ILLUME

June 7, 2024

Illinois Solar for All:

Program Year Four (PY4) Annual Evaluation Report

Prepared for:
Illinois Power Agency

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ILLUME Advising

In Partnership with:
Verdant Associates, LLC
Industrial Economics, Inc.

ACKNOWLEDGEMENTS

ILLUME Advising, LLC is a forward-thinking consulting company at the rare intersection of insight and execution. Founded in 2013, the company has quickly grown to include a deep bench of quantitative and qualitative research experts. ILLUME uses cutting edge research strategies to help build a resilient energy ecosystem to enrich lives, improve global health, and ensure a more secure and sustainable future.

For this effort, we would like to acknowledge, first and foremost, Illinois Power Agency. We would also like to acknowledge Elevate Energy's support in providing information about this program. Additionally, we would like to recognize the dedicated work of Verdant Associates, LLC and Industrial Economics, Inc. Finally, we would like to acknowledge the ILLUME team members Miriam Stein, Arianna Zrzavy, Sergio Olalla Ubierna, Leigh Michael, Bahareh van Boekhold, and Eileen Hannigan.

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Executive Summary

This summary includes evaluated impacts and findings for Illinois Solar for All (ILSFA) Program Year 4 (June 1, 2021, to May 31, 2022). ILSFA is implemented by the Illinois Power Agency (IPA) and administered by Elevate. Below, we show impacts for projects approved in PY4 (approved) and projects approved in PY1-PY4 that were energized by the end of PY4 (energized). In PY4, six projects fell into both the PY4 approved and PY4 energized project analysis categories (four 1-4 Unit Distributed Generation projects and two Non-Profit/Public Facilities projects).

Based on the type of impact, the evaluation team calculated impacts based on PY4 approved projects, PY4 energized projects, or both. For energy impacts, environmental impacts, and social impacts, the team estimated impacts based on PY4 approved projects to be consistent with how IPA reports impacts to stakeholders its project summary reports. The team additionally estimated energy and environmental impacts for energized projects, which are included in the PY4 annual report. The team calculated estimated bill impacts for PY4 energized projects only, based on when participants receive these benefits following project energization. Finally, the team calculated job and economic impacts for both PY4 approved and PY4 energized projects to reflect the jobs and economic impacts that occur during the construction phase of a project, as well as those that occur following the project, as customers receive financial benefits from on-bill savings.

The evaluation team conducted a lighter touch evaluation in PY4, focusing more resources on a more in-depth evaluation for the evaluations for PY5 and PY6. The team selected this approach to focus on developing more relevant recommendations and information to support the program, reflecting the timing of updates to the program due to the Climate and Equitable Jobs Act (CEJA), as well as the likelihood that program participants and stakeholders may be more easily able to provide feedback about a more recent program year. We will also use results from the PY4 evaluation to inform topics of focus for PY5 and PY6.

Distributed Generation

1-4 Units

5+ Units

Non-Profit /Public

Energy Impacts | Approved Projects

1-4 Units	5+ Units	Non-Profit /Public
Number of projects: **158**	Number of projects: **2**	Number of projects: **41**
Total PV Capacity (KW_{AC}): **954.2**	Total PV Capacity (KW_{AC}): **370.8**	Total PV Capacity (KW_{AC}): **5631.8**
Average Project Cost per KW_{AC}: **$3,345**	Average Project Cost per KW_{AC}: **$3,209**	Average Project Cost per KW_{AC}: **$2,546**

Bill Impacts | Energized Projects

1-4 Units	5+ Units	Non-Profit /Public
Number of projects: **63**	Number of projects: **1**	Number of projects: **41**
Average Monthly Estimated Bill Savings per Customer: **$90.94**	Average Monthly Estimated Bill Savings per Customer: **$71.08**	Average Monthly Estimated Bill Savings per Customer: **$1,290.78**

Economic Impacts | Approved and Energized Projects

1-4 Units	5+ Units	Non-Profit /Public
Number of projects: **217**	Number of projects: **3**	Number of projects: **80**
Employee Compensation: **$11,860,000**	Employee Compensation: **$160,000**	Employee Compensation: **$440,000**
GDP Impacts: **$39,680,000**	GDP Impacts: **$550,000**	GDP Impacts: **$1,470,000**

Environmental Impacts | Estimated First Year Avoided Emissions (NREL) for Approved Projects

1-4 Units	5+ Units	Non-Profit /Public
Number of projects: **158**	Number of projects: **2**	Number of projects: **41**
CO_2e lbs: **638,642**	CO_2e lbs: **239,053**	CO_2e lbs: **4,086,657**
NO_X lbs: **341**	NO_X lbs: **126**	NO_X lbs: **2,169**
SO_2 lbs: **707**	SO_2 lbs: **262**	SO_2 lbs: **4,506**

Community Solar

Energy Impacts

Number of projects: **6**

Number of subscribers: **2,535**

Total PV Capacity (KW_{AC}): **7,405.0**

Average Project Cost per KW_{AC}: **Not Available**

Bill Impacts

Number of projects: **2**

Average Monthly Estimated Bill Savings per Customer: **$82.08**

Economic Impacts

Number of projects: **8**

Employee Compensation: **$4,370,000**

GDP Impacts: **$14,630,000**

Environmental Impacts

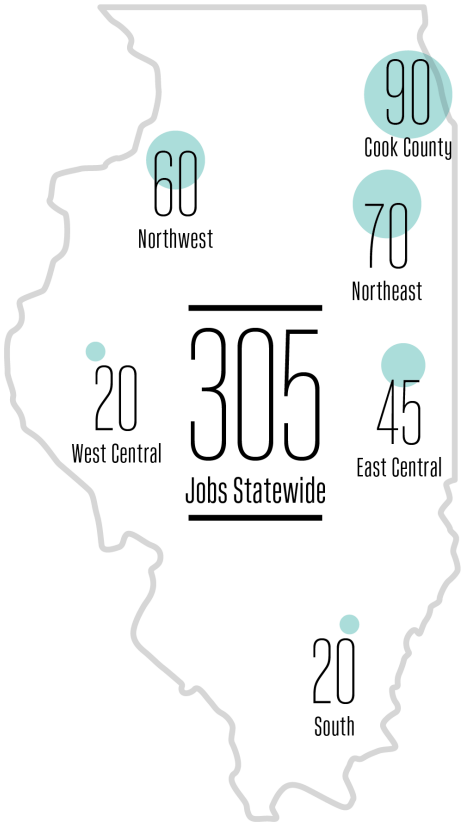
Number of projects: **6**

CO_2e lbs: **7,101,742**

NO_X lbs: **3,706**

SO_2 lbs: **7,698**

Statewide Impacts



770 Cars Taken Off the Road for a Year

3,278 Homes Powered for a Year

Program Administrative Costs | Program Year 4 (June 1, 2021 – May 30, 2022)

Category	Entity	Total Spend
Program Implementation	IPA	$354,282.98
Program Administration	Elevate	$2,299,688.13
Evaluation	APPRISE	$109,531.25 [a]
Grassroots Educators	All PY4 Grassroots Educators	$417,894.09 [b]
Total Administrative Costs		**$3,149,326.09**

[a] The previous evaluation cycle concluded November 2021, so these costs are inclusive of June 1, 2021 – November 30, 2021.

[b] Grassroots educator costs include two additional month of spending (June 1, 2021 – July 31, 2022) because some grassroots educators from the PY4 cohort were given additional time following the conclusion of the program year to complete their campaigns.

Summary of Findings

PY4 approved projects will result in an estimated 27.1 GWh of solar energy produced and 8.96 MWs of peak demand savings in the first year of production.

Customer bill savings estimates from PY4 energized projects ranged between 84% and 89% of the customer's average monthly bill. The estimated total net present value (NPV) of lifetime bill savings for energized projects is $26 million dollars and the NPV of lifetime customer costs is $5 million dollars.

Evaluation next steps: The evaluation team will review data collected by the implementer about the customer's energy consumption prior to installation. We will determine whether it is sufficient to include in future analysis, to update the assumption that PV is sized to 100% of customer's load.

Based on economic models, ILSFA PY4 energized and approved projects created or are projected to create an estimated $56.3 million in GDP impacts in Illinois from project spending and $16.8 million in employee compensation. The labor needed for construction and maintenance of solar projects, to supply components for projects, and for other sectors due to ripple effects of project spending increased demand for labor by 305 full-time-equivalent jobs worth of employment across the year.

Evaluation next steps: The program year five (PY5) evaluation will further investigate the existing job training programs and outcomes.

The geographic distribution of modeled economic impacts follow roughly the same distribution as program spending across the six main program regions.

Program recommendation: Focus spending in areas with disadvantaged communities and other geographies of interest, as project spending tends to directly and indirectly benefit the communities which house the projects themselves.

Based on economic models of household spending patterns, new household spending following on-bill savings generated additional economic activity, focused on the healthcare and housing sectors.

Program Recommendation: Increase widespread access to solar programs to allow for on-bill savings that contribute to overall health and well-being of Illinois communities.

Summary of Findings

PY4 approved projects allocated 47% of program incentives to environmental justice communities (EJCs) across subprograms, which exceeds the program's target of allocating 25% of program incentives to EJCs. The portion of projects and incentives distributed to EJCs by sub-program is shown in the figure below.

While ComEd provides service to 70% of Illinois residents, most ILSFA projects (88%) are concentrated within ComEd's service territory. This indicates the program's geographic coverage is not proportionate to utility service area populations. The Low-Income Distributed Generation subprogram appears to largely drive this trend with 97% of the projects within this subprogram being located within ComEd's service territory. Because ILSFA did not need to apply project selection criteria to the Low-Income Distributed Generation subprogram (as funds were not fully allocated in PY4), these differences are most likely driven by implementation challenges that the program faces in downstate.

Evaluation next steps: Evaluate program outreach and implementation strategies to determine how best to reach customers in rural areas and support vendors and grassroots educators to reach these customers. The evaluation team will further investigate these issues through the PY5 process evaluation.

Evaluation next steps: Gather community input from rural communities and/or downstate communities to understand their current needs and concerns, and to gauge their opinions on solar. The evaluation team will prioritize collecting this input through PY5 stakeholder interviews and participant focus groups.

Distributed Generation PY4 Approved Projects

33% of projects sited in EJCs

25% of funding allocated to EJCs

Community Solar PY4 Approved Projects

33% of projects sited in EJCs

53% of funding allocated to EJCs

56% of subscribers reside in EJCs

Non-profit/ Public Facilities PY4 Approved Projects

61% of projects sited in EJCs

43% of funding allocated to EJCs

Summary of Findings

Different entities use different disadvantaged community (DAC) designations depending on their programmatic focus, but there is no single 'ideal' DAC designation. Disadvantaged communities is a generalized term used in this report to represent the myriad of designations for communities that have been (and may continue to be) marginalized. ILSFA's EJC definition uses indicators from U.S. EPA EJSCREEN, which prioritizes environmental burdens with demographic data; this approach is used by other entities as well. However, this designation may exclude certain populations that may benefit from ILSFA.

Future considerations: IPA is planning to consider updates to the EJC criteria and methodology. They will gather input from stakeholders later in 2024 and will release a pre-proposal for an update to the Long-Term Renewable Resource Procurement Plan in the spring of 2025 based on stakeholder feedback. A draft of the Plan will be released in the fall of 2025.

Elevate and IPA may consider adding additional criteria to fill potential gaps and closer align with other state and federal standards. We believe conducting further analysis to understand how specific indicators could shape a potential expansion of the ILSFA EJC criteria.

In PY4, Elevate addressed some of the pain points and inefficiencies identified by vendors and program evaluators, including improving the vendor portal. Elevate also expanded its vendor management team, added a technical subcontractor for program review, and rolled out a new option for customers to get income verification directly through the program and a referral process.

Although the program administrator made several improvements to program processes in PY4, some processes remained challenging. The vendor portal and application processes were identified as areas in need of further research and improvement. Vendors also faced challenges navigating workforce development criteria across the ILSFA and the Illinois Shines, the stipulation that job trainees are counted toward the program's requirement only for three years after their training, and with the geographic distribution of job training programs.

Evaluation next steps: Based on the PY4 evaluation findings, we have identified a few areas for further investigation as part of the PY5 process evaluation, including the application process and vendor portal and job trainee requirements.

KEY FINDINGS AND RECOMMENDATIONS

Summary of Program Performance

ILLUME Advising, in partnership with Verdant Associates and Industrial Economics (herein referred to as the evaluation team), evaluated program year four (PY4) of the Illinois Solar for All (ILSFA) program, which ran from June 1, 2021, to May 31, 2022.

Our evaluation included an assessment of program impacts, including energy, bill, environmental, jobs and economic, and social impacts. We also conducted a light-touch process evaluation to assess the performance of the program administrator, Elevate. Throughout our evaluation planning and analysis process, we collected input from stakeholders to ensure that the evaluation aligned with the needs and priorities of the entities that the ILSFA program aims to serve.

The evaluation team conducted a lighter touch evaluation in PY4, focusing more resources on a more in-depth evaluation for the evaluations for program year five (PY5) and program year six (PY6).[1] The team selected this approach to focus on developing more relevant recommendations and information to support the program. The Climate and Equitable Jobs Act (CEJA) resulted in substantial updates to the program during and after PY4, meaning that recommendations related to PY5 and PY6 may be more actionable. In addition, respondents may recall program details easier during primary data collection for a more recent program year. The evaluation for PY5 and PY6 will calculate program impacts, but will also more heavily focus on the participant and stakeholder experiences.

The evaluation team expects to deliver the PY5 evaluation report in Fall 2024 and the PY6 evaluation report in Spring 2025.

Key Findings and Recommendations

The following section summarizes our key findings and recommendations for PY4.

The evaluation team calculated program impacts for approved projects, energized projects or both. PY4 approved projects are projects that applied for the ILSFA program in PY4 and have received Part I approval by May 31, 2022 (including all subsequent project stages). PY4 energized projects, which are projects that applied for the ILSFA program in PY1 through PY4 and have received Part II approval by May 31, 2022. In PY4, six projects fell into both the PY4 approved and PY4 energized project analysis categories (four 1-4 Unit Distributed Generation projects and two Non-Profit/Public Facilities projects).

For energy impacts, environmental impacts, and social impacts, the team estimated impacts based on PY4 approved projects to be consistent with how IPA reports impacts to stakeholders in its project summary. The team additionally estimated energy and environmental impacts for energized projects, which are included in the Detailed Findings section of this report. The team calculated estimated bill impacts for PY4 energized projects only, based on when participants received these benefits following project energization. Finally, the

[1] PY5 ran from June 1, 2022 to May 31, 2023 and PY6 ran from June 1, 2023 to May 31, 2024.

team calculated job and economic impacts for both PY4 approved and PY4 energized projects to reflect the jobs and economic impacts that occur during the construction phase of a project, as well as those that occur following the project, as customers receive financial benefits from on-bill savings.

FINDING 1

In PY4 ILSFA approved 207 projects across the four subprograms (herein referred to as PY4 approved projects). The evaluation team estimated the energy and environmental impacts that will result from these projects when constructed. PY4 approved projects included 158 Small Residential Distributed Generation projects, 2 Large Residential Distributed Generation projects, 41 Non-profit/Public Facilities Distributed Generation, and 6 Community Solar projects.

- **Energy impacts:** ILSFA PY4 approved projects will result in an estimated 14,631.8 KW_{AC} of new capacity, 27.1 GWh of estimated solar energy produced, and 8.96 MWs of demand savings in the first year of production. The average project cost per capacity (KW_{AC}) for PY4 energized projects was $3,353 for Distributed Generation projects and $3,405 for Community Solar. Project costs were based on actual installed solar system costs, as reported by Approved Vendors in project applications.
- **Environmental impacts:** We estimated that the first year avoided emissions of PY4 approved projects have the potential to reduce CO_2 emissions by 12 million pounds, NO_x emissions by six thousand pounds, and SO_2 emissions by 13 thousand pounds. The avoided CO_2 impacts are equivalent to powering 3,278 homes or taking 770 cars off the road. The evaluation team used the National Renewable Energy Laboratory (NREL) Standard Scenarios to provide the most realistic estimates. Past evaluations used eGrid which we provide in Appendix B for reference.
- **Social impacts:** In PY4, ILSFA allocated 47% of program incentives to environmental justice communities (EJCs). This exceeded ILSFA's target of allocating 25% of program incentives to EJCs.

Program recommendations:

- **To improve the accuracy of energy impacts:**
  - **Collect project costs:** Project costs were not available for all approved PY4 Community Solar projects. We recommend collecting this information as early as possible in the application process to give IPA a more accurate understanding of recent project costs.
  - **Provide metered photovoltaics production:** Metered (PV) production or a proxy data source was not available for the PY4 evaluation. However, IPA notified the evaluation team that REC production data could be used as a proxy for metered production data in future years. The evaluation team will explore using this data in PY5 and PY6 to improve the certainty of estimated impacts.

FINDING 2

By the end of PY4, 107 ILSFA-approved projects had been constructed and energized (herein referred to as PY4 energized projects). The count of energized includes all projects approved in PY1-PY4 that were energized by the end of PY4. PY4 energized projects included 63 Small Residential Distributed Generation

projects, 1 Large Residential Distributed Generation projects, 41 Non-profit/Public Facilities Distributed Generation, and 2 Community Solar projects. The evaluation team estimated bill impacts resulting from these projects.

