meta-review of LMI solar program evaluations, Bentham et al. (2021) found that only four of the 16 programs with publicly available evaluations reviewed had conducted a full evaluation that addressed both process and impact assessments in rigorous ways (ILSFA was one of the four programs cited). This same study identified 46 existing LMI solar programs across the US, meaning that 30 programs did not have publicly available evaluations (roughly 66% in total). This, combined with the recent growth in LMI solar programs, highlights the need for consistent and rigorous evaluation best practices.

Other publicly available LMI solar evaluations have focused on similar questions relevant to the evaluability of nascent programs. Itron, ILLUME, and Verdant Associates (2020) conducted an evaluation of early feedback on the design of the Solar On Multifamily Affordable Housing (SOMAH) program in California. Key research activities included a program-theory and logic model (PTLM) and developing a list of recommended metrics to assess in future evaluations. The subsequent evaluation (Verdant Associates and ILLUME 2023) focused on providing an update on progress towards goals based on established metrics and key performance indicators. Likewise, the most recent evaluation of the Disadvantaged Communities Single-Family Affordable Solar Homes (DAC-SASH) and Single-Family Affordable Solar Homes (SASH) program in California recommended defining programmatic goals and metrics more conclusively for DAC-SASH setting specific goals for energy savings and bill savings for SASH, so that evaluators can assess success (Evergreen Economics and BrightLine Group 2023a, 2023b).

Our paper will focus on the application of similar lessons learned related to the evaluability of ILSFA. Specifically, we will address defining and tracking participation in multi-phase projects, as well as development of consistent approaches, analytical assumptions, data processing and reporting procedures to support more accurate assessments of key metrics, including bill savings and energy generation. In the absence of consistent tools like Technical Reference Manuals (TRMs), establishing these practices will be important as programs expand.

## Methodology

ILLUME, an E Source company (ILLUME), was hired to evaluate ILSFA for PY4-PY6, which covers the period June 1, 2021 – May 31, 2024. Our objective as the third-party independent evaluator was to evaluate program impacts using a set of objective criteria developed through a public stakeholder process, as well as to assess the performance of the third-party program administrator, Elevate. In this section, we provide an overview of both the methodologies that we used to evaluate the program and our approach

to synthesizing the overall lessons learned that we present in this paper. Detailed evaluation methodology and results can be found in our published evaluation reports (ILLUME, Verdant Associates, and Industrial Economics 2025a).

**Participatory Evaluation: Background and ILSFA Application**

Participatory evaluation describes an evaluation approach that includes stakeholders in the evaluation process. There are several benefits to pursuing this type of approach including ensuring research questions are relevant to those participating in the program, improving the accuracy and relevance of reports, empowering participants, and building capacity of those participants to champion the program. Some of the challenges of this approach are that it requires time and commitment from participants, greater evaluation resources to collect and incorporate participant feedback, and there can be conflicting perspective on priorities and approaches. Participatory evaluations may face challenges with ongoing stakeholder engagement if they do not incorporate stakeholder feedback throughout the evaluation process, if they are not grounded in the social and cultural context of participants, or if stakeholders do not feel their feedback is being heard and incorporated into the evaluation or program design (Sette 2021).

There are several reasons why a participatory evaluation is vital to the success of a program like ILSFA. First, ILSFA has broad statewide goals, at a high level to *"bring photovoltaics to low-income communities in this State in a manner that maximizes the development of new photovoltaic generating facilities, to create a long-term low-income solar marketplace throughout this state, to integrate, through interactions with stakeholders, with existing energy efficiency initiatives, and to minimize administrative costs"* (IPA 2024). The program also has goals to allocate 25% of funds to serve customers in Environmental Justice Communities. Participatory evaluation can help facilitate achieving these goals by facilitating gathering input from the various stakeholders involved in the program not just to understand how the program is operating, but also to inform topics of focus for the evaluation and results.