- **Bill impacts:** Overall, we estimate that customer bill savings could range between 84 percent and 89 percent of their total monthly bill. The average per-customer monthly bill savings range from $71.08 to $90.94 for residential customers. Non-Profit/Public Facilities customers save an estimated average of $1,290.78 per month on their bill. The evaluation team estimated the total net present value (NPV) of lifetime bill savings of energized projects at $26 million dollars and the NPV of lifetime customer costs at $5 million dollars.

Evaluation next steps:

- **To improve the accuracy of bill savings estimates:**
  - The evaluation team will review data collected by the implementer about the **customer's energy consumption** prior to installation. We will determine whether it is sufficient to include in future analysis, in order to update the assumption that PV is sized to 100% of customer's load.

FINDING 3

The evaluation team estimated job and economic impacts resulting from the 308 total projects that have been approved and energized by ILSFA through PY4, including 217 Small Residential Distributed Generation projects, 3 Large Residential Distributed Generation projects, 80 Non-profit/Public Facilities Distributed Generation, and 8 Community Solar projects.

- **Job and Economic Impacts:** Based on economic models, ILSFA PY4 energized and approved projects created or are projected to create an estimated $56.3 million in GDP impacts in Illinois from project spending and $16.8 million in employee compensation. The labor needed for construction and maintenance of solar projects, to supply components for projects, and for other sectors due to ripple effects of project spending increased demand for labor by 305 full-time-equivalent jobs worth of employment across the year.

Evaluation next steps:

- ILSFA year five (PY5) evaluation will further investigate the existing job training programs and outcomes.

FINDING 4

Direct, indirect, and induced modeled economic impacts follow roughly the same distribution as program spending across the six main program regions. The highest portion of project spending occurred in Cook County, with 54% of projects sited and 32% incentive dollars spent in this region, so a similarly large portion of economic impacts occur there. Indirect impacts were slightly more distributed, especially among

Cook County and the Northeast region, suggesting that the Northeast region may be contributing to the supply of components for ILSFA projects in Cook County in addition to local projects.

Program recommendations:

- Focus spending in areas with disadvantaged communities (DACs) and other geographies of interest, as project spending tends to directly and indirectly benefit the communities which house the projects themselves.

FINDING 5

New household spending following on-bill savings generated additional economic activity, focused on the healthcare and housing sectors, based on economic models of household spending patterns. The induced impacts from increases in disposable income for participating households totaled roughly $90,000. Over a third of those savings were projected to be spent on healthcare and housing. This figure will grow year-after-year as ILSFA expands.

Program recommendations:

- Increase widespread access to solar programs to allow for on-bill savings that contribute to overall health and well-being of Illinois communities.

FINDING 6

While ComEd provides service to 70% of Illinois residents, most ILSFA projects (88%) are concentrated within ComEd's service territory. This indicates ILSFA's geographic coverage is not proportionate to utility service area populations. The Low-Income Distributed Generation subprogram appears to largely drive this trend with 97% of the projects within this subprogram being located within ComEd's service territory. Because ILSFA did not need to apply project selection criteria to the Low-Income Distributed Generation subprogram (as funds were not fully allocated in PY4), these differences are most likely driven by implementation challenges that the program faces in downstate.

Based on program administrator interviews, stakeholder interviews, and research conducted for the Illinois Solar for All: Residential Solar (Small) subprogram mid-year report these challenges are in large part driven by the higher concentration of rural communities in downstate Illinois, which creates economic constraints for the Approved Vendors and grassroots educators serving this region.[2] Stakeholders also reported challenges with downstate utilities that would approve some projects but not others. The evaluation team will further investigate these issues through the PY5 process evaluation.

Evaluation next steps:

[2] https://www.illinoissfa.com/announcements/2024/01/illume-advising-releases-evaluation-report-for-illinois-solar-for-all/

- Evaluate program outreach and implementation strategies to determine how best to reach customers in rural areas and support vendors and grassroots educators to reach these customers. The evaluation team will further investigate these issues through the PY5 process evaluation.
- Gather community input from rural communities and/or Ameren service territory communities to understand their current needs and concerns, and to gauge their opinions on solar. The evaluation team will prioritize collecting this input through PY5 stakeholder interviews and participant focus groups.

FINDING 8

There are many ways to characterize disadvantaged communities (DACs) in Illinois. While ILSFA program eligibility and environmental justice communities (EJC)—the designation the ILSFA program uses to identify disadvantaged communities—encompass many communities in Illinois, there are many other designations in use across the U.S. and even in Illinois. The equity landscape in Illinois contains multiple designations of DACs, each with its own set of criteria and indicators. Some types of indicators are absent in the ILSFA EJC designation, such as climate, crime, health, and housing indicators. The ILSFA EJC designation also measures some indicators (e.g., economic, or environmental indicators) differently from other designations.

ILSFA is currently in compliance with its statutory guidance categorizing EJCs. However, it is important to understand other characterizations of DACs as IPA considers future updates to criteria and indicators within that guidance.

FINDING 9

Different entities use different disadvantaged community (DAC) designations depending on their programmatic focus, but there is no single 'ideal' DAC designation. Disadvantaged communities is a generalized term used in this report to represent the myriad of designations for communities that have been (and may continue to be) marginalized. ILSFA's EJC uses indicators from US EPA EJSCREEN, which prioritizes environmental burdens with demographic data; this approach is used by other entities as well. However, this designation may exclude certain populations that may benefit from ILSFA. Most rural communities within Illinois, for example, are absent in the ILSFA EJC designation but are present in other DAC designations. This is likely due to the types of indicators that are not currently included in the ILSFA EJC designation that are likely to occur in rural areas. For example, Justice40 indicators include future climate predictors of expected agricultural loss that would affect rural areas.

Future considerations:

- IPA is planning to consider updates to the EJC criteria and methodology. They will gather input from stakeholders later in 2024 and will release a pre-proposal for an update to the Long-Term Renewable Resource Procurement Plan in the spring of 2025 based on stakeholder feedback. A draft of the Plan will be released in the fall of 2025. Elevate and IPA may consider adding additional criteria to fill potential gaps and closer align with other state and federal standards. We believe conducting further analysis to understand how specific indicators could shape a potential expansion of the ILSFA EJC criteria.

Program recommendations:

- Besides changing ILSFA EJC criteria, another way to make the ILSFA EJC designation more inclusive would be changing the self-designation process. For example, other categories of indicators (crime, housing, etc.) could be added to the rubric.

FINDING 10

PY4 marked a pivotal year as Elevate embarked on program improvement and refinement. For ILSFA's first three years, Elevate needed to quickly develop complicated infrastructure, tools, and materials to support ILSFA while adapting to program changes. In PY4, Elevate addressed some of the pain points and inefficiencies identified by vendors and program evaluators, including improving the vendor portal. Elevate also expanded its vendor management team, added a technical subcontractor for program review, and rolled out a new option for customers to get income verification directly through ILSFA and a referral process.

FINDING 11

Although ILSFA administrator made several improvements to program processes in PY4, some processes remained challenging. The vendor portal and application processes were identified as areas for further research and improvement. Approved Vendors noted that they had challenges with program updates in the middle of a cycle and revised program forms in response to program changes and modifications, and with uploading documentation to the vendor portal. Vendors also faced challenges navigating workforce development criteria across the ILSFA and the Illinois Shines (also known as the Adjustable Block Program; this program is run by IPA and provides solar incentives to market rate customers), the stipulation that job trainees are counted toward ILSFA's requirement only for three years after their training, and with the geographic distribution of job training programs.

Evaluation next steps:

- Based on the PY4 evaluation findings, we have identified a few areas for further investigation as part of the PY5 process evaluation.
    - Application process and AV portal: Elevate started with process improvements and AV portal optimization in PY4 and continued in PY5. As part of the PY5 process evaluation, the evaluation team will assess the Approved Vendors' experiences with program documentation, use of the program portal, review process, and timeline to identify remaining pain points.
    - Job trainee requirements: As part of PY5 evaluation data collection, we will survey job trainees and Approved Vendors to assess Approved Vendors' understanding of and comfort with program job training requirements, preparedness and expertise of job trainees, the efficacy of job training programs, and any remaining challenges with identified pain points.

INTRODUCTION

ILSFA Program Overview

In 2017, revisions to Section 1-56(b) of the IPA Act contained in the Future Energy Jobs Act (also known as FEJA or Public Act 99-0906) created the ILSFA program to *"include incentives for low-income distributed generation and community solar projects."* The program objectives are 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 interaction with stakeholders, with existing energy efficiency initiatives, and to minimize administrative costs."*

To accomplish this, FEJA originally created four sub-programs, including:

- Low-Income Distributed Generation, for on-site solar projects, which included incentives for small (1-4 unit) and large (5+ unit) residential projects.
- Low-Income Community Solar, for off-site solar projects.
- Incentives for non-profits and public facilities to do on-site projects.
- Low-Income Community Solar Pilot Projects, with distinct rules and incentives.

In September 2021, the Climate and Equitable Jobs Act (also known as CEJA or Public Act 102-0662) took effect, increasing available funding, and prioritizing expanding participation to areas of Illinois previously underserved by ILSFA. CEJA also updated ILSFA to discontinue the Low-Income Community Solar Pilot Projects and split the Low-Income Distributed Generation sub-program into separate sub-programs for distributed generation projects serving small residential (single- to four-unit residences) and large residential (five units or more) buildings. Under CEJA, ILSFA includes the following sub-programs:

- Low-Income Single-Family and Small Multifamily Solar (1-4 units), referred to in this report as the Small Residential Distributed Generation subprogram.
- Low-income large multifamily solar (5+ units), referred to in this report as the Large Residential Distributed Generation subprogram.
- Incentives for non-profits and public facilities, referred to in this report as the Non-profit/Public Facilities Distributed Generation subprogram.
- Low-Income Community Solar, referred to in this report as the Community Solar subprogram.

To better prioritize the underserved portions of ILSFA, IPA implemented changes to the program's project prioritization criteria to better target these projects. ILSFA uses these criteria to select some projects over others in the event of having too few funds. Changes to the project prioritization criteria included the addition of a Regional EJ score, which ILSFA uses to help ensure proportional distribution of funds to EJCs throughout Illinois.

Our evaluation covers program year 4 (PY4) of the ILSFA program, which ran from June 1, 2021, to May 31, 2022.

Program Year 4 Summary

Program Year Four (PY4) featured two separate initial project submission windows, one for the Low-Income Distributed Generation subprogram, which encompasses Small and Large Residential Distributed Generation projects, and the Non-Profit/Public Facilities sub-programs and one for the Low-Income Community Solar sub-program.

Both initial project submission windows remained open for two weeks. In the Low-Income Distributed Generation sub-program, submissions during the initial project submission window did not exceed the available budget so the Program Administrator opened a rolling submission window for the remainder of the program year. The incentive values for the approved projects never reached the budgeted amount of funds available for this sub-program so the remaining funds were rolled over to the Program Year Five (PY5) Low-Income Distributed Generation sub-program budget. After the passage of CEJA, additional funding was made available to open a second submission window in PY4 for both the Non-Profit/Public Facilities and Low-Income Community Solar sub-programs, allowing ILSFA to approve additional projects for funding. Figure 1 summarizes key dates in the PY4 timeline.

Key terms used in the ILSFA program:

Environmental Justice Community (EJC) - A community area that has historically been affected by environmental health hazards and/or has been left out of dialogues that have direct impact on the quality of life of the community due to potential environmental and public health effects.

Income Eligible – Households whose income does not exceed the 80% area medium income (AMI).

Photovoltaic (PV) – A renewable electricity generation technology that provides electricity by converting photons from sunlight into electrical potential.

Renewable Energy Credit (REC) – RECs represent the environmental value of energy generated by renewable sources, including solar. A REC is issued when one megawatt-hour of electricity from a renewable energy source is added to the electrical grid.

Figure 1. Key Dates in Program Year 4

Source: Illinois Solar for All Annual Summary: June 2021 – May 2022

Table 1 below shows a breakdown of the overall budget for the ILSFA PY4 sub-programs, as well as the total number of approved projects, their system capacity, and their total inventive value.

Table 1. ILSFA PY 4 Budget and Approved Projects by Sub-Program

SUBPROGRAM	BUDGET	TOTAL APPROVED PROJECTS	TOTAL SYSTEM CAPACITY (MW)	TOTAL APPROVED PROJECT INCENTIVE VALUE
Low-Income Distributed Generation	$36,674,305	162	1.321	$3,276,420
Incentives for non-profits and public facilities	$15,076,529	41	5.869	$13,604,870
Low-Income Community Solar	$26,309,991	6	7.405	$21,338,128
Total Year 4	$78,060,825	209 [a]	14.323	$34,942,998

[a] Note that project counts in the PY4 Annual Summary differ from evaluated project counts, due to two projects being ineligible or withdrawn between PY4 and the evaluation.
Source: Illinois Solar for All Annual Summary: June 2021 – May 2022.

EVALUATION OBJECTIVES AND APPROACH

Program Year Four Evaluation Approach

For the PY4 (June 2021 through May 2022) evaluation, the program team conducted participatory evaluation planning, an impact assessment, and a process assessment. The evaluation team conducted a lighter touch evaluation in PY4, focusing more resources on a more in-depth evaluation for the evaluations for PY5 and PY6. The team selected this approach to focus on developing more relevant recommendations and information to support the program. CEJA resulted in substantial updated to the program during and after PY4, meaning that recommendations related to PY5 and PY6 may be more actionable. In addition, respondents may recall program details easier during primary data collection for a more recent program year.

Assessments included in the PY4 evaluation

Participatory evaluation: The evaluation team conducted stakeholder interviews and hosted a stakeholder webinar to ensure stakeholders' input was considered in evaluation planning and execution

Impact assessment: The impact assessment quantifies program participation, costs, and impacts. In PY4, the impact assessment focused on statutorily required metrics, with more in-depth analyses planned for PY5 and PY6. The team evaluated the following impacts:

- **Energy impacts:** Evaluating energy impacts and peak demand savings.
- **Bill impacts:** Evaluating customers' annual bill savings in dollars.
- **Environmental impacts:** Evaluating reduced pollutants, including greenhouse gases, NO_x, and SO_2.
- **Social impacts:** Evaluating the extent to which communities are directly benefiting from program investments.
- **Workforce and Economic Impacts:** Evaluating workforce and economic impacts including but not limited to jobs created, trainings, reduced energy burden, and access to other programs.

Process assessment: The process assessment evaluated overall program operations and processes.

To ensure the evaluation reflected the experiences and priorities of program stakeholders, the program team completed ten interviews with stakeholders to inform the PY4 evaluation. We describe our findings from these interviews in the Participatory Evaluation section. This section also summarizes feedback received from stakeholders during the evaluation plan webinar (held October 31, 2023) and comments received during the comment period following the webinar (through November 2, 2023).

Our evaluation consisted of primary data collection activities, program materials review, and tracking data review, which then supported our program impact and process assessments. Program tracking data includes information about participants and projects in the ILSFA program, and is maintained by the ILSFA implementer, Elevate, in a Salesforce database. More information about the tracking data can be found in

Appendix A. Methodologies. Table 2 below presents the primary and secondary data sources that supported our analyses.

Table 2. PY4 Data Collection Activities and Sources

DATA SOURCE	TARGET COMPLETES	ACTUAL COMPLETES	OBJECTIVE
1.a. Program Materials	NA	NA	Understanding ILSFA goals, design, and any recent changes made to the program that would impact our research activities
1.b. Program Tracking Data	NA	NA	Assess whether the information necessary to complete the evaluation was available, as well as for completeness and accuracy
1.c. Program Administrator Interviews	6	6	Understand program design, delivery, and implementation successes and challenges during PY4
1.d. Stakeholder Interviews	9-12	10	Understand the key challenges and opportunities associated with the communities each stakeholder serves and understand stakeholders' priorities as it relates to this evaluation
1.e. Stakeholder Webinar	NA	NA	Give stakeholders insight into what to expect from the evaluation and ensure they can provide input into key questions and priorities that should be addressed

We provide more detail on these activities in Appendix A. .

The Participatory Evaluation section below summarizes key themes from stakeholder interviews and comments. We provide objectives, approach, and any limitations or considerations for the impact and processes analyses in the detailed results chapter, with any additional detail included in Appendix A. .