Another vital reason to pursue a participatory evaluation approach is to ensure that the program is responsive to the needs and priorities of the customers and communities it intends to serve. Income eligible communities face multi-faceted barriers in engaging with solar and other clean energy programs, including (Heeter et al. 2021):

- **Mistrust in institutions**, including utilities, government, and installers, due to previous negative interactions of these entities or a history of being targeted by scams
- **Lack of awareness and knowledge of solar**, due to limited outreach and technical assistance by market actors and other solar representatives
- **Competing priorities** that may reduce customer capacity to pursue solar, particularly for households in crisis that may include access to food, addressing unpaid bills, access to safe and comfortable housing, or medical needs
- **Programs and services that do not meet customers where they are**: for example, not offering in-language outreach and support, not offering marketing or enrollment options for customers without access to internet or with low digital literacy
- **Limited capacity to participate in utility and regulatory processes** because of their highly technical and difficult-to-navigate proceedings resulting in programs that reflect lack of community input and are not well designed to meet community needs

Participatory evaluation can help overcome these barriers by creating a cycle by which participants, communities, and community-based organizations are asked for input at regular intervals and given the opportunity to review evaluation insights and shape evaluation recommendations. This

engagement can also help build community trust in the program, by creating an avenue for the implementer to share how evaluation recommendations are being used, increasing community knowledge and buy-in into the program.

The team collected input from program stakeholders to better understand their needs as they related to the evaluation. Data collection activities included 10 stakeholder interviews prior to the start of PY4, a comment form and email inbox that were open for stakeholder comments and feedback throughout the evaluation process, and webinars to share program results and collect feedback on recommendations.

Our participatory evaluation built upon best practices for community and stakeholder engagement (US DOE and NREL 2025), and began with:

- **Identifying community and stakeholder needs related to the evaluation.** We began by conducting a series of in-depth interviews with an array of different stakeholders to understand the organization, their mission, the customers or communities they served, their priorities, and needs both generally and related to ILSFA.
- **Creating an evaluation plan that incorporated this feedback and sharing it with stakeholders.** Our team collected stakeholder feedback to refine and hone our evaluation approach. We shared our evaluation plan with stakeholders via webinar. The recordings and slides were posted following the webinar to the ILSFA website and stakeholders could submit comments via an online form or email following the webinar. Stakeholder feedback during and after the webinar was summarized and shared in the subsequent evaluation report.
- **Creating an inbox and online form for stakeholders to submit any questions or feedback throughout the evaluation.** The evaluation team summarized all feedback received and how it was addressed within the evaluation at the start of each report.
- **Webinar and meetings to share results.** The evaluation team presented the findings of each annual report at a webinar, as well as sharing findings for the full evaluation cycle at a Stakeholder Advisory Committee meeting. Recordings and slides were posted following each webinar to the ILSFA website and stakeholders could submit comments via an online form or email following the webinars and meeting. Stakeholder feedback during and after the webinars and meeting was summarized in the subsequent evaluation report or shared with IPA at the end of the evaluation cycle.

Through these engagement opportunities, stakeholders influenced research questions, key metrics included in the evaluation, and approaches to communicating impacts. For example, one area of concern that emerged early in the evaluation cycle was the limited participation in the Residential (Small) subprogram in central and southern Illinois. Identifying this theme early allowed us to incorporate this lens throughout our research, looking not only at the geographic distribution of participants, vendors, and grassroots educators, but also at the attitudes, market barriers, and elements of program design that helped shape this trend. Our team was able to use these insights to identify recommendations across evaluation activities that will help the program reach more diverse regions of the state.

**Stakeholder Input**

We also collected input from all key stakeholders involved in the program to understand their experiences and perspectives. Key stakeholders included the Illinois Power Agency (IPA), Elevate, AVs, program participants in all four subprograms, grassroots educators, job training program administrators, job trainees, and other stakeholders not directly involved with the program. Table 1 describes our data collection across the three years of the program evaluation.

Table 1. Data Collection included in the ILSFA PY4-PY6 Program Evaluation

| Program Stakeholder | Data Collection Methodology | Number of completes | Data collection dates for | | |
| --- | --- | --- | --- | --- | --- |
| | | | PY4 | PY5 | PY6 |
| IPA, Elevate | In-depth interview | 10 staff participants (18 interviews over three years) | Jul-Aug 2023 | Jun 2024 | Feb 2025 |
| Participants: Community Solar | Focus Group | 18 program participants (3 focus groups) | NA | Oct – Nov 2024 | |
| Participants: Residential Small | Focus Group, In-depth interview | 14 program participants (1 focus group, 9 in-depth interviews) | NA | Nov-Dec 2024 | |
| Participants: Non-Profit/Public Facilities | In-depth interview | 6 program participants (6 interviews) | NA | Jan 2025 | |
| Participants: Residential Large | In-depth interview | 1 program participant (1 interview) | NA | Jan 2025 | |
| Approved Vendors | Survey, In-depth interview | 10 AV participants (6 surveys, 4 interviews) | NA | Sept 2024 – Jan 2025 | |
| Grassroots Educators | In-depth interview | 9 participating organizations (9 interviews) | NA | Aug – Sept 2024 | |
| Job training program administrators | In-depth interview | 7 participating organizations (7 interviews) | NA | Aug – Oct 2024 | |
| Job trainees | Survey | 7 trainee participants (7 surveys) | NA | Aug – Sept 2024 | |
| Non-participating stakeholders | In-depth interview | 5 stakeholder organizations (5 interviews) | NA | Aug – Sept 2024 | |