Participatory Evaluation

Stakeholder Interviews

We conducted 10 stakeholder interviews to inform our evaluation planning. Our stakeholder interviews revealed several key themes around who stakeholders are serving, the needs and priorities of those communities, and ways in which ILSFA program design or implementation could improve to better serve those communities. Across the ten interviews, our team uncovered throughlines of key priority areas for this evaluation, as articulated by stakeholders. The evaluation team took these findings and added them as key research areas for the PY4 evaluation. In other words, the interview findings informed our evaluation approach and activities. The following key themes emerged in these interviews:

- Customers are wary of the legitimacy of the ILSFA program. We heard from several respondents that customers believe ILSFA is "too good to be true," and that there still exists general mistrust in both the government and these types of solar offers. Respondents mentioned that they educate customers

(in their role as a vendor or grassroots educator) on the benefits of ILSFA. *In PY5, we will interview grassroots educators to understand more about their strategies to educate communities on ILSFA, specifically how they build trust for the program.*

- ILSFA materials are not always accessible to individuals who do not speak English as their first language. Materials may also use technical concepts or explain complex processes that are difficult to understand for a lay audience. Both grassroots educators and Approved Vendors face these challenges when trying to educate customers about ILSFA. Grassroots educators explained they have asked for ILSFA materials to be shared in the languages commonly spoken by their communities (e.g., Spanish) but were told translated materials are not available.[3] Vendors also mentioned they do a lot of work to explain the ILSFA program to their customers, thus serving as another type of educator. *In PY5, we will ask ILSFA participants about their understanding of the program – not just for different languages, but for ease of understanding (e.g., are the materials written in such a way that a layperson can understand them?).*

- Participation in the Small Residential Distributed Generation subprogram is low, although has increased since PY4. Vendor respondents explained that complicated funding structures and general "red tape" for ILSFA projects dissuade solar firms from pursuing them. Other stakeholders mentioned that the residential program is difficult to navigate from the customer side. *The evaluation team conducted research on the Small Residential Distributed Generation program through a mid-year report.[4] In PY5, we will include a battery of questions in the Approved Vendor Surveys about project financing and Small Residential projects. We will also discuss Small Residential projects in other research activities, such as stakeholder interviews with CBOs.*

- Vendors struggle with the Elevate Approved Vendor portal. Almost every vendor we interviewed shared various issues that they experienced with the Elevate portal. *In PY5, we will include a battery of questions in the Approved Vendor surveys that address the portal, with specific questions related to usability.*

- Stakeholders are very interested in the results of this evaluation. Respondents mentioned they would share the results with their customers or communities, particularly to assure consumers they can trust ILSFA and the program's benefits. *In our evaluation, we will highlight examples or case studies of successful projects in detail, including elements like vendor strategies of engagement, grassroots educators' strategies of program participation, among other factors.*

One critical theme emerged across the stakeholder interviews: stakeholders felt their previous communications and input had not been recognized by the previous evaluators or the implementer. We plan to model participatory evaluation planning by communicating explicitly with stakeholders about what we heard from them – and how their insights will impact and shape the research. IPA also noted that sometimes they are not able to incorporate stakeholder feedback due to statutory constraints, but that its possible this

[3] Illinois Solar for All currently offers several resources in Spanish including program brochures, telephone support, and program forms.

[4] https://www.illinoissfa.com/announcements/2024/01/illume-advising-releases-evaluation-report-for-illinois-solar-for-all/

was not properly communicated to stakeholders, so that it's evident why their feedback was not incorporated.

In PY5, we will conduct stakeholder interviews focused on community-based organizations to better understand their ongoing needs, perspectives, and priorities as they relate to this evaluation. Our team will home in on communities of interest that emerge from the social impacts analysis. We describe this analysis approach in the Social Impact Analysis section.

Stakeholder Webinar Feedback

The evaluation team held a stakeholder webinar in October 2023 to gather feedback on the PY4 evaluation plan and to understand stakeholder priorities. These comments are summarized here:

- Stakeholders offered suggestions to better communicate ILSFA evaluation activities and results. If future evaluations conduct focus groups with ILSFA participants, stakeholders recommend going to grassroots educators for interested participant contact information, with the caveat that there may be some sensitivity around providing this information. Stakeholders also suggested that the evaluation report environmental impacts in better metrics, like train cars of coal not burned, as opposed to planting trees. *The evaluation team will consult with grassroots educators in PY5 to determine whether grassroots educators are able to assist with recruiting for participant focus groups, which are also planned for the PY5 evaluation. The evaluation team will aim to report environmental impacts in a manner that is accessible to stakeholders.*
- Stakeholders wanted more information on the customer experience in future evaluations, from participant focus groups and Approved Vendor surveys. Specifically, stakeholders were interested in the following challenges that they have heard about or experienced: participant experience with income verification; participant experience with billing; participant wait time; Approved Vendors participating and dropping out, and the effect on participants. *The evaluation team will explore these topics through primary data collection in PY 5.*
- Stakeholders noted that the ILSFA program struggles to reach participants in downstate Illinois. Stakeholders attributed several key challenges in reaching downstate communities, namely: a lower portion of vendors and grassroots educators operating downstate, challenges serving customers in rural areas, and project selection criteria that prioritizes EJCs, which are disproportionately located in the northern part of the state. *The evaluation team began exploring these topics through the social impacts analysis in PY4 and will continue to explore these challenges and potential solutions through the PY5 evaluation.*

DETAILED FINDINGS

This section summarizes detailed findings from the energy impacts, bill impacts, environmental impacts, jobs and economic impacts, social impacts, and process analyses.

For energy and environmental impacts, we report impacts for all PY4 approved projects. Approved PY4 projects are projects that applied for the ILSFA program in PY4 and have received Part I approval by May 31, 2022 (including all subsequent project stages). For bill impacts, we report impacts for all PY4 energized projects, which are projects that applied for the ILSFA program in PY1 through PY4 and have received Part II approval by May 31, 2022. We also show impacts for PY4 energized projects for the energy and environmental impacts, and we report jobs and economic impacts for PY4 approved and energized projects together. In PY4, six projects fell into both the PY4 approved and PY4 energized project analysis categories (four 1-4 Unit Distributed Generation projects and two Non-Profit/Public Facilities projects).

Key terms used to describe program impacts:

PY4 approved projects – Projects that applied for the ILSFA program in PY4 and have received Part I approval by May 31, 2022 (including all subsequent project stages).

PY4 energized projects – Projects that applied for the ILSFA program in PY1 through PY4 and have received Part II approval by May 31, 2022 (including all subsequent project stages.

Energy Impacts

The evaluation team estimated the energy savings and coincident demand savings of PY4 approved projects and PY4 energized projects. These values represent the energy generated by the solar systems installed through ILSFA. The research questions addressed by the energy impact analysis are outlined in Table 3 below.

Table 3. Energy Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Project Summary	What is the total number of approved and energized projects? What is the total capacity (kW_{AC}) of approved and energized projects? What is the average system cost per kW_{AC} of project capacity (approved and energized)?
Energy Savings	How much energy would be produced in a typical meteorological year [5] from approved and energized projects?
Demand Savings	How much peak load would be reduced by the energy generated by approved and energized projects?

[5] Typical meteorological year weather and solar radiation data is a widely used type of data that represents median weather conditions over a multiyear historical period.

Project Summary

Table 4 and Table 5 summarize program participation by number of projects, total capacity (KW_{AC}), average capacity per project, and average project cost per projects, for PY4 approved projects and PY4 energized projects respectively. There are six projects which fall into both the PY4 approved and PY4 energized project analysis categories (four 1-4 Unit Distributed Generation projects and two Non-Profit/Public Facilities projects). These metrics were calculated from data provided in the program tracking data.

The total PY4 approved project capacity was almost evenly split between Community Solar (52%) and Distributed Generation (48%) projects. Notably, 99% of the PY4 energized capacity comes from Distributed Generation projects. This is largely due to the smaller size of the two energized Community Solar projects (both from PY1) compared to approved PY4 projects (the Community Solar average energized capacity per project is 26.7 kW and the average PY4 approved capacity per project is 1,234.2 kW). The average project cost per capacity (KW_{AC}) for PY4 energized projects was $3,353 for Distributed Generation projects and $3,405 for Community Solar.

Table 4. Total Capacity and Average Project Costs of PY4 Approved Projects

PROJECT TYPE		NUMBER OF PROJECTS	TOTAL PV CAPACITY (KW_{AC})	AVERAGE PV CAPACITY PER PROJECT (KW_{AC})	AVERAGE PROJECT COST PER KW_{AC}
Distributed Generation	1-4 Units	158	954.2	6.0	$3,345
	5+ Units	2	370.8	185.4	$3,209
	Non-Profit/ Public Facilities	41	5,631.8	137.4	$2,546
	Total	**201**	**6,956.8**		
Community Solar	**Total**	**6**	**7,405.0**	**1,234.2**	**Not Available***
All Approved Projects		**207**	**14,361.8**		

* Project cost data was not available in the program tracking data for the PY4 approved Community Solar projects.

Table 5. Total Capacity and Average Project Costs of PY4 Energized Projects

PROJECT TYPE		NUMBER OF PROJECTS	TOTAL PV AC CAPACITY (KW)	AVERAGE PV AC CAPACITY PER PROJECT (KW)	AVERAGE PROJECT COST PER AC KW
Distributed Generation	1-4 Units	63	352.4	5.6	$3,521
	5+ Units	1	2,000.0	2,000.0	$2,368
	Non-Profit/ Public Facilities	41	5,466.8	133.3	$3,114
	Total	**105**	**7,819.2**		
Community Solar	**Total**	**2**	**53.3**	**26.7**	**$3,405**
All Energized Projects		**107**	**7,872.5**		

Project costs were not available for all approved PY4 Community Solar projects. We recommend collecting this information as early as possible in the application process to give IPA a more accurate understanding of recent project costs.

Energy Savings

This section presents the estimated first-year and lifetime energy savings by project type. Electric energy savings for PV systems are the kilowatt-hours that the PV systems installed through the program generate. The electricity generated from these projects displaces electricity from the grid.

Table 6 and Table 7 present the first-year estimated electrical generation by project type for PY4 approved projects and PY4 energized projects, respectively. These tables also include the average first-year estimated energy savings per project and an estimated capacity factor. The total first-year energy savings from PY4 approved projects is 27.1 GWh. About 58% of the savings come from Community Solar projects and 42% comes from Distributed Generation projects. In contrast, 99% of the PY4 energized projects estimated first-year energy savings comes from Distributed Generation projects. This is largely due to the smaller size of Community Solar projects in the energized population compared to the approved PY4 population (the Community Solar average energized capacity per project is 26.7 kW and the Community Solar average PY4 approved capacity per project is 1,234.2 kW).

Overall estimated first-year capacity factors are in line with PV production expectations for fixed and tracking systems, respectively. Capacity factor is a metric of system utilization and is defined as the amount of energy generated during a given period divided by the maximum possible amount of energy that could have been generated during that period.

Table 6. First-Year Estimated Energy Savings of PY4 Approved Projects

PROJECT TYPE		ESTIMATED FIRST-YEAR ENERGY SAVINGS (MWH)	NUMBER OF PROJECTS	AVERAGE ANNUAL ESTIMATED ENERGY SAVINGS PER PROJECT (MWH)	AVERAGE ESTIMATED ANNUAL CAPACITY FACTOR (AC)
Distributed Generation	**1-4 Units**	1,456.9	158	9.2	17.6%
	5+ Units	539.5	2	269.8	17.0%
	Non-Profit/ Public Facilities	9,280.3	41	226.3	18.4%
	Total	**11,276.8**	**201**		
Community Solar	**Total**	**15,855.2**	**6**	**2,642.5**	**23.4%**
All Approved Projects		**27,132.0**	**207**		

Table 7. First-Year Estimated Energy Savings of PY4 Energized Projects

PROJECT TYPE		ESTIMATED FIRST-YEAR ENERGY SAVINGS (MWH)	NUMBER OF PROJECTS	AVERAGE ANNUAL ESTIMATED ENERGY SAVINGS PER PROJECT (MWH)	AVERAGE ESTIMATED ANNUAL CAPACITY FACTOR (AC)
Distributed Generation	**1-4 Units**	509.7	63	8.1	16.5%
	5+ Units	4,214.9	1	4,214.9	24.1%
	Non-Profit/ Public Facilities	7,586.3	41	185.0	18.9%
	Total	**12,310.9**	**105**	**--**	**--**
Community Solar	**Total**	**105.5**	**2**	**52.8**	**22.7%**
All Energized Projects		**12,416.4**	**107**	**--**	**--**

The evaluation team's analysis of customer energy consumption outside of Illinois found that many customers increased their energy consumption following the installation of solar.[6] The analysis presented here assumes no change in consumption has taken place. However, if customers do increase their energy consumption once the PV systems are installed, there will be a reduction in energy (along with environmental, and bill) savings impacts relative to the assumption of no change in customer energy consumption. It is also important to note that the energy savings presented here are based on typical meteorological year weather estimates. If metered PV production data were available, more accurate estimates of energy savings would be possible.

Demand Savings

Our team assessed peak coincident demand savings in order to understand how the ILSFA program mitigates overall strain on the electric grid. Peak demand refers to a period of time when the strain on the grid is highest due to customer demand for energy usage at this time. Peak coincident demand savings measure the amount of that demand that is offset by solar energy generated by systems installed through ILSFA.

To estimate coincident peak demand savings, we simulated the energy generated by ILSFA PV systems during hours of grid-system peak demands. The grid-system peak hour provides a brief snapshot of program coincident demand savings. Additionally, analyzing peak demand over the top 100 peak hours provides greater insight into how ILSFA impacts the grid during hours of highest load.

In this section, we examine estimates of generation during PJM and MISO annual peak load hours as well as their top 100 load hours.[7] We used PJM load data specific to the ComEd load zone. For MISO, we used the load data specific to Illinois. Table 8 presents the hours and magnitudes of PJM-ComEd and MISO-Illinois peak demands in 2022.

[6] https://verdantassoc.com/wp-content/uploads/IEPEC-2022_Residential-Solar-Consumption.pdf

[7] PJM and MISO are the independent system operators (ISOs) in Illinois

Table 8. PJM-ComEd and MISO-Illinois Peak Hours and Demands (MW)

ISO REGION	PEAK DEMAND (MW)	DATE	HOUR BEGINNING (LOCAL TIME)
PJM-COMED	21,262	2022-06-21	5:00 PM
MISO-ILLINOIS	9,083	2022-07-05	4:00 PM

By coincidentally generating electricity during system peak hours, the program's projects allow the electric utility to avoid the purchase of high-cost wholesale energy. At the same time, the electric utility reduces its transmission and distribution losses during hours of high system congestion. It should be noted however, that these hours are not necessarily when ILSFA PV systems have their highest output (i.e., during the middle of the day when irradiance peaks).

Peak Hour Impacts

Using the simulated generation results from ILSFA PV systems, the generation that would have been coincident with the PJM-ComEd and MISO-Illinois annual peak hours in 2022 is shown by ISO region for PY4 approved and energized projects in Table 9.

The estimated generation from PY4 approved projects that would have been coincident with the 2022 peak hour is equivalent to 0.02% of the 2022 PJM-ComEd peak load and 0.04% of the 2022 MISO-Illinois peak load. The estimated generation from energized projects that would have been coincident with the 2022 peak hour is equivalent to 0.01% of the 2022 PJM-ComEd peak load and 0.02% of the 2022 MISO-Illinois peak load. The estimated peak hour capacity factor in PJM-ComEd is lower than the MISO-Illinois estimated peak hour capacity factor due to lower energy production during the 5:00 p.m. hour.

Table 9. Estimated Peak Hour Generation for PY4 Approved and Energized Projects

PROJECT GROUP	ISO REGION	NUMBER OF PROJECTS	ESTIMATED PEAK HOUR GENERATION (MW)	ESTIMATED PEAK HOUR CAPACITY FACTOR
Approved Projects	PJM-COMED	184	5.250	39.4%
	MISO-ILLINOIS	23	3.709	62.1%
Energized Projects	PJM-COMED	82	2.890	35.0%
	MISO-ILLINOIS	25	1.790	83.5%

Top 100 Peak Hours

The estimated PJM-ComEd and MISO-Illinois peak hour coincident generation is a snapshot of beneficial program impacts.

Table 10 shows total program estimated generation coincident with PJM-ComEd and MISO-Illinois 2022 top 100 hours, alongside estimated capacity factors during the top 100 hours for PY4 approved and energized projects. Higher utilization coincident with PJM-ComEd and MISO-Illinois peak hours yields higher benefits to the grid than during other hours.

Table 10. Estimated Generation Coincident with Top 100 Hours for PY4 Approved and Energized Projects

PROJECT GROUP	REGION	NUMBER OF PROJECTS	ESTIMATED TOP 100 HOURS GENERATION (MWH)	ESTIMATED TOP 100 HOURS CAPACITY FACTOR
Approved Projects	PJM-COMED	184	555.0	51.5%
	MISO-ILLINOIS	23	260.9	43.1%
Energized Projects	PJM-COMED	82	265.8	47.1%
	MISO-ILLINOIS	25	115.7	55.9%

Bill Impacts

The evaluation team estimated two metrics to assess impacts to customer bills because of participating in ILSFA: first-year bill savings and lifetime bill savings compared to customer costs. The research questions addressed by the bill impact analysis are listed in Table 11 below.

Table 11. Bill Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Bill Impacts	How much bill savings can participants expect due to the energy produced by ILSFA projects? How do bill reductions compare to the participant's cost to acquire solar (represented as the ratio of lifetime costs to lifetime bill savings)?

The evaluation team calculated bill savings from energized projects by estimating the difference between customer bills with and without PV benefits. As discussed in the previous section, this analysis assumes no increase in electrical consumption after PV installation. Additionally, the evaluation team assumed that the PV systems were sized to cover 100% of the customer's load (since actual customer load information was not available).[8] Further details about the bill calculation methodology can be found in Appendix A. For the lifetime view, we compared bill savings and the participant's costs to acquire solar PV (e.g., system costs, debt service payment, lease/PPA payments) over the 20-year estimated life of the system.

[8] The evaluation team will explore in future reports whether information about PV size relative to load is available for energized projects. If available, the 100% assumption will be adjusted to more accurately reflect actual PV sizing.

First-Year Bill Savings

Table 12 shows the average first-year bill savings per customer by project type. We present the bill savings as average annual bill savings, average monthly bill savings, and average savings as a percentage of the customer's total bill. The per-customer monthly bill savings range from $71.08 to $90.94 for residential customers. We estimate that Non-Profit/Public Facilities customers save $1,290.78 per month on their bill. Overall, bill savings estimates show that customer savings could range between 84% and 89% of their overall bill.

Table 12. Estimated Average First-Year Bill Savings per Customer

PROJECT TYPE		NUMBER OF PROJECTS	AVERAGE ANNUAL ESTIMATED BILL SAVINGS PER CUSTOMER	AVERAGE MONTHLY ESTIMATED BILL SAVINGS PER CUSTOMER	AVERAGE SAVINGS PERCENTAGE
Distributed Generation	**1-4 Units**	63	$1,091.25	$90.94	87.9%
	5+ Units	1	$852.99	$71.08	89.3%
	Non-Profit/Public Facilities	41	$15,489.38	$1,290.78	83.5%
Community Solar		2	$984.97	$82.08	84.4%

These bill savings estimates are approximate due to the limited information available regarding bills. We could improve the accuracy of the bill savings estimates if the following information were available: the customer's annual energy consumption prior to installation (monthly or hourly would be even better) and the customer's billing rate.[9] Additionally, energy savings estimates based on metered performance would also improve the accuracy of these bill estimates.

Lifetime Bill Savings Compared to Customers' Costs

Table 13 shows the net present value (NPV) of lifetime bill savings and customers' costs by project type. The costs represent the customer's payment (total, per month, or per kWh) under their purchase agreement, lease agreement, power purchase agreement (PPA), or subscriber agreement over the duration of their contract. The table also includes a ratio of the lifetime customer costs (NPV) to lifetime customer bill savings (NPV).[10]

We estimate the total NPV of lifetime bill savings of energized projects to be $26 million dollars and the NPV of lifetime customer costs at $5 million dollars. Overall, this results in a ratio of costs to bill savings of 0.20, indicating that the lifetime bill savings are five times greater than the lifetime costs.

[9] This information is not available for evaluation unless benefitting customer signs a release form of their data. For this reason, the data was not available for the PY4 evaluation. The evaluation team is investigating whether annual REC production data may be used as a proxy for annual consumption data in the PY5 and PY6 evaluations.

[10] Note that this ratio of cost to bill savings is calculated over the 20-year estimated lifetime of the system. This metric is different than the savings percentage calculated for program eligibility, which is estimated over the customer's contract term.

The 5+ unit Distributed Generation projects and the Non-Profit/Public Facilities Distributed Generation projects had the highest cost to savings ratios, at 0.26 and 0.17 respectively. The 1-4 unit Distributed Generation projects had the lowest cost to savings ratio, at 0.01. The 1-4 unit projects had the lowest ratio because the majority of these projects had $0 payment terms (92% of projects). Both energized Community Solar projects had a ratio of 0.00 because they had $0 payment terms for their subscribers.

Table 13. Net Present Value of Bill Savings and Costs of Energized Projects by Type

PROJECT TYPE		NUMBER OF PROJECTS	NPV LIFETIME BILL SAVINGS	NPV LIFETIME CUSTOMER COSTS	NPV CUSTOMER COST PER BILL SAVINGS RATIO	NUMBER OF PROJECTS WITH $0 PAYMENTS
Distributed Generation	**1-4 Units**	63	$1,809,443	$21,520	0.01	58
	5+ Units	1	$10,487,470	$2,768,611	0.26	0
	Non-Profit/Public Facilities	41	$13,537,783	$2,318,857	0.17	3[11]
	Total	**105**	**$25,834,697**	**$5,108,988**	**0.20**	**61**
Community Solar	**Total**	**2**	**$243,428**	**$0**	**0.00**	**2**
All Energized Projects		**107**	**$26,078,125**	**$5,108,988**	**0.20**	**63**

We show the net present value (NPV) of bill savings and customer's costs by sector and ownership type in Table 14 below for Distributed Generation projects. For residential projects, the leased and purchased projects had the lowest cost to savings ratio (0.00) because all of these projects had $0 payments on their contract terms. The residential PPA projects had a cost to savings ratio of 0.26.

The non-profit/public facilities projects had a much lower proportion of projects with $0 payments (one PPA and one purchased project). The savings ratio for the leased and PPA non-profit/public facilities projects were similar with ratios of 0.16 and 0.17

Ownership models in the ILSFA program:

Lease: Participants lease the project. The project is on the participant's property but owned by someone else.

Power Purchase Agreement (PPA): Participants purchase electricity generated by the solar project through a Power Purchase Agreement. The project is on the participant's property but is owned by someone else.

Purchase: Participants purchase the solar project outright. The participant may take out a loan to finance the purchase.

[11] The customer payment terms were not available for one Non-profit/Public Facility project since the Approved Vendor and the customer were the same entity. However, since the total REC incentives for this project were greater than the total project cost, the customer cost for this project is modeled as a $0 payment.

respectively. The savings ratio for the purchased non-profit/public facilities projects were much higher, with a ratio of 0.54, despite one of the four projects having $0 payment terms.

Table 14. Net Present Value of Bill Savings and Cost by Sector and Ownership Type of Distributed Generation Projects

SECTOR	OWNERSHIP TYPE	NUMBER OF PROJECTS*	NPV LIFETIME BILL SAVINGS	NPV LIFETIME CUSTOMER COSTS	NPV CUSTOMER COST PER BILL SAVINGS RATIO	NUMBER OF PROJECTS WITH $0 PAYMENTS
Residential	**Lease**	54	$1,597,302	$0	0.00	54
	PPA	9	$10,688,602	$2,790,131	0.26	3
	Purchase	1	$11,009	$0	0.00	1
Non-Profit/ Public	**Lease**	12	$2,561,819	$401,727	0.16	0
	PPA	25	$9,402,507	$1,599,934	0.17	1
	Purchase	3	$589,318	$317,196	0.54	1

* This table excludes one Non-Profit/Public Distributed Generation project, as its ownership type was not available.

Environmental Impacts

The evaluation team estimated environmental impacts of PY4 approved projects and energized projects. We calculated emission impacts as the difference between the emissions generated by the program PV systems and baseline emissions that would have occurred in the absence of ILSFA. The research questions addressed by the environmental impact analysis are listed in Table 15 below.

Table 15. Environmental Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Environmental Impacts	What are the first-year and lifetime emissions reductions associated with approved and energized ILSFA projects?

We estimated avoided emissions using two data sources: 1) the National Renewable Energy Laboratory (NREL) Standard Scenarios; and 2) the Environmental Protection Agency (EPA) Emissions & Generation Resource Integrated Database (eGrid).[12,13] The evaluation team believes that the NREL-based estimates prove a more realistic estimate of the environmental impacts of ILSFA (since they are forward-looking and more granular), however, we included the eGrid-based analysis for consistency with past evaluations.

[12] https://www.nrel.gov/analysis/standard-scenarios.html

[13] https://www.epa.gov/egrid

The eGrid-based methodology and results are presented in Appendix B. Environmental Impacts per eGrid Data. We estimated the environmental impacts using typical meteorological year weather estimates. Note that if metered PV production data were to become available, our estimates of environmental impacts would be more accurate.

Using the NREL Standard Scenarios data, we estimated that first-year avoided emissions of PY4 approved projects could reduce CO_2e emissions by 12 million pounds, NO_x emissions by six thousand pounds, and SO_2 emissions by 13 thousand pounds. Table 16 shows the distribution of estimated NREL-based emissions impacts by project type.

Table 16. PY4 Approved Projects Estimated First-Year Avoided Emissions per NREL Data

PROJECT TYPE		FIRST-YEAR ESTIMATED AVOIDED LBS OF CO_2E	FIRST-YEAR ESTIMATED AVOIDED LBS OF NO_X	FIRST-YEAR ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	638,642	341	707
	5+ Units	239,053	126	262
	Non-Profit/ Public Facilities	4,086,657	2,169	4,506
	Total	**4,964,352**	**2,636**	**5,475**
Community Solar	**Total**	**7,101,742**	**3,706**	**7,698**
All Approved Projects		**12,066,095**	**6,342**	**13,174**

Applying the NREL-based methodology to PY4 energized projects, we estimate that first-year avoided emissions reduce CO_2e emissions by five million pounds, NO_x emissions by almost three thousand pounds, and SO_2 emissions by six thousand pounds. Table 17 shows the distribution of estimated NREL-based emissions impacts by project type.

Table 17. Energized Projects Estimated First-Year Avoided Emissions per NREL Data

PROJECT TYPE		FIRST-YEAR ESTIMATED AVOIDED LBS OF CO_2E	FIRST-YEAR ESTIMATED AVOIDED LBS OF NO_X	FIRST-YEAR ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	223,647	119	247
	5+ Units	1,891,768	985	2,047
	Non-Profit/ Public Facilities	3,323,990	1,773	3,684
	Total	**5,439,405**	**2,877**	**5,978**
Community Solar	**Total**	**46,528**	**25**	**51**
All Energized Projects		**5,485,933**	**2,902**	**6,029**

Using the NREL-based methodology to estimate lifetime emissions reductions of PY4 approved projects, we estimate the projects could reduce CO_2e emissions by 213 million pounds, NO_x emissions by 42 thousand pounds, and SO_2 emissions by 47 thousand pounds. Table 18 shows the distribution of estimated NREL-based emissions impacts by project type for PY4 approved projects.

Table 18. PY4 Approved Projects Estimated Lifetime Avoided Emissions per NREL Data

PROJECT TYPE		LIFETIME ESTIMATED AVOIDED LBS OF CO_2E	LIFETIME ESTIMATED AVOIDED LBS OF NO_X	LIFETIME ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	11,249,802	2,277	2,545
	5+ Units	4,210,955	843	942
	Non-Profit/ Public Facilities	71,987,204	14,507	16,211
	Total	**87,447,961**	**17,627**	**19,698**
Community Solar	**Total**	**125,098,466**	**24,784**	**27,696**
All Approved Projects		**212,546,427**	**42,411**	**47,394**

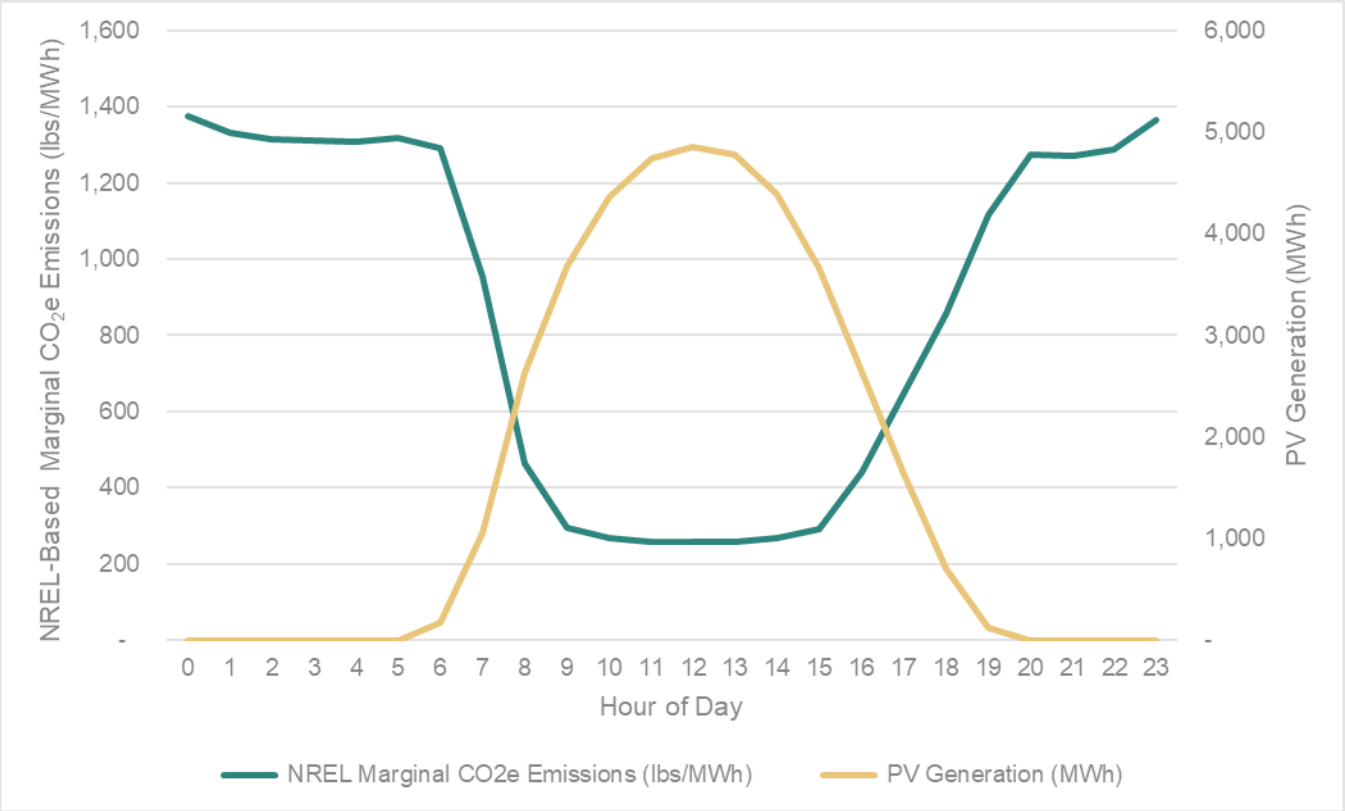
Using the NREL-based method to estimate lifetime emissions reductions from PY4 energized Projects, we estimate that projects could reduce CO_2e emissions by 97 million pounds, NO_x emissions by 19 thousand pounds, and SO_2 emissions by 22 thousand pounds. Table 19 shows the distribution of estimated NREL-based emissions impacts by project type for Energized Projects.

Table 19. Energized Projects Estimated Lifetime Avoided Emissions per NREL Data

PROJECT TYPE		LIFETIME ESTIMATED AVOIDED LBS OF CO_2E	LIFETIME ESTIMATED AVOIDED LBS OF NO_X	LIFETIME ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	3,939,584	797	890
	5+ Units	33,323,836	6,589	7,363
	Non-Profit/ Public Facilities	58,552,679	11,859	13,252
	Total	**95,816,098**	**19,244**	**21,504**
Community Solar	**Total**	**819,605**	**165**	**184**
All Energized Projects		**96,635,703**	**19,409**	**21,689**

The NREL-based avoided emission estimates are 74% lower than the eGrid-based estimates (found in Appendix B. Environmental Impacts per eGrid Data). NREL-based estimates consider a forward-looking view of grid emissions, incorporating regulatory goals and planned grid changes. In contrast, the eGrid-based estimate provides a snapshot in a time of marginal emissions. Additionally, the NREL-based estimation of avoided CO_2-equivalent (CO_2e) is calculated on hourly marginal emissions. As shown in Figure 2 below, the peak PV production coincides with the lowest marginal CO_2e emissions. Therefore, the hourly-based estimate of avoided emissions is lower than an estimate based on a single annual number, due to lower marginal grid emissions during the peak solar producing hours of the day.

Figure 2. Average NREL-based Marginal CO_2e Emissions Compared to Average PV Generation of All Program Systems



Impact Equivalencies

To help understand the magnitude of the energy and environmental estimated impacts, the evaluation team calculated estimates of equivalent actions that would reduce the same amount of energy or CO_2 emissions as the ILSFA PV project impacts. These impact equivalents are presented in Table 20 below.

Table 20. Estimated First-Year Impact Equivalents

EQUIVALENT IMPACT	PY4 APPROVED PROJECTS	PY4 ENERGIZED PROJECTS
Number of homes powered for a year	3,278	1,500
Number of cars taken off the road for a year	770	350

The average annual amount of electricity sold to residential customers in Illinois was 8,276.3 kWh in 2022.[14] Therefore, the first-year energy savings from PY4 approved projects is equivalent to the energy consumption of 3,278 homes. The first-year energy savings of PY4 energized projects are equivalent to the energy consumption of 1,500 homes.

[14] https://icc.illinois.gov/api/web-management/documents/downloads/public/en/22-21%20Comparison%20of%20Electric%20Sales%20Statistics-.pdf

The reduction in CO_2 emissions from program projects can also be considered in terms of the number of cars taken off the road. The EPA estimates that the average CO_2 emissions per vehicle per mile in 2022 was 527.308 grams.[15] The US Department of Transportation estimates that the average annual miles driven per driver is 13,476 miles.[16] Therefore, the average vehicle emits 7,106,003 grams of CO_2 per year, or 15,666 pounds. The first-year NREL estimated CO_2e emissions reductions of PY4 approved projects is equivalent to taking 770 cars off the road. The first-year NREL estimated CO_2e emissions reductions of Energized Projects is equivalent to taking 350 cars off the road.

Workforce and Economic Impacts

This section considers the impacts of the ILSFA program's implementation on the Illinois workforce, as well as other economic impacts.

When a program participant gains access to new solar power under the ILSFA program, the necessary funds go to support a variety of activities, including site inspections and planning for installation, purchase of the solar panels, purchase of other necessary construction materials, and the installation of the panels. Additionally, program participants benefit from on-bill energy cost savings once the new solar systems are energized. While some of the economic impacts created by ILSFA's activities are unlikely to create significant economic impacts within Illinois (such as the manufacturing of solar panels, which largely takes place overseas), other impacts such as the sourcing of construction materials and installation activities will take place locally.

Given the range of possible economic impacts and their potential relevance to the Illinois geography, we assessed two high-level economic contributions of the ILSFA program: near-term investments constructing and installing new solar infrastructure, and ongoing energy bill savings following program participants' resulting access to affordable solar power. To measure these two economic effects, we aimed to answer the research questions summarized in Table 21.