**Impact Methodologies**

The IPA solicited feedback from stakeholders to develop a set of objective criteria on which to evaluate the program each year. In addition to these criteria, the evaluation team collected input from IPA and stakeholders on additional metrics that would be meaningful to report out on. The following describes the impact categories we analyzed and provides a high-level overview of our methodology. Details on specific approaches to impact calculations and modeling can be found in the published evaluations (ILLUME, Verdant Associates, and Industrial Economics 2025a).

- **Energy Impacts:** The evaluation team produced hourly simulations to generate independently verified estimates of energy produced by solar arrays installed through the program. The team compiled photovoltaic (PV) system configuration information from the program tracking data and simulated PV production using the National Renewable Energy Laboratory (NREL) PVWatts Calculator Application Programming Interface (API) (version 8). This approach was used to model energy produced by ILSFA projects in a typical meteorological year and peak load reduction impacts from these projects within MISO and PJM.
- **Environmental Impacts:** The evaluation team estimated emissions reductions from ILSFA projects using the National Renewable Energy Laboratory (NREL) Cambium dataset of marginal $CO_2e$

emissions rates and marginal $CO_2e$, $NO_x$ and $SO_2$ emissions rates from the U.S. Environmental Protection Agency's (EPA) AVoided Emissions and geneRation Tool.

- **Bill Impacts:** The evaluation team calculated bill savings by estimating the difference between participant bills with and without solar PV benefits. The evaluation team leveraged the statewide load profiles available from NREL's database of end use load profiles to approximate participant's load. These load shapes were adjusted based on a sample of electric bills issued prior to PV installation. The team then used PV Sizing factors to estimate the portion of load that would be covered by solar, where possible using sampled participant bills to inform these factors.
- **Jobs & Economic Impact:** The evaluation team estimated economic impact metrics by applying the IMPLAN input/output economic model with tailored inputs informed by ILSFA program data. IMPLAN's economic sector characterization of the Illinois state economy allows for each of the economic impacts to be disaggregated by economic sector. This enabled an illustration of the breakdown of employment, income, or GDP impacts across sectors such as construction, manufacturing, engineering, and administration.
- **Social impacts:** The evaluation team analyzed the locations of ILSFA projects to determine the portion of projects and funding in different utility service territories in Illinois, in environmental justice communities, and in income-eligible communities. The team also analyzed the portion of projects classified as energy sovereignty projects (on track to be owned by the participant within a certain timeframe), as well as the demographic characteristics of participants in the program.


**Lessons Learned from the Evaluation**

The following sections focus on our lessons learned about effectively evaluating the ILSFA program model. We synthesized our experiences over the three evaluation cycles. These lessons learned are informed by our interviews and conversations with stakeholders, feedback from the program administrator, and our experience evaluating other programs serving the income-eligible customer segment. We organize our lessons learned into two categories: Lessons learned specifically related to participatory evaluation and lessons learned about more general evaluability considerations.

## Findings

**Participatory Evaluation Insights and Lessons Learned**

Below, we share evaluation results generated through our participatory evaluation approach. We also share learnings related to apply a participatory evaluation approach to a low-income solar evaluation..

**Participatory Evaluation Results**

The use of a participatory evaluation approach within ILSFA led to the following insights captured within our evaluation results:

- **The successful implementation of ILSFA relies on the continued engagement and coordination of these many parties, who may have varied needs and priorities in relation to the program.** For example, AVs may prioritize a simple and streamlined program application process to minimize their "soft costs" as they relate to program participation, while grassroots educators, program participants, and advocacy organizations may prioritize robust consumer protections to ensure participants receive the intended benefits from the program. A participatory evaluation approach ensures that the diverse perspectives and priorities of these different actors are captured, and

used to develop relevant and actionable recommendations that can be used to improve the program