Table 21. Workforce and Economic Impacts Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Near-Term Employment Impacts	How is near-term employment affected by spending on ILSFA projects?
New Employee Income	What portion of ILSFA's investments directly or indirectly become local employee wages?
Contribution to GDP	What is the total amount of additional value added to in-state GDP?
New Household Savings Spending Patterns	Where in the economy do households spend their on-bill savings?
Impacts on Taxes	What are the changes in collected taxes resulting from program spending?

[15] U.S. Environmental Protection Agency, Office of Transportation and Air Quality, personal communication, Oct. 13, 2023: https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and
[16] https://www.fhwa.dot.gov/ohim/onh00/bar8.htm

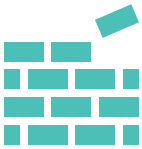
This analysis deploys the IMPLAN input/output economic model, using ILSFA program data inputs to estimate workforce and economic impacts described above. IMPLAN approximates a multisectoral cash flow model of the economy, with the ability to disaggregate by geography (state, county, etc.). Essentially, the model tracks dollars as they are spent in one economic sector (e.g. hospitals) and in turn generate additional spending in other related sectors (e.g. healthcare supplies). For the purposes of this analysis, we use IMPLAN to track the effects of new spending within the Illinois solar industry and subsequent ripple effects throughout the state's economy. For each dollar of new program spending, IMPLAN estimates new demand for employment, new employee compensation, impacts on taxes, and other changes.

Where possible, these metrics are disaggregated by ILSFA program region.[17] For this analysis, IMPLAN is configured to accept new investments aligned with the ILSFA program regions, while accounting for the fact that new spending in one region will also cause spillover impacts in nearby regions. For example, a project in the East Central region may rely on some labor or materials from the adjacent West Central region. Out of state impacts are not captured as a part of this analysis.

Impacts measured by IMPLAN are also differentiated by three different types of economic impact: direct, indirect, and induced effects, which differentiate the ways an investment (i.e., an ILSFA project) can affect the local economy. These effects are defined as follows:

Direct Effects

New demand for employment that is a direct result of program-funded activities and investment dollars, including, for example, installation of new solar arrays.



Indirect Effects

Employment and dollars that are generated by changes in supply chain demand due the product, such as the purchase of tools, materials, and other inputs that are necessary for completing the construction of ILSFA projects and are produced or provided by companies located in Illinois.

[17] Program region definitions can be found in the ILSFA Vendor Directory: https://www.illinoissfa.com/vendor-directory/. These regions are primarily used to help participants locate contractor through the program. They used calculated Regional EJ Scores, which are also one of the criteria considered when prioritizing which projects will be approved through the program.

Induced Effects

Refer to changes in expenditure driven by newly earned income following new employment in the direct and indirect sectors, or by household savings resulting from lower energy costs. For example, a new employee in the solar installation field might spend part of their pay on local haircuts or restaurants, contributing to demand for employment and products in those sectors.

The following sections outline the results of this IMPLAN analysis, broken out based on the two high-level economic contributions of ILSFA: near-term solar installations, and ongoing energy bill savings.

Modeled Near-Term Impacts from Solar Installations

ILSFA's projects support a range of new solar installations, from individual household rooftop arrays to larger municipal building installations and Community Solar field development. The development of each of these sites requires an initial, near-term direct investment in labor and materials using program funds to construct the projects. These investments in turn have indirect and induced economic impacts. The following sections describe these near-term impacts.

Total Near-Term Impacts

Table 22 totals the modeled direct, indirect, and induced economic impacts associated with new investments in solar panel installation. As discussed above, the levels of economic impact correspond to the number of projects as well as the overall level of direct project costs associated with each program region. This analysis includes both energized and approved projects to fully reflect project related economic activity during PY4. Approved projects require construction spending which typically consists of the largest portion of spending, while energized projects have more minimal maintenance costs each year.

Table 22. Key Modeled Economic Impacts and Demographic Information

REGION	POPULATION	NUMBER OF PROJECTS (ENERGIZED AND APPROVED)	TOTAL EMPLOYMENT IMPACT	TOTAL MODELED EMPLOYEE COMPENSATION	PROJECT COST MODELED IMPACTS TO GDP
Cook County, IL	5,275,541	165	90	$5,680,000	$17,770,000
Northeast	3,462,229	70	70	$4,490,000	$14,460,000
Northwest	1,496,983	29	60	$3,300,000	$11,290,000
East Central	808,510	23	45	$1,680,000	$6,270,000
West Central	1,240,089	11	20	$970,000	$3,630,000
South	529,156	10	20	$720,000	$2,920,000
Total	**12,812,508**	**308***	**305**	**$16,830,000**	**$56,330,000**

*Note: Total number of projects does not equal the sum of energized and approved projects as there were 6 projects that were both energized and approved during PY4.

Table 23 details modeled GDP and employee compensation impacts by project type for direct, indirect, and induced impacts. We show the total impacts by project type and the statewide total reflects the full dollar amount of economic impacts for the state of Illinois resulting from PY4 approved project spending and projects that were approved in PY1-4 and energized by PY4.

Table 23. Modeled GDP and Employee Compensation Impacts by Project Type

IMPACT TYPE	PROJECT TYPE		EMPLOYEE COMPENSATION	GDP IMPACTS
Direct	Distributed Generation	1-4 units	$7,280,000	$23,290,000
		5+ Units	$100,000	$320,000
		Non-Profit/ Public Facilities	$270,000	$860,000
	Community Solar		$2,680,000	$8,590,000
Indirect	Distributed Generation	1-4 units	$2,030,000	$7,740,000
		5+ Units	$30,000	$110,000
		Non-Profit/ Public Facilities	$70,000	$290,000
	Community Solar		$750,000	$2,850,000
Induced	Distributed Generation	1-4 units	$2,550,000	$8,660,000
		5+ Units	$40,000	$120,000
		Non-Profit/ Public Facilities	$90,000	$320,000
	Community Solar		$940,000	$3,190,000
Total	Distributed Generation	1-4 units	$11,860,000	$39,680,000
		5+ Units	$160,000	$550,000
		Non-Profit/ Public Facilities	$440,000	$1,470,000
	Community Solar		$4,370,000	$14,630,000
	Statewide Total		**$16,830,000**	**$56,330,000**

Direct Impacts

Direct impacts include those resulting from the actual installation of solar panels and any related development activities. Table 24 details impact from direct effects for each of ILSFA regions. The impacts measured are changes to:

- **Total employee compensation:** measures wages earned by employees in jobs created by direct impact.
- **Impacts to GDP:** quantifies new industry spending across activities related to solar installation.

Across the projects supported by ILSFA in PY4, approximately 30% of total project costs went to hiring in-state labor related to project installations. The highest employment compensation and GDP impacts are focused on Cook County and the Northeast region, which aligns with the high concentration of project spending in those regions.

Table 24. Modeled Direct Impacts of PY4 Approved and Energized Projects by Program Region

REGION	TOTAL MODELED EMPLOYEE COMPENSATION	ONE-TIME DIRECT PROJECT COST IMPACTS TO GDP
Cook County, IL	$3,080,000	$9,680,000
Northeast	$2,670,000	$7,870,000
Northwest	$2,240,000	$7,250,000
East Central	$1,170,000	$4,140,000
West Central	$650,000	$2,210,000
South	$520,000	$1,910,000
Total	**$10,330,000**	**$33,060,000**

Indirect Impacts

As seen in Table 25, indirect impacts (i.e., the "ripple effects" of purchasing supplies and services in Illinois to support project construction) have smaller increases in employment demand, wages, and GDP than direct impacts. These effects come from more subtle changes in demand for tools, materials, and other inputs needed to construct new solar installations, and are separate from (and can be added to) direct effects. In the context of indirect impacts, GDP contributions can be interpreted as additional upstream supply chain spending to support direct installation activities.

Cook County and the Northeast region have the highest portion of indirect impacts to GDP and employee compensation. The Northeast region has a relatively high project cost impact suggesting that this region may be providing construction inputs to Cook County projects in addition to regional projects. The South region has the lowest impacts to GDP and compensation.

Table 25. Modeled Indirect Impacts of PY4 Approved and Energized Projects by Program Region

REGION	TOTAL MODELED EMPLOYEE COMPENSATION	ONE-TIME INDIRECT PROJECT COST IMPACTS TO GDP
Cook County, IL	$1,130,000	$3,730,000
Northeast	$850,000	$3,230,000
Northwest	$470,000	$1,880,000
East Central	$200,000	$900,000
West Central	$150,000	$740,000
South	$80,000	$500,000
Total	**$2,880,000**	**$10,980,000**

Induced Impacts

Induced impacts represent the smallest set of impacts in dollar value, but these impacts often represent the most significant reach within the communities served by the ILSFA program, because they reflect the local economic impacts of spending the money earned by those employed in the construction of the projects. Table 26 shows these induced impacts, which occur in a broad range of industries where wages are spent, including housing, retail, and healthcare, and reflect increased need for jobs (e.g., employees in retail or services) as well as demand for products and services themselves (e.g., food and medicine).

As before, the induced impacts are concentrated in Cook County, but the Northeast region also has a high level of induced impacts. This suggests that induced spending generally stays within the same region as where the project spending occurred. As with direct impacts, the East Central Region has a larger impact on GDP and total wages than the West Central Region.

Table 26. Modeled Induced Impacts of PY4 Approved and Energized Projects by Program Region

REGION	TOTAL MODELED EMPLOYEE COMPENSATION	ONE-TIME INDUCED IMPACTS TO GDP
Cook County, IL	$1,460,000	$4,360,000
Northeast	$970,000	$3,360,000
Northwest	$580,000	$2,160,000
East Central	$310,000	$1,220,000
West Central	$170,000	$680,000
South	$120,000	$510,000
Total	**$3,620,000**	**$12,290,000**

Modeled Employment Impacts

Total employment impact approximates the total demand for employees in PY4 from program-funded direct activities. The employment impact metric is not a rigid count of annual full-time employees. Rather, it reflects total demand for full-time-equivalent employment across the full year, including temporary demand for a portion of the year. For example, demand for ten workers for six months would be captured as a total employment impact of five.

Key terms used to describe employment impacts:

Direct employment impacts: specific to demand for jobs that facilitate the construction of solar projects from the ILSFA program in PY4.

Indirect employment impacts: estimate demand for jobs that enable the purchasing of supplies and services that enabled construction.

Induced employment impacts: demand for employment in other sectors of the economy that benefit from increased spending due to economic activity from direct and indirect impacts.

Table 27. Modeled Employment Impacts of PY4 Approved and Energized Projects by Program Region

REGION	TOTAL DIRECT EMPLOYMENT IMPACT	TOTAL INDIRECT EMPLOYMENT IMPACT	TOTAL INDUCED EMPLOYMENT IMPACT	TOTAL
Cook County, IL	60	10	20	**90**
Northeast	40	10	20	**70**
Northwest	40	10	10	**60**
East Central	30	< 10	10	**45**
West Central	10	< 10	< 10	**20**
South	10	< 10	< 10	**20**
Total	**190**	**45**	**70**	**305**

Note: In the above table, "<10" approximates any single-digit estimates for employment impacts.

Tax Impacts

This section also includes a tax impact modeling analysis to estimate the effects of ILSFA on specific groups of taxpayers at the federal, state, and local levels. Potential tax impacts may include:

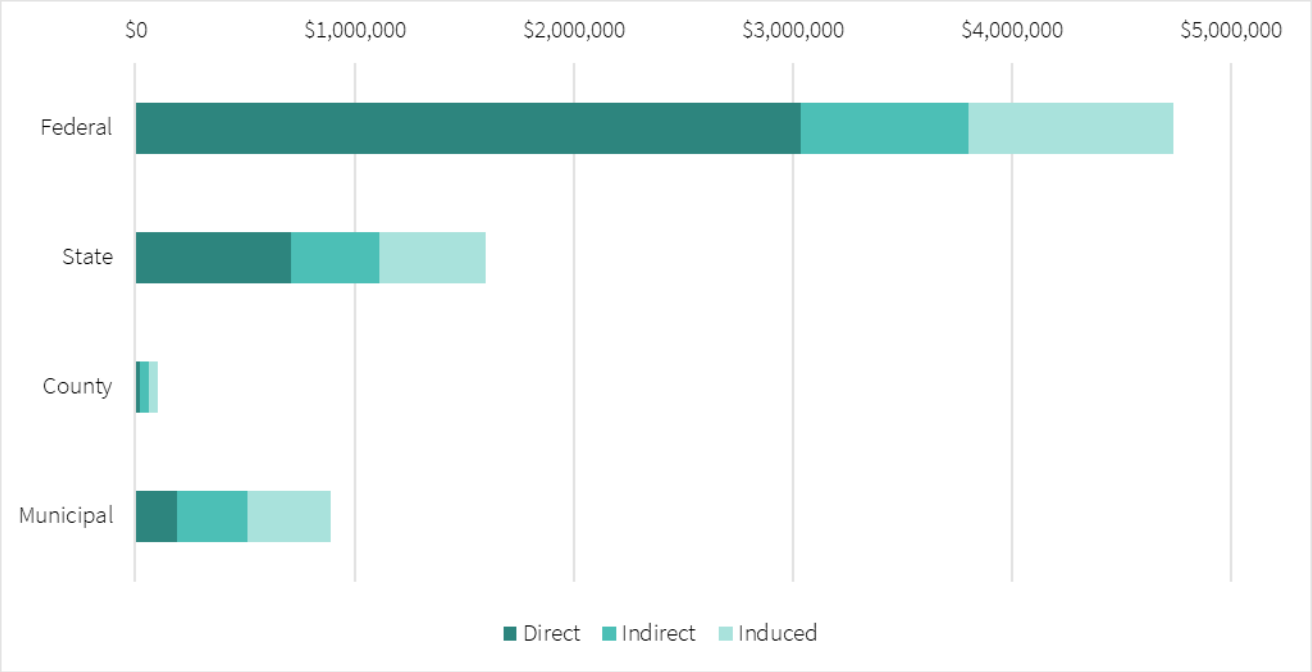
- Federal and state employment and income taxes on wage earners
- Local property taxes
- State sales taxes and some local assessments
- Federal and income taxes on corporations

Note that federal tax impacts do not include potential tax savings due to the solar investment tax credit (Solar ITC). Because ILSFA directly affects both regional employment and household spending, and has potential longer-term impacts on property values, the related tax impacts can be complex. While the tax impacts are small compared to total project impacts, they may overlap and have the effect of redistributing some program benefits.

For ILSFA participants, for example, increased disposable income from energy bill savings may be spent in other places where taxes are higher than those for electricity (e.g., buying clothing and paying a sales tax), increasing overall tax burden as a percentage of income and spending. On the other hand, new taxes paid to municipalities or counties could directly benefit program participants through the funding of public programs serving individuals living in that community. The overall benefits of the tax impacts are overlapping and might cancel out in some cases.

Figure 3 shows the breakdown of direct, indirect, and induced tax impacts federal, state, and local (including county and municipal) taxes.

Figure 3. Direct, Indirect, Induced Tax Impacts of PY4 Approved and Energized Projects



*Note: Direct tax impacts are those resulting directly from project spending, indirect effects come from economic activity related to inputs or supplies for projects, and induced effects are from money that flows from project spending into other parts of the economy.

Figure 4 shows the distribution of how the direct tax effects flow from various taxpayers.[18] The taxpayer categories are typically separated by the payer and the type of tax paid.

Almost 40% of the federal tax impacts come from employee compensation taxes, which are paid by employees toward social security. An increase in social security taxes implies an increase in income overall which reiterates the positive impacts of ILSFA. Production and import taxes make up a very small portion of federal tax impacts but are larger contributors for state and municipal impacts. This signals that direct production expenses are most likely to benefit taxpayers directly by way of municipal programs that benefit their constituents.

Key terms used to describe tax impacts:

Employee Compensation: social security taxes paid by employees.

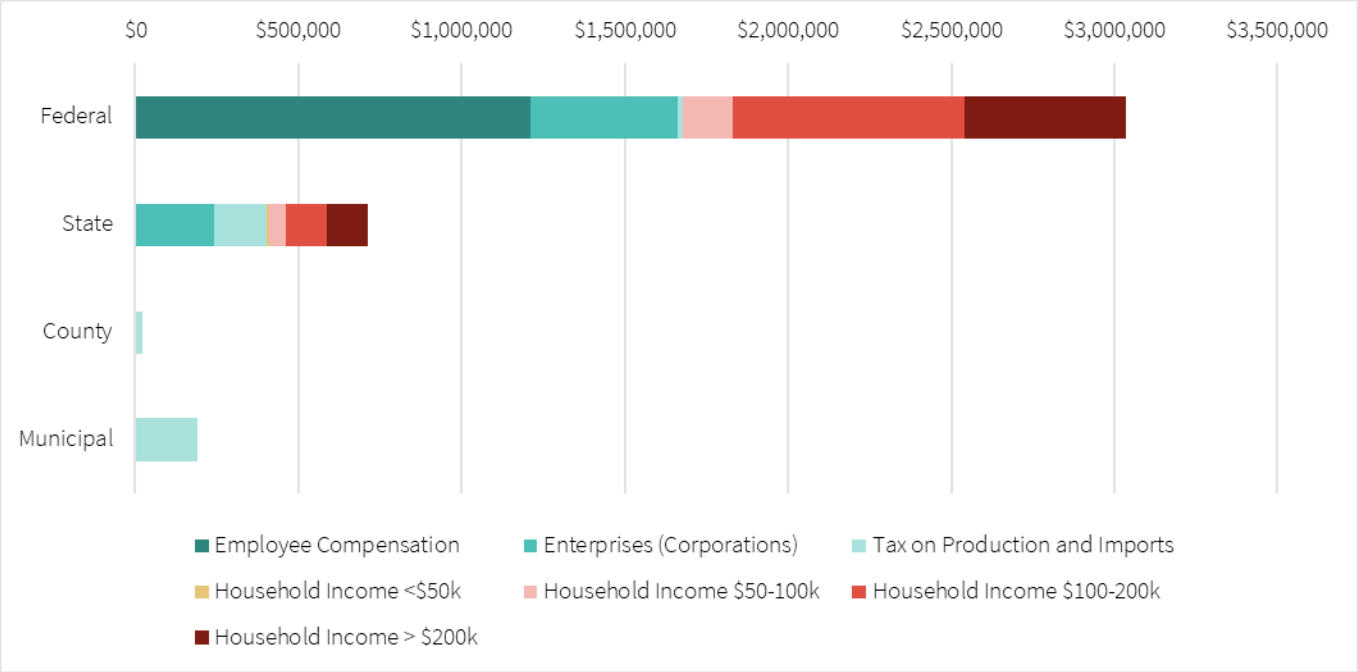
Enterprise (Corporations): taxes paid by corporations.

Households: personal income taxes paid by households with various annual income levels.

Tax on Production and Imports: encompasses a range of various taxes such as excise taxes, import duties, property taxes, and sales tax that may be paid by individuals or larger entities depending on the situation.

[18] See Appendix E for data tables.

Figure 4. Direct Tax Impacts of PY4 Approved and Energized Projects by Source



Direct project spending results in economic activity, such as demand for labor and materials, which impact firms and individuals in segments of the economy not directly participating in ILSFA. These modeled economic ripple effects result in tax revenues to actors not participating in ILSFA. Notably, the state and federal tax impacts personal income taxes for households in higher income brackets than ILFSA program participants, reflecting tax impacts on higher paid workers at firms that construct and maintain the projects.

Ongoing Impacts from Household Energy Bill Savings

In addition to one-time impacts from direct investments in solar installations, ILSFA also supports access to ongoing energy bill savings for program participants. Once new solar installations are energized, program participants will pay less in electricity expenses, assuming no changes in usage habits. These on-bill savings (see Bill Impacts) effectively operate as new disposable household income. Households have the option to relegate these funds in the direction of their choosing, and subsequent spending in those sectors effectuates additional induced impacts. Because this benefit will accrue annually for all program participants, it will increase in overall magnitude as ILSFA progresses, and more projects are energized.

As with the one-time impacts above, we use IMPLAN to assess the distribution of economic impacts associated with new household spending. This analysis limits its assessment of ongoing impacts to those associated with household energy bill savings, or the Distributed Generation projects funded under ILSFA, due to data limitations. Additional benefits due to bill savings accrue to Non-Profit/Public Facilities entity participants but spending patterns in these cases are likely to reflect the specialized operating budgets of those organizations and are not captured here. To the extent these entities are funded by taxpayer resources, these savings may simply represent a more effective distribution of public funds.

We estimate that Distributed Generation program participants have received approximately $36,000 in increased household disposable income in PY4, because of reduced energy bill burdens from PY4 energized ILSFA projects (see Bill Impacts section). IMPLAN identifies the sectors where this influx of income is likely to generate the newest induced economic activity, as displayed in Table 28. IMPLAN nets out cash savings before developing the spending profile, which is specific to Illinois households with incomes between $15,000 and $30,000. Notably, the induced impacts estimated by IMPLAN total $84,000, higher than the total estimated household savings for program participants. This is because the new induced activity generated by participant spending in turn creates additional induced activity. For example, if a program participant spends more money at the grocery store following new on-bill energy savings, there is a small additional induced ripple effect as grocery store employees go out and spend their earnings.

While the modeled increase in household income is derived from bill savings, the IMPLAN tool is used to assess where spending is likely to occur following any increase in disposable income for households with annual income between $15,000 and $30,000 in Illinois. Thus, this analysis could more broadly capture which sectors would benefit most from additional spending from individuals with increased income through other project-related means, such as a higher salary following participation in the job training program.

Table 28. Top Sectors for Modeled Induced Economic Impacts from Increased Household Spending due to PY4 Energized Projects

CATEGORY	INDUCED IMPACT
Healthcare	$17,000
Housing	$15,000
Other	$13,000
Retail Shopping	$9,000
Groceries & Dining	$7,000
Debt Service	$6,000
Transportation	$6,000
Utilities	$5,000
Insurance	$3,000
Non-Cash Savings & Investments	$3,000
Business Expenses	$500

Healthcare and housing are projected to be the largest single sectors for modeled new induced activity following new household spending under ILSFA. These categories represent basic needs which program participants are eager to address. Similarly, retail shopping, groceries, debt service, transportation, and other utilities make up the next largest share of sectoral spending, focusing on lifestyle fundamentals. Insurance and non-cash savings also represent a choice option for households to dedicate this new discretionary income. The “Other” category captures a wide range of additional activities with small overall impacts, including business development, legal services, entertainment, and home investments. While these results capture changes in economic activity following new household spending, measured in dollars, the real social benefits to households come in the form of what these dollars can provide. For instance, new spending in the healthcare, housing, and food sectors translates to improvements in health, housing stability, and nutritional benefits that are not as easily quantified. These improvements represent an additional value of program participation.

Social Impacts

Background

Solar For All uses designated environmental justice communities (EJCs) in its programming and project operations to allocate budget. For example, ILSFA must allocate at least 25% of program funds for projects in or serving EJCs. ILSFA also uses EJCs as part of the project selection process (e.g., projects sited in or benefiting EJCs are scored higher in the ranking for funding). IPA designates EJCs using a scoring system that considers environmental and demographic factors. Communities can also apply to self-designate as EJCs, provided they provide evidence that their communities still meet or approximate key criterion, such as exposure indicators (pollution), environmental effects, sensitive populations (based on age or health), and socioeconomic factor indicators. These indicators align closely with the current ways in which EJCs are measured in Illinois.[19]

Key terms used to describe social impacts:

Disadvantaged communities (DAC) – General term used in this chapter to represent the myriad of designations for communities that have been (and may continue to be) marginalized.

Environmental Justice Community (EJC) – Term used by the ILSFA program to describe areas that stand to benefit greatly from access to solar energy.

Indicator – The raw data used in DAC characterization, the variables used to categorize "disadvantage" (e.g., unemployment rates). Indicators are collected through datasets like the U.S. Census, so the data are attributable to locations.

Criterion – A standard/threshold for an indicator (e.g., average area unemployment is >120% of national average).

Designation – The combination of criteria which can be mapped to illustrate areas in need (e.g., a Disproportionately Impacted Area).

Renewable Energy Credit (REC) - RECs represent the environmental value of energy generated by renewable sources, including solar. A REC is issued when one megawatt-hour of electricity from a renewable energy source is added to the electrical grid.

The PY4 social impacts analysis centered on examining how the ILSFA EJC designation compares to other designations of disadvantaged communities (DACs) and how the EJC criteria might shape access to the program. "Disadvantaged communities," or "DACs," is a general term that broadly describes the different criteria that entities may use to identify populations who have been (and may continue to be) marginalized. We refer to "DACs" broadly in this report and use "EJC" to refer to ILSFA's specific EJC designation.

The research team sought to develop a baseline understanding of the equity landscape within Illinois, as it will inform future social impacts research.[20] Feedback from the stakeholder interviews conducted by the evaluation team at the beginning of the PY4 evaluation (for more details, see Program Year Four Evaluation Approach) helped to shape this PY4 baseline social impacts research. One theme emerging from the stakeholder interviews was that there may be barriers in the ILSFA program that prevent some populations (e.g., rural communities, communities served by certain utilities) from participating in ILSFA. The team examined barriers to populations by exploring DAC designations and the overlap between DAC designations and project distribution.

[19] For more information on program eligibility, EJC criteria, and self-designation please review Appendix C. Social Impacts: Detailed Findings.

[20] In the PY5 evaluation, the evaluation team will assess progress made related to ILSFA's goals in creating social and energy sovereignty impacts, evaluating the extent to which communities directly benefit from ILSFA investments.

Table 29 summarizes the primary research questions that supported our exploration of DAC designations, and our understanding of how different designations might impact which projects are funded through the ILSFA program.

Table 29. Social Impacts Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
DAC Designations	What indicators are used to characterize communities that face disproportionate impacts from climate change and/or inequitable energy services?
	What criteria are used to designate the geographic areas where these communities live?
EJC Comparisons	How do these designations compare to ILSFA's Environmental Justice Communities (EJCs)? How are they different?
	Where do ILSFA projects occur? Do they align with areas of greatest need in Illinois?
Incentives	How does ILSFA incentive allocation compare to the ILSFA EJC and other DAC designations?

Methods

To understand how the criteria used by ILSFA to prioritize projects impacts the current distribution of projects in ILSFA, and how incorporating different criteria could influence the distribution of different projects, the evaluation team conducted the following analyses:

- Criteria Analysis: Completed a comparative analysis of DAC designations, criteria, and underlying indicators.
- Geographic Analysis:
    - Applied DAC designations to ILSFA's service territory to understand how differences between the criteria affect block group designations.
    - Created interactive maps to show DAC designations, the distribution of ILSFA Community Solar and Distributed Generation projects across Illinois, and the utilities service territories.
        - ILSFA PY4 Projects and DACs Map: https://illumeadvising.com/2024/ilsfa-py4-projects-and-dacs-map/
        - ILSFA PY4 Projects and DACs Heatmap, including Ameren and ComEd service territories: https://illumeadvising.com/2024/ilsfa-py4-projects-and-dacs-heatmap/
- Project Analysis: Analyzed locations of PY4 approved projects compared to utility service territories.

Criteria Analysis

Our team compared the criteria used by the ILSFA program to seven state and national DAC designations as shown in Table 30.

While ILSFA program eligibility and EJCs encompass many communities in Illinois, these designations are not the only ones used in the US, or even in Illinois. The equity landscape in Illinois contains multiple designations of DACs, each with their own set of criteria and indicators. Some types of indicators are absent in the ILSFA EJC designation, such as climate, crime, health, and housing indicators. There are also types of indicators, like economic or environmental indicators, that ILSFA EJC has, but other designations measure differently.

Given the goal of the ILSFA program—to provide solar opportunities to households and communities that may otherwise be left behind in the clean energy transition—it is important to understand what kind of indicators, and thus which populations, are currently included and excluded.

In general, the designations of what makes a community "disadvantaged" are usually in line with the mission or goals of the enforcing body. For example, the Illinois Department of Commerce and Economic Opportunity (DCEO) uses the designations of "Disproportionately Impacted Area" and "R3 Area" per the Cannabis Regulation and Tax Act (CRTA). These designations are largely economic, and include some indicators related to crime. None of the other designations we examined used crime indicators.

Table 30. Comparison of ILSFA EJC Criteria to DAC Criteria Used at the State and National Level

Solar For All Environmental Justice Community (EJC)

Source: Illinois Power Agency Act (IPAA)

Environmental	National-scale Air Toxics Assessment (NATA) Air Toxics Cancer NATA respiratory hazard index NATA diesel PM Particulate matter Ozone Lead paint indicator Proximity to Risk Management Plan sites Proximity to Hazardous Waste Treatment, Storage and Disposal Facilities Proximity to National Priorities List sites Wastewater Dischargers Indicator
Transportation	Traffic proximity and volume
Economic	Percent Low-Income
Sociodemographic	Percent Minority Less than high school education Linguistic isolation Individuals under age 5 Individuals over age 64

Restore, Reinvest, Renew (R3) Area

Source: Cannabis Regulation and Tax Act (CRTA)

Economic
- Unemployment
- Child poverty rates (children under 6 years old living at or below 100% of the FPL)

Crime
- Highest rates of gun injury (gun injury hospitalization rate)
- Commitments to and returns from the Illinois Department of Corrections

INVEST South/West Community Area

Source: City of Chicago Initiative

These high-level indicators are assumed from the methodology that INVEST South/West presents on their website for choosing neighborhoods of interest for their initiative.

Transportation
- Transit service

Economic
- Business licenses

Sociodemographic
- Demographics
- Historic resources
- Community plans

National Designations

Historically Redlined - Grade C Or D;

Source: Homeowners' Loan Corporation (HOLC) *(defunct)*

These indicators are high-level due to the non-specific documentation of redlining at the time it was used.

Economic
- Income

Housing
- Housing quality
- Housing sale and rent values

Sociodemographic
- Race/Ethnicity

Justice 40 Disadvantaged Community

Source: Justice 40 Initiative, Climate and Economic Justice Screening Tool (CEJST)

Environmental

- Underground storage tanks and releases
- Wastewater discharge
- PM2.5 in the air
- Have at least one abandoned mine land
- Formerly used defense sites
- Proximity to hazardous waste facilities
- Proximity to superfund sites
- Proximity to risk management plan facilities

Climate

- Expected agricultural loss rate
- Expected building loss rate
- Expected population loss rate
- Projected flood risk
- Projected wildlife risk

Transportation

- Diesel particulate matter exposure
- Transportation barrier
- Traffic proximity and volume

Economic

- Energy cost
- Low median income
- Poverty
- Unemployment

Health

- Asthma
- Diabetes
- Heart disease
- Low life expectancy

Housing

- Housing cost
- Lack of green space
- Lack of indoor plumbing
- Lead

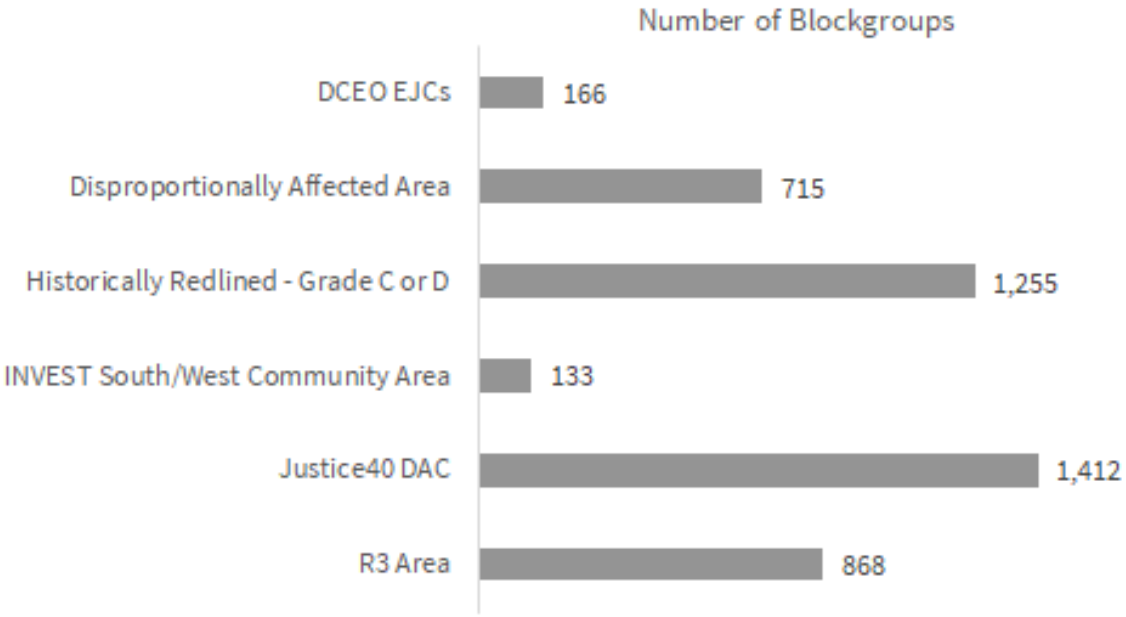
Sociodemographic

- Linguistic isolation

Many indicators must be paired with others (e.g., some pollution indicators must meet an income threshold as well to be considered a DAC). More details can be found in the Appendices.

The current EJC designation includes 2,422 block groups. Figure 6 shows the number of block groups for each designation that are not EJCs but are considered DACs under other designations. For example, more than 1,400 block groups identified as disadvantaged by Justice40 are not recognized under ILSFA EJCs. Additionally, 1,255 block groups considered disadvantaged under Historically Redlined criteria are not included in ILSFA EJCs, along with 868 R3 block groups. An expansion of the EJC criteria would have the potential to be more inclusive of these block groups.