- **Participatory evaluation uncovers the practical solutions that those closest to the program are already doing**. For example, one pain point identified in our evaluation of ILSFA was the difficulty that participants, particularly participants in more rural parts of Illinois, had in finding vendors to complete their projects. We also learned that the market actors on the ground were already trying to address this challenge. Through our conversations with participants, grassroots educators, and AVs, we discovered that one successful strategy many grassroots educators were pursuing was to reach out to AVs in their area to determine who was accepting new projects and share this information with participants, in some cases inviting AVs to present at grassroots educator-hosted events. This approach helped lower the burden on participants to locate an AV, lowered acquisition costs for AVs, and helped build participant confidence in the AV and the program, since the information came from a trusted source, the grassroots educator. As such, our evaluation included recommendations to formalize and support these partnerships, including adding this responsibility to grassroots educator contracts and creating program infrastructure to facilitate connections between grassroots educators and AVs.

- **Participatory evaluation can help uncover insights from those who are unable to or choose not to participate in evaluation research. However, more research with non-participants and partial participants is needed to better understand the individual and community attitudes towards the program and barriers to access.** Since this evaluation cycle was the first one that offered participant population sizes large enough to support primary data collection, the evaluation team prioritized qualitative research with these customers to gain more in-depth insights into topics like trust in the program and post-installation benefits. However, we did not have the opportunity to research partial participants, who started but did not complete the participation process, or non-participants, who opted not to try to participate in the program. We were able to get some insights on these groups from grassroots educators and community-based organizations not directly involved in the program by designing guides for these groups that focused on community needs broadly as well as those directly related to the program. Through these conversations, we heard about challenges like the income verification process, competing priorities impacting participant bandwidth to participate, and how solar readiness remained a barrier for potential participants, despite a pilot being launched in PY6 to address this barrier. In the next evaluation cycle we are seeking ways to gain further insights from these groups including collecting feedback at grassroots educator events and conducting longitudinal research with people as they navigate the participation process.

## Participatory Evaluation Lessons Learned

The following summarizes our lessons learned about applying the participatory evaluation approach to the ILSFA evaluation.

- **Where possible, compensate stakeholders for their time.** As noted earlier, income eligible customers and communities may face competing priorities and limited capacity that prevent them from engaging with clean energy programs and evaluation research. Providing compensation, both in the form of direct payment, as well as stipends to cover meals, transportation, and childcare can help remove barriers to their engagement. Our team was able to compensate certain entities including participants, job training administrators, job trainees, and former grassroots educators for their time, but not other entities, including AVs, current grassroots educators, and other stakeholders. This created some challenges with low response rates.

- **Coordinate with existing engagements to minimize data collection burden.** Because ILSFA prioritizes stakeholder engagement in its program design, stakeholders receive a variety of requests to engage with the program outside the evaluation, including requests for input on program design and feedback on program improvements. Our team coordinated with the program implementer and program administrator to share information through existing engagement channels, including the Stakeholder Advisory Committee meeting (convened and run by the program administrator) and coordinating with AV managers to get in touch with current AV contacts. In the future, we recommend leveraging other channels like grassroots educator office hours, grassroots educator outreach events in communities, and other existing fora to get in touch with stakeholders.
- **Ensure clarity around how feedback is incorporated.** One piece of feedback that our team received early on is that stakeholders were concerned the feedback they shared was not being incorporated into the program. IPA explained that in some cases, they are limited in how quickly they can implement feedback, as some changes require updates to program design documents which are required to undergo stakeholder review and updated annually, or in some cases, every two years. Other changes may require changes to legislation which is outside of IPA's control. As such, the evaluation began dedicating some time in webinars to provide greater transparency as to how IPA was using evaluation findings and recommendations to update the program. In future evaluation years, we plan to keep a tracker of all evaluation recommendations and regularly update these with the program administrator and implementer. This tracker could also be shared with stakeholders to provide updates on the status of evaluation recommendations.
- **Promote and provide opportunities for feedback across many channels.** While webinars served as a useful forum for gathering stakeholder feedback, in some cases webinars saw limited attendance and engagement. The evaluation team had better success getting feedback at a hybrid in-person/virtual stakeholder advisory committee meeting, where a longer presentation time allowed opportunities for small group discussion and more interactivity. In the future, we recommend more one-on-one, in-person, and small group engagements to ensure feedback is collected from a variety of stakeholders – not just the most vocal ones.