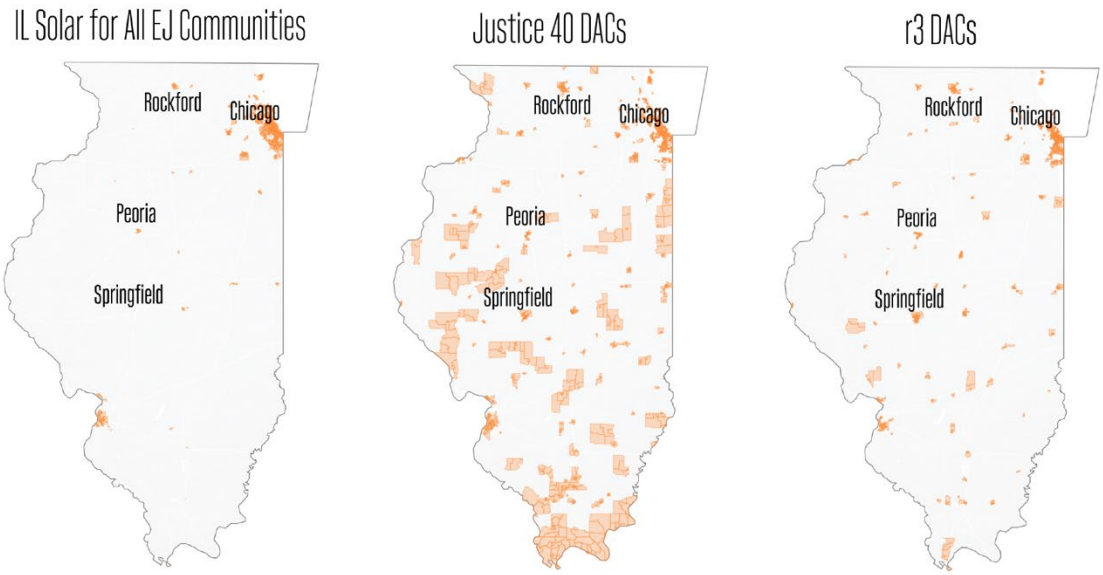
Figure 6. Number of DACs Under Each Designation That Are Not Considered ILSFA EJCs.



Note: The INVEST South/West Communities Area only includes block groups in the city of Chicago, since this effort is locally implemented. All other criteria include block groups throughout the state, since they are statewide or national efforts.

Different entities use different DAC designations depending on their programmatic focus. While there is no single ideal designation, by overlaying these DAC designations on a state map, we found that the EJCs may be excluding some populations that may benefit from Solar For All. For example, most rural communities are absent in the ILSFA EJC designation but are present in other DACs. This is likely due to the types of indicators that are not currently included in the ILSFA EJC designation that are likely to occur in rural areas. For example, Justice40 indicators include future climate predictors of expected agricultural loss that would affect rural areas. Below we compare EJCs to Justice40, R3, and historically red-lined designations.

Figure 7. Illinois Solar For All Environmental Justice Communities (EJCs), Justice 40 DACs, R3 DACs



Justice40

Figure 7 illustrates the large differences between EJCs and Justice40 DACs. ILSFA EJCs are highly concentrated in the Chicagoland region, and some parts of East Saint Louis. The differences are due to several types of indicators that appear in the Justice40 DAC designation but not in the ILSFA designation. For example, Justice40 encompasses future-facing climate indicators (e.g., expected agricultural loss, projected flood risk), health indicators (e.g., asthma, diabetes), and some housing indicators (e.g., lack of indoor plumbing), among others, that are not represented in the ILSFA designation. One result is that more rural areas are included in the Justice40 designation. Conversely, ILSFA EJCs include "Percent Minority" as an indicator, while racial and ethnic indicators are absent in the Justice40 designation.

R3 Areas

Figure 7 also shows ILSFA EJCs next to R3 areas. R3 areas are more focused on crime factors like rates of incarceration and gun injury, as well as several indicators related to income and poverty levels. R3 areas include more rural census blocks than EJCs because they do not include the environmental indicators that are included in ILSFA EJC criteria.

The designations use different indicators of income. ILSFA EJCs includes one indicator of income: percent low-income (% that does not exceed 80% Area Median Income (AMI)). R3 areas include multiple indicators of income including unemployment and child poverty rates. This shows that there is more than one lens to look at income, depending on specific populations of interest.

Historically Redlined Communities

Historical redlining practices have had lasting detrimental impacts on communities today. These effects include perpetuating economic inequalities and exacerbating public health disparities in redlined neighborhoods. Historically redlined communities (those historically defined as Grades C or D) include many communities not included in the ILSFA EJC designation. This designation is historical, meaning it is based on maps drawn many decades ago, and it is possible that these redlined communities may have changed economically or socio-demographically. While ILSFA EJC, Justice 40, and R3 indicators already identify some of the documented effects that persist from historical redlining (e.g., socioeconomic, and environmental disparities), a more thorough analysis is needed to identify what indicators would reveal persistent effects that are overlooked by EJC, Justice 40 and R3 indicators.

Project Analysis

The evaluation team analyzed ILSFA projects' geographic locations to identify the portion of ILSFA-funded projects and incentives that occur within DAC communities under different designations. Our team conducted this analysis for six Community Solar, 42 Non-profit/Public Facilities, and 160 Low-income Distributed Generation (DG) approved projects in PY4.

Low-income Distributed Generation projects have a lower tendency to be in block groups that satisfy one or more DAC designation, with only 62% of these projects situated in a DAC. In comparison, 83% of Community Solar projects, and 93% Non-profilt/Public Facilities were situated in DACs. Looking at the locations of Community Solar subscribers, the majority (90%) were in block groups considered a DAC under at least one designation.

Table 31 shows the percentage of projects by subprogram and subscribers that are in DACs according to different designations. Although many ILSFA projects are in Environmental Justice Communities (EJCs), there is room for more projects to be sited in these communities. Community Solar subscribers have a higher tendency to be in EJCs than Community Solar projects, which means that the subprogram is reaching underserved communities and benefiting EJCs even when the projects are not built in an EJC. Finally, some projects and subscribers are in block groups that are not considered EJCs but are considered DACs under other criteria (e.g., Justice 40).

Table 31. Percentage of Projects in DACs under Different Designations

DAC DESIGNATION	COMMUNITY SOLAR (%)*	DISTRIBUTED GENERATION (%)	NON-PROFIT/PUBLIC FACILITIES (%)
Illinois Solar For All EJC	33 (56)	33	61
DCEO EJC	33 (54)	34	61
Disproportionately Affected Area	17 (60)	33	46
R3 Area	50 (68)	38	56

DAC DESIGNATION	COMMUNITY SOLAR (%)*	DISTRIBUTED GENERATION (%)	NON-PROFIT/PUBLIC FACILITIES (%)
Historically Redlined – Grade C or D	17 (52)	38	56
Justice 40 DAC	67 (74)	42	75
INVEST South/West Community Area	0 (24)	13	7

*Numbers in parenthesis indicate the percentage of subscribers that are in DACs.

Table 32 illustrates the distribution of ILSFA's REC incentive values within DACs according to the different designations. Notably, ILSFA has surpassed its requirement to allocate 25% of incentives to EJCs, with 47% of the incentives directed towards these areas.

Table 32. Percentage of REC Incentive Values Allocated in DACs over Total REC Incentive Values

DAC DESIGNATION	COMMUNITY SOLAR (%)	DISTRIBUTED GENERATION (%)	NON-PROFIT/PUBLIC FACILITIES (%)
Illinois Solar For All EJC	53	25	43
DCEO EJC	53	26	43
Disproportionately Affected Area	28	41	39
R3 Area	41	45	46
Historically Redlined – Grade C or D	29	29	37
Justice 40 DAC	67	47	71
INVEST South/West Community Area	0	9	11

Geographic Gap

Most ILSFA projects are in ComEd service territory: In PY4, 88% of PY4 approved projects were in ComEd service territory. ComEd service territory includes approximately 70% of the Illinois population. This unbalanced distribution is explained by 97% of the projects within the Low-income Distributed Generation program being located within ComEd's service territory.

Stakeholder interviews (conducted in summer 2023) indicated several concerns over the geographic coverage of ILSFA's projects: First, there were concerns that the program excessively concentrated on ComEd's service territory, especially within the Chicagoland region. Second, stakeholders expressed difficulties in locating vendors within the Ameren service territory. Third, there were anecdotal remarks on challenges working with downstate utilities on ILSFA projects, such as approving some projects but not others.

EJC designations might accentuate the geographic gap in future program years, particularly if the Low-income Distributed Generation program reaches oversubscription. 92% of ILSFA ECJs are within ComEd's service territory. As Figure 7 showed, ILSFA EJCs tend to be concentrated in or near urban areas, with most being in Chicago and surrounding cities. Rural areas, many of which rely on Ameren for utility service, could be less likely to receive the advantages of ILSFA because they are less likely to be designated as EJCs.

Considerations

Defining DACs and implementing designations for programmatic decisions involves complex data and policy considerations that affect all DAC designations, including ILSFA EJCs. These are outlined below.

ILSFA Environmental Justice Community (EJC) Limitations

All DAC designations risk excluding some customers who could benefit from the associated services or programs. For example, to identify EJCs, communities are ranked by various indicators, and only the top 25% (the communities with the greatest environmental and demographic issues) are considered an EJC, which mirrors the carveout for EJC funding. The 26th percentile is, therefore, not considered an EJC, yet by this ranking system we know that the 26th percentile is not significantly better off (i.e., we know the 26th percentile could still need the assistance ILSFA provides). This will be true of any cutoff. Even with the self-designation option, which puts the onus on the community to prove their needs for ILSFA, there may be gaps that ILSFA or other government programs can look to fill.

Data Limitations

Much of the data used in defining DACs is generalized over larger geographic boundaries and applied to smaller units (census tracts and block groups), which can lead to error. Additionally, block groups are not the same as community boundaries. This means that parts of what residents perceive as a cohesive community can be considered an EJC (or other designation) and receive prioritization, while other parts of that same community are excluded. The Agency has acknowledged this limitation with EJC designations before.

Lastly, there are legal limitations that exclude certain indicators from appearing in the data, such as race, which is not an indicator in many DAC designations. While there are several proxies that are used to measure this, there is a history of redlining and structural racism that has affected communities of color in the past that may not be fully represented in DAC designations without those indicators. This is a broader issue with DAC designations.

Future Changes

The designation of ILSFA EJCs may change in the future as communities change environmentally or economically. The ILSFA EJC maps are currently updated on a five-year cycle. Given the extended time frame that many of the ILSFA projects have, changing requirements can affect vendors' confidence in approaching EJCs for projects. Vendors may not want to start a project if they cannot guarantee its approval and completion, so clear communication with vendors is key.

Process Evaluation

The PY4 process evaluation was a lighter touch review that laid the groundwork for the evaluation team to understand ILSFA processes for ILSFA's three-year evaluation cycle. Table 33 presents our primary process evaluation research objectives.

Table 33. Process Evaluation Objectives

CATEGORY	PRIMARY RESEARCH OBJECTIVE
Program Processes	Understand ILSFA processes, roles, and responsibilities of key program actors and their interactions.
Assess PY4 Program Performance	Document the PY4 program goals and whether ILSFA achieved its goals, and Highlight program implementation successes and challenges, identifying pain points or inefficiencies
PY Program changes	Document changes or updates to ILSFA in PY4

The PY4 process evaluation findings are based on conversations with IPA staff and key Elevate staff on the vendor management, grassroots education, and job training teams. We reviewed findings from stakeholder interviews and considered their input on program processes to inform our evaluation. The team conducted a full review of the program materials, documentation, and program tracking database.

The team created process flow diagrams to outline project processes for each subprogram as a foundation for both the evaluation team and external stakeholders. These follow from a recommendation in the PY3 evaluation, based on feedback from Approved Vendors, that there is a need to present program information in a more concise and simplified manner. We had additional follow-ups with the Elevate team to review the process flow diagrams and get clarification on steps that were unclear from the program manual or website. We organized the findings in this section under the PY4 evaluation research objectives.

Program Processes

ILSFA program implementation involves multiple organizations, each playing critical roles in program delivery and success.

Below, we outline the organizations and individuals that play major roles in the ILSFA program:

- Elevate is the ILSFA program administrator and is responsible for all aspects of the Low-Income Distributed Generation (encompasses Large and Small Residential Distributed Generation), Low-Income Community Solar, and Non-Profit/Public Facilities Distributed Generation sub-programs. Elevate responsibilities include program marketing, call center, website, and stakeholder outreach. Elevate manages all interactions and relationships with the entities below. The Elevate PY4 program administrator team included Shelton Group, responsible for income eligibility verification, and AECOM, which led the technical review of projects and virtual and onsite quality assurance and control. This team has changed since PY4.
- Approved Vendors (AVs) are the main conduit to bring ILSFA to customers. They complete customer acquisition, build the projects, and receive incentive payments for RECs.
- Illinois Power Agency (IPA) implements the ILSFA program and is responsible for program planning. IPA hires the program administrator to implement the program and oversees the implementation.
- Grassroots educator (GE) organizations are trusted members of their communities who educate Illinois residents and non-profit/Public Facilities staff on the basics of solar energy and the benefits available through ILSFA. Grassroots education campaigns are funded based on a competitive Request for Proposals (RFP) Elevate issues every year.
- Illinois Shines or the Adjustable Block Program (ABP) is the market-rate solar incentive program, also implemented by IPA. The ABP program administrator, Energy Solutions, creates all RECs contracts for the ILSFA program.

One of our key deliverables for this evaluation cycle was to develop program process flows that comprehensively outline project processes, roles and responsibilities, and interactions among key stakeholders throughout the lifecycle of an ILSFA project. These process flows provided our team with a clear framework for evaluation while enabling the ILSFA team to visualize the program processes in a structured format.

In this chapter, we've included a simplified process flow and general information on each step in the process. These steps vary slightly between Low-Income Distributed Generation, Non-profit/Public Facilities Distributed Generation, and Community Solar projects, but all projects follow a similar flow.

The simplified process flow below shows the important role of Approved Vendors in the program. Approved Vendors participate in almost every step of the program, interacting both with customers and with the program administrator. This is a large role, and sometimes multiple companies will work together to complete all the aspects of program participation. One way Approved Vendors work together is for a larger, more established company to support small or new solar companies in program participation. In ILSFA, the larger company is known as an aggregator. The companies that they support are called designees. Aggregators can provide important services to designees, such as supporting with installation, procurement, or meeting job training requirements. In this relationship, designees contract with aggregators to complete projects. Designees have their own ILSFA portal accounts and can manage project applications independently, but those account are formally associated with a registered aggregator. Aggregators manage the long term RECs contracts. In the process flows, these roles are all lumped together under the term "Approved Vendor," but it's possible different companies are completing different responsibilities of the Approved Vendor on a single project.

Figure 8. ILSFA Simplified Process Flow

Below, we provide links to the more detailed versions of the process flows.

- Residential Low Income Distributed Generation Customer Acquisition
- Residential Low Income Distributed Generation and Non-Profit/Public Facilities Project Application Process
- Community Solar Project Development and Application Process

PY4 Program Performance

The PY4 process evaluation did not include primary data collection with customers or Approved Vendors. Instead, the evaluation team relied on information sourced from IPA, Elevate, stakeholder interviews, and program reports to assess PY4 program performance. This section presents findings on program performance with respect to its goals, achievements, and challenges encountered during the implementation of PY4.

Program Goals

In the interview with IPA staff, they shared that the main way they quantitatively measured program success in PY4 was if the program allocated its annual sub-programs budget. During PY4, the Climate Equity and Jobs Act (CEJA) was passed. The program received additional funds from this act, almost doubling the total PY4 program budget. As a result, ILSFA could fund waitlisted Community Solar and Non-Profit/Public Facilities Distributed Generation projects.

In PY4, the Non-Profit/Public Facilities Distributed Generation and Community Solar subprograms awarded 90% and 81% of their incentives budget, respectively. The Low-Income Distributed Generation (Large and Small Residential Distributed Generation) subprogram allocated less than 10% of its budget. It is important to note that the Low-Income Distributed Generation sub-program received over $15,000,000 of rollover funds from the previous program years. The Low-Income Distributed Generation program has struggled to get the project volume and meet its program budget target throughout ILSFA's lifetime. The Illinois Solar for All Residential Solar Sub-Program - Mid-year report (published January 2024) focused on the barriers and opportunities to increase participation in the Small Residential portion of the Low-Income Distributed Generation sub-program.[21]

Table 34. PY4 Sub-program Budget and Allocated Incentives

SUB-PROGRAM	PY4 TOTAL BUDGET	PY4 CEJA BUDGET INFUSION	PY4 INCENTIVE VALUE OF APPROVED PROJECTS	% BUDGET ALLOCATED TO INCENTIVES
Distributed Generation	$36,674,305	$14,359,969	$3,276,419.85	9%
Non-Profit/Public Facilities	$15,076,529	$10,243,988	$13,604,870	90%
Community Solar	$26,309,991	$14,115,982	$21,338,128	81%

Source: Illinois Solar for All Annual Summary: June 2021 – May 2022

[21] https://www.illinoissfa.com/announcements/2024/01/illume-advising-releases-evaluation-report-for-illinois-solar-for-all/

Program Accomplishments and Successes

PY4 marked a pivotal year as Elevate shifted its focus to program improvement and refinement. For ILSFA's first three years, Elevate needed to quickly develop complicated infrastructure, tools, and materials to support the program while adapting to program changes. This rapid development phase necessitated a significant allocation of resources, leaving limited capacity for process improvements and optimization of existing systems and portals. Feedback from Approved Vendors and program evaluations highlighted several pain points and inefficiencies that needed to be addressed.[22] Elevate addressed some of these, including improving the vendor portal. Elevate also expanded its vendor management team, added a technical sub-contractor for program review, and rolled up a new option to get income verification directly through ILSFA and a referral process. Below we describe these improvements in more detail:

Elevate improved the ILSFA program (AV) portal. Elevate maintains a program platform or portal with information on Approved Vendors, projects, participants, and grassroots educator events. The platform is used by Elevate, IPA, Shelton Solution, and AECOM for projects, vendor management, call center data tracking, and program reporting. Most importantly, Approved Vendors use the external facing part of this platform, commonly called the AV portal, to submit program applications and required documentation. The PY3 program evaluation documented the Approved Vendors' difficulties in using ILSFA portal and uploading large-size documents. The Elevate team noted that they began improving the AV portal and addressing some pressing issues with file upload functionality. The improvement to ILSFA portal continued through the PY5 program year.