**Evaluability and lessons learned**

To assess the impacts of ILSFA, our team built off best practices employed within energy efficiency and other clean energy program evaluations but adapted these to the unique complexities of solar programs. Our evaluation incorporated the following key elements. Below, we summarize the challenges and future considerations associated with evaluating emerging programs like SFA programs. We provide these as considerations for evaluators engaged in similar efforts.

1. **Establish consistent metrics that assess program progress towards goals.** In the case of ILSFA, there were a pre-determined set of statutorily required metrics that had been developed through a public stakeholder process, which our team ensured was included in our evaluation each year. We also assessed program success based on the program's goal to award all incentives in each of the four subprogram budgets each year. These goals and metrics are detailed in our evaluation report (ILLUME, Verdant Associates, and Industrial Economics, 2025a). Similar solar programs and evaluations have likewise undertaken goals and metrics definition as one of their first activities (Itron, ILLUME, and Verdant Associates 2020, Evergreen Economics and BrightLine 2023a, Evergreen Economics and BrightLine 2023b).

   In some cases, the metrics may be required to assess benefits that are less easily quantifiable than new solar capacity or bill savings. For example, the grassroots educator

component of ILSFA directs up to 5% of funds annually to community-based organizations to assist in *"community-driven education efforts related to ILSFA, including general energy education, job training program outreach, and other efforts deemed to be qualified by the agency* (IPA 2024)." IPA asked the evaluation team to contribute to the development of metrics to assess the efficacy of these funds. For these less straightforward goals, tools such as program-theory logic models (PTLMs) may be helpful to map the intended short-, medium-, and long-term outcomes of the program and measure how activities help the program achieve these outcomes (ILLUME, Verdant Associates, and Industrial Economics 2025b).

**Lesson learned:** For other solar program and emerging evaluations, an important first step for evaluators will be to carefully review reporting requirements associated with project funding to ensure the program is collecting any metrics required by these funding sources. The next step is to review program goals and assess whether any additional metrics are needed to measure progress towards these. Finally, ensure that the data needed to assess these impacts is publicly available or can be collected through the program. Program administrators and evaluators should consider both goals and metrics pertaining to individual customers, as well as the program overall to monitor success.

2. **A participation definition should ensure results are not double counted and reflect the timescales of solar development.** Solar projects can be less straightforward than typical energy efficiency measures to assign to a given program year, as projects are not often fully constructed and energized in the same year that program funds are awarded. To address this within ILSFA, our team developed two definitions to measure participation: Approved project impacts and Energized project impacts

   a. **Approved projects:** Approved projects were all projects that were awarded ILSFA funding in a program year. The approved project definition aligned with how IPA and Elevate reported impacts by program year to external stakeholders, and so our team used this to assess energy, environmental, and social impacts.

   b. **Energized projects:** Energized projects were all projects that had been constructed, energized, and had submitted Part II of the ILSFA application, which initiates the payment of RECs to vendors. Some details within the project tracking data were not available until project energization, particularly project cost, so we used the energized project view to look at bill impacts, as well as job and economic impacts. Solar PV system configuration details are also finalized following project construction and energization, so the evaluation team assessed energy and environmental impacts for energized projects, in addition to approved ones to provide insight into modeled impacts realized through these constructed systems.

   **Lesson learned:** Based on the impacts measured, the evaluator may consider defining participation based on when 1) funding is awarded, 2) when data is available, or 3) when impacts are realized. In some cases, multiple definitions can be used to look at projected and actual impacts.

3. **Access to real data is challenging. Programs should work on strategies to gain access to actual data, but modelling may need to be used in some cases to overcome data limitations.** One challenge solar programs may face is that of limited available data to assess actual impacts. In the case of ILSFA, the solar program is implemented by an entity other than the utility. In Illinois, privacy laws prevent utilities from sharing customer consumption and bill data without

permission from customers. Obtaining even a representative sample of customer data can be cost-prohibitive, particularly given that participant population sizes can be smaller for solar programs, on top of the barriers to engaging with income eligible customers laid out above. Actual energy and bill data are important to things like assessing the degradation of system performance over time, to verify if customers are realizing bill savings at the level required by the program (50% bill savings for ILSFA), and to assess the portion of pre-installation household load covered by solar. Other studies reviewed were able to access more complete utility and customer bill data, although challenges still remained (Itron, ILLUME, and Verdant Associates 2020, Evergreen Economics and BrightLine 2023a, Evergreen Economics and BrightLine 2023b).

**Lesson learned:** While modelling approaches to estimate solar energy generation are well established and researched and can serve as a substitute for real customer data, programs should seek ways to gain access to actual data to improve the reliability of estimates. If possible, incorporating requirements for sharing customer utility bills or data into program requirements can improve assessment of program impacts. Evaluators may also explore asking customers to volunteer to provide this information, if using a large-scale data collection approach like surveys. Within ILSFA, the evaluation team was able to use a sample of pre-installation energy bills to improve modeling inputs like pre-solar load profiles and the portion of pre-solar energy usage the system was anticipated to cover. In future evaluations, we will seek to gain access to post-installation bills. Those designing future SFA programs should seek ways to make real data available for evaluation. However, evaluators should be prepared to employ alternative approaches in cases where this data isn't available.

4. **Evaluators may play a critical role in establishing tracking data quality assurance and review processes upfront.** Solar for All administrators may not have prior experience with data tracking or management best practices, common within the energy efficiency space. Therefore, the evaluator may be called on to help establish some of these processes to ensure high-quality data is available for evaluation.

   Some of the specific challenges that the program administrator of ILSFA faces include that they must collect data from the many entities who help implement the program and store this information in a centralized repository to track metrics and outcomes. To facilitate this tracking, ILSFA uses a tracking data system that requires limited upfront coding and allows users to input data through web forms. While this system makes it easier for these various entities to input data into the system, our team has found that this type of database results in an increased risk of data errors, inconsistent formatting between similar reports, and limited documentation of data fields. Use of similar low-code tracking systems may be common when working with entities like community action agencies or other governmental agencies, who use software more focused on tracking engagement with customers or clients (case-management) than on tracking outcomes related to energy and bill-related metrics. As such, the evaluator may receive data that has more inconsistencies and errors than they might receive in the context of an energy efficiency program.

   As the evaluator, we developed and implemented a variety of tools to manage this type of data for this evaluation, including:
   a. Creating a data request process that references prior reports delivered, so that these can be easily re-run by program staff.
   b. Leveraging regular meetings with the program administrator to address data questions or inconsistencies.
   c. Leveraging data checks internally across evaluation teams working with the data, as well as against external sources such as the ILSFA project dashboard (IPA 2025).

d. Where possible, cross-checking samples of PDF information to confirm project data.

As part of our evaluation, we also recommended improvements to tracking and managing program data, including creation of scripts that automatically flag potential data issues, creation of a data dictionary, and creation of a scorecard summarizing key program metrics.

**Lessons learned:** Tracking data systems that collect data from a variety of program actors, particularly those for a new program, may require additional steps to properly verify and quality control (QC) data. Program administrators can take steps at the outset of the program to ensure high quality data is available in a more streamlined manner, including early identification metrics and key information that need to be monitored for program success, establishment of data quality assurance/quality control (QA/QC) procedures – automating these processes where possible, and creation of scorecards to track and regularly report key metrics. These scorecards can later be used as an external-check to verify evaluator data and data delivered to other third-parties. Early engagement of a third-party evaluator can help program administrators determine what data and metrics are most suitable for program evaluability. A program evaluator or program implementer can also advise on the establishment of data governance processes.

## Conclusion

This paper demonstrates how best practices established within the realm of program evaluation for energy efficiency and income eligible programs can be applied to SFA programs. While there are many similarities between the implementation approach and strategies of these programs, emerging program offerings like SFA may face unique challenges that require adaptations to the evaluation approach.
We find that participatory evaluation can be used to:

- help build customer trust in a new program offerings
- incorporate the voices of stakeholders who can speak to the needs of underserved communities
- allow an array of stakeholders – including those who may not have interacted with energy programs previously – have a voice in informing the focus and priorities of the evaluation
- generate buy-in to programs over time by providing insight into how evaluation recommendations are used to shape future program design.

We also demonstrate ways that evaluators can support program administrators and implementers in ensuring the right high-quality data is available to assess program impacts. As shown by programs like ILSFA, which have undergone multiple years of robust evaluation, the establishment of consistent tracking metrics, clear participation definitions, modelling and data collection approaches, and strong data management and quality assurance procedures are all critical considerations in measuring program impacts over time.
While our research demonstrated ways to overcome barriers to the implementation of these programs, challenges still remain. These include the capacity of stakeholders and participants to provide ongoing input to the program, demonstrating the impact their feedback has on program decision making – particularly given long time-scales that may be needed to make improvements, and also challenges accessing real-world data to improve modelling inputs. Future SFA administrators and evaluators should keep these challenges top of mind as they embark on designing, implementing, and continuously improving future programs.

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