Elevate grew its vendor management team. Elevate's vendor management team works directly with the Approved Vendors to enroll them as ILSFA-Approved Vendors. The vendor management team supports vendors through the application and vetting process, reviews vendor applications, and recommends to IPA whether they should approve each vendor. Once vendors are approved, Elevate leads the vendor onboarding process, provides them with vendor credentials to access the portal, trains them on how to use ILSFA portal, and answers questions on their projects. The vendor management team is responsible for supporting Approved Vendors through part I and II applications, reviewing applications, ensuring projects meet program requirements, and recommending qualified projects to ICC for funding. Aware that the documentation needs of the program were a barrier, especially to small and emerging businesses participating as Approved Vendors, Elevate increased the Vendor Management team to increase its capacity to work with Approved Vendors and support MWBE (minority and women-owned business enterprise) firms.

Approved Vendors became more comfortable with program processes, and the number of projects increased. In PY4 the number of funded projects more than doubled and the number of Approved Vendors significantly increased. The Elevate Vendor Management team we interviewed noted a growing comfort level of returning Approved Vendors with ILSFA and a higher number of DG projects (see Table 35). The growth in DG projects was also due to converting some customers who had engaged with Approved Vendors in the previous program years to signed projects.

[22] This was noted as finding on the PY3 ILSFA program evaluation.

Table 35. Number of total and DG Project and Approved Vendors Growth

PROGRAM YEAR	ALL PROEJCTS (DGPROJECTS)	APPROVED VENDORS - (MWBE)
Program Year 1	11 (0)	8
Program Year 2	38 (10)	49 (6)
Program Year 3	84 (62)	58 (10)
Program Year 4	209 (162) [a]	86 (12)

[a] Note that project counts in the PY4 Annual Summary differ from evaluated project counts, due to two projects being ineligible or withdrawn between PY4 and the evaluation.
Source: Illinois Solar for All Annual Summary: June 2021 – May 2022

While the number of Approved Vendors has grown year-over-year, only a subset of vendors submit projects, and a smaller number have approved projects. This indicates an opportunity to increase engagement with existing approved vendors, a topic that will be explored further in future evaluation years. Table 36 shows the number of Approved Vendors with submitted and approved projects per year over the last four program years.

Table 36. Number of Approved Vendors Active in Each Progam Year

PROGRAM YEAR	UNIQUE NUMBER OF APPROVED VENDORS WITH APPROVED PROJECTS (TOTAL NUMBER OF UNIQUE APPROVED VENDORS WITH SUBMITTED PROJECTS)		
	DISTRIBUTED GENERATION	NON-PROFIT/PUBLIC FACILITIES	COMMUNITY SOLAR
Program Year 1	0 (1)	3 (7)	3 (14*)
Program Year 2	2 (2)	10 (14)	6 (14*)
Program Year 3	3 (12)	6 (16)	2 (14*)
Program Year 4	4 (6)	10 (12)	5 (9)

* Seventeen Community Solar projects and associated 11 vendors submitted projects that are tracked over two or three prgoram years. Consequently, this number includes carried-over projects and associated approved vendors from one program year to another.

A new customer income and program eligibility verification process lets customers complete the verification process directly with Elevate. One of the most notable changes—and program improvements—in PY4 was that Elevate added an option for residential customers to complete income verification directly with Elevate. This new eligibility verification option enabled customers to explore program participation without the prerequisite involvement of Approved Vendors. Moreover, this option allows customers who are uncomfortable with sharing their income information with Approved Vendors to share it directly with Elevate for verification instead. Elevate developed a referral process to connect interested and eligible customers to Approved Vendors active in their area.

Elevate rolled out a new approach to grassroots educator check-ins. In PY4, Elevate worked with grassroots educators to create a new pod approach where grassroot educators met monthly to provide updates, share experiences, and learn from one another. Each pod was run by grassroots educators with an IPA staff in attendance. Grassroot educators also track their progress in Salesforce and provide an end of year report on their meetings throughout the year.

Elevate and IPA continued progress in program partnership. In PY4, Elevate started partnering with various groups and organizations that deliver energy efficiency programs. IPA led a discussion with the Illinois Department of Commerce and Economic Opportunity (DCEO) Office of Community Assistance (OCA), the Illinois Association of Community Action Agencies (IACAA), which are responsible for the Low Income Home Energy Assistance Program (LIHEAP), and the Illinois Weatherization Assistance Program (IHWAP).

Additionally, IPA joined the National Community Solar Partnership (NCSP) Collaboratives and began to work with the Department of Energy (DOE) for the DOE Low-Income Clean Energy Connector platform pilot. This pilot aims to connect customers who participate in energy assistance programs and ILSFA, enhancing accessibility to clean energy solutions.

Elevate engaged with a new subcontractor to support application review. Elevate partnered with AECOM to support the technical review of applications. This collaboration significantly improved the application review process, allowing the Elevate team to spend time on desktop QA/QC and addressing ad hoc issues during application review.

IPA added staff. IPA hired more staff in PY4, including a legal counsel, to support the ILSFA program.

Program Challenges and Pain Points

Despite progress made in PY4, ILSFA continued to grapple with challenges related to Approved Vendors' familiarity with program requirements. Key areas of difficulty included comprehension of program documentation, usability, and functionality of ILSFA portal, and job training requirements.

Program portal and documentation. Despite efforts to streamline the application process, Approved Vendors reported ongoing difficulties. We interviewed five Approved Vendors as part of the PY4 stakeholder interviews and heard that the AV portal and Part I and II documentation posed common challenges, particularly in the context of uploading documents. This was particularly burdensome for small and emerging businesses, as understanding the documentation requirements for ILSFA required significant time and effort. Approved Vendors also cited challenges in keeping pace with the frequent changes and modifications to program requirements and revisions to forms, resulting in additional work and strain on their resources.

Job Training Requirements. In our interview with the Elevate staff, they discussed several challenges related to meeting job training requirements and highlighted areas of difficulty for Approved Vendors:

- Approved Vendors often struggled to navigate the differences between job training requirements for the Illinois Solar for All (ILSFA) program and other programs, such as Illinois Shines (or Illinois ABP). Each of these programs has its own set of workforce development criteria and this can lead to confusion among newly Approved Vendors.
- A significant challenge arises from the stipulation that job trainees are counted toward ILSFA's requirement only for three years after their training. This requirement forces some Approved Vendors to release previous trainees to hire new ones whose hours contribute toward fulfilling the training requirement.
- The availability of job training programs is notably concentrated in Cook County and the Chicagoland area. This geographical imbalance poses challenges for Approved Vendors operating outside of these regions in sourcing adequate training opportunities for their employees.

Program and Policy Changes in PY4

CEJA legislation enacted in PY4 included directives for the ILSFA program. Though most program design changes due to CEJA did not go into effect until PY5, CEJA had impacts on the PY4 program.

Increased funding due to the Climate and Equitable Jobs Act (CEJA). ILSFA received an infusion of funds after CEJA was passed by the Illinois General Assembly. CEJA increased the funds that ILSFA received from the renewable energy resources budgets of the utilities from approximately $11,000,000 in the 2021-2022 program year to up to $50,000,000 per delivery year.

After the addition of the CEJA funds into PY4 budget, ILSFA offered funding to all Non-Profit/Public Facilities waitlist projects at their full incentive values and ILSFA reopened for additional project submissions. The ILSFA program offered funding to all projects on the Low-Income Community Solar waitlist, though two projects required resizing. The Low-Income Distributed Generation Sub-program had additional funding for new projects.

CEJA Job Training transition and transition challenges. CEJA moved the training programs from ComEd to the Illinois Department of Commerce and Economic Opportunity (DCEO) in March 2022.[23] This transition introduced additional complexities for the ILSFA program in PY4. Elevate, and IPA adjusted ILSFA requirements to trainee recruitment to avoid disruptions during this transition. After this transition, Elevate had difficulties in establishing effective communication channels with the DCEO to obtain updated information on training programs, while IPA observed a reduction in the prioritization and influence of ILSFA compared to the previous arrangement under ComEd's leadership.

Next Steps

Based on the PY4 evaluation findings, we have identified a few areas for further investigation as part of the PY5 process evaluation.

- Application process and AV portal: Elevate started with process improvements and AV portal optimization in PY4 and continued in PY5. As part of the PY5 process evaluation, ILLUME will assess the Approved Vendors' experiences with program documentation, use of the ILSFA portal, review process, and timeline to identify remaining pain points.
- Job trainee requirements: As part of PY5 evaluation data collection, we will survey job trainers and Approved Vendors to assess the understanding and comfort of Approved Vendors with program job training requirements, preparedness and expertise of job trainees, the efficacy of job training programs, and any remaining challenges with identified pain points.

[23] Docket No. 17-0332

APPENDIX

Appendix A. Methodologies

Primary Data Collection

The following section describes additional details on the primary data collection activities conducted for the PY4 ILSFA program evaluation.

Program Material Review

The evaluation team reviewed many of ILSFA's program materials for the purpose of understanding the ILSFA program goals, design, and any recent changes made to the program that would impact our research activities. In total, our team reviewed 51 materials for the ILSFA program. These materials cover several aspects of ILSFA, such as:

- Program design (e.g., the Approved Vendor manual, the Long-Term Renewable Resources Procurement Plan (LTRRPP))
- Vendor resources (e.g., the overview of the Vendor Portal)
- Customer resources (e.g., "Community Solar Opportunities for Owners and Renters")
- Marketing materials (e.g., newsletters, announcements, brochures)
- Previous reports or evaluations (e.g., quarterly, and annual summaries)

The team made extensive notes from their materials review that answer the questions summarized below in Table 37.

Table 37. Program Materials Review Questions

CATEGORY	REVIEW QUESTIONS
Program Design	What are the goals or objectives of the ILSFA program?
	How is the ILSFA program designed to meet those objectives?
	Who are the key actors in program implementation and what are their roles?
	How is the ILSFA program funded?
	How does the ILSFA program define the communities that it is meant to assist with these programs?
	How does the ILSFA program verify income for participants?
	What does ILSFA program success look like?
Program Participation Processes & Barriers	What does project selection look like?
	What does participation look like from the perspective of an Approved Vendor? What barriers might prevent vendors from participating?
	What does participation look like from the perspective of a job trainer? What barriers might prevent job trainers from participating?

CATEGORY	REVIEW QUESTIONS
	What does participation look like from the perspective of a job trainee? What barriers might prevent job trainees from participating?
	What does participation look like from the perspective of a grassroots educator? What barriers might prevent grassroots educators from participating?
	What does participation look like from the perspective of an end-user? What barriers might prevent end-users from participating?
	What barriers have stakeholders raised?
Program History & Status	What is the history of the ILSFA program?
	What changes were made to ILSFA in PY21-22?
	What changes are in the pipeline for ILSFA, if any?
	Did the ILSFA program meet its goals?
	What has been successful in the ILSFA program? What has been challenging?
	Are there specific end-users, program actors, geographies, building types, etc. that seem to be underserved by the ILSFA program?
Program Marketing	Through what channels does program marketing and outreach occur?
	Who does the marketing and outreach target?

Program Tracking Data

The evaluation team requested and reviewed tracking data for PY1-PY4. The team reviewed the tracking data to assess whether the information necessary to complete the evaluation was available, as well as for completeness and accuracy. Tracking data was a fundamental input for both the impact and process analyses for this evaluation. ILSFA implementer, Elevate, maintains a Salesforce database that houses the ILSFA program tracking data for all Distributed Generation and Community Solar projects. The Elevate database provided the following key elements necessary for the energy, environmental and bill, jobs, economic, and social impacts analyses:

- **Project information** such as application program year, project stage (including the date of the last project stage update), project specifications (installation type, system size, azimuth, tilt, etc.), and project financials (project costs, incentive values, total projected Renewable Energy Credits (RECs), etc.). This data will be used to assess program metrics required by statute and key performance indicators (KPIs) and to develop estimates of PV system energy production.
- **Location details** including if the project is in an Environmental Justice Community or in a low-income census tract. This data allowed us to evaluate if programs are being developed in more distressed areas.
- **Utility territory of the project, buyer information, and contract information** (e.g., length and contract type). This information was used to segment and analyze the data by specific subcategories.
- **Subscriber Information was used** to analyze the percentage of Community Solar subscribers that are in environmental justice communities.

- **Trainee Data by subprogram**, including number of job trainees and their total amount of hours worked, which was used for the jobs and economic impacts analysis.

In-Depth Interviews

To better understand the PY4 program design, key updates and changes, challenges and successes, evaluation priorities, and job impacts, the evaluation team conducted in-depth interviews (IDIs) with program administrators and program stakeholders.

For each data collection effort, the evaluation team developed a semi-structured interview guide to ensure they captured the key themes and metrics of interest to IPA and ILSFA stakeholders, while allowing room for the interviews to explore unexpected yet pertinent details associated with ILSFA's implementation. Where possible, our team applied learnings from one interview to enhance our inquiry in the next. We provided each interview guide to the IPA project manager for review and comment prior to commencing any of the data collection. The evaluation team conducted and recorded all IDIs (assuming the interviewee provided their consent). The evaluation team incorporated interview findings into both evaluation planning and the PY4 evaluation report.

Program Administrator Interviews

ILLUME conducted six interviews with IPA and the Elevate program teams via Microsoft Teams, an online video conferencing software, between July and August of 2023. The primary purpose of these interviews was to understand program design, delivery, and implementation successes and challenges during the PY21-22 program year. We spoke with key program staff at IPA and Elevate, as well as Elevate staff leading the Approved Vendor Management, Grassroots Educator, and Job Trainee components of the ILSFA program. Interview topics included:

Program Administrator Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Roles and Responsibilities	What are the roles and responsibilities of IPA and Elevate staff? What is the participation process for each sub-program for end-users, Approved Vendors, and grassroots educators?
Program design and delivery	What are the key program components and steps? What role does each key actor play, and how do they work together? What changes have been made to the ILSFA program since PY4?
Program Funding and Budget	How is the ILSFA program funded? How is funding allocated? How do the REC's incentive and contracting work?
Program Goals	What are ILSFA goals or Key Performance Indicators (KPIs)? What were the goals of the ILSFA program in PY4? Were there any PY4 goals related to societal benefits or impacts? What goals are IPA or Elevate required to hit?

CATEGORY	PRIMARY RESEARCH QUESTIONS
Program Performance	Did the ILSFA program meet its goals in PY4? Which aspects of implementation went well, and where did the ILSFA program run into challenges? What are the participation barriers from the program administrator's perspective?
Marketing and Outreach	Are there specific KPI or guidelines for marketing and outreach? What channels does the ILSFA program use for outreach? What works well with program outreach, and where is the ILSFA program facing challenges?
Evaluation Needs	What are the evaluation priorities and needs for PY4? What are the evaluation and ILSFA program data needs across the three-year evaluation cycle?

Program administrator interviews complemented review of ILSFA program material and tracking data informing PY4 process evaluation report chapter. Interview findings supported the development of ILSFA process flows and provided context for interpreting the PY4 impact findings.

Stakeholder Interviews

ILLUME conducted ten, 45-minute-long interviews with ILSFA program stakeholders via Microsoft Teams, an online video conferencing software, between July and August of 2023. ILLUME targeted a broad range of ILSFA stakeholders, including vendors, community-based organizations (CBOs), and members of the ILSFA Advisory Committee. These interviews had two primary objectives: first, to understand the key challenges and opportunities associated with the communities each stakeholder serves, and second, to understand stakeholders' priorities as it relates to this evaluation. Interview topics included:

- General stakeholder information: organizational mission, scope, and service territory
- Stakeholders' perspectives on their communities: their communities' biggest priorities
- Perspectives on ILSFA: program knowledge, perception of strengths and challenges of ILSFA
- Communication preferences: respondents' desired method to receive updates about ILSFA and the evaluation
- Stakeholders' evaluation needs: evaluation expectations and interests

The results from these interviews provided a foundation for the ILLUME team to understand the nuances of the communities served by ILSFA and served as critical input in our PY4 evaluation planning process.

Stakeholder Webinar (Evaluation Plan Review)

The evaluation team presented the PY4 and preliminary PY5 research questions and activities to program stakeholders in a webinar on October 31, 2023. The purpose of the webinar was to give stakeholders insight into what to expect from the evaluation and to ensure stakeholders that they can provide input into key questions and priorities that should be addressed. The evaluation team collected stakeholder input both during the webinar and afterwards in a comment period. Feedback collected during the webinar is summarized in the Participatory Evaluation section of the report.

Energy Impact Analysis

The evaluation team estimated the energy savings and coincident demand savings of PY4 approved projects and energized projects. Approved PY4 projects are projects that applied for the ILSFA program in PY4 and received Part I approval by May 31, 2022 (including all subsequent project stages). Energized Projects are projects that applied for the ILSFA program in PY1 through PY4 and received Part II approval by May 31, 2022. The table below outlines the research questions addressed by the energy impact analysis.

Table 38. Energy Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Project Summary	What is the total number of approved and energized projects? What is the total capacity (kW_{AC}) of approved and energized projects? What is the average system cost per kW_{AC} of project capacity (approved and energized)?
Energy Savings	How much energy would be produced in a typical meteorological year from approved and energized projects?
Demand Savings	How much peak load would be reduced by the energy generated by approved and energized projects?

Project Summary

The evaluation team reviewed ILSFA program tracking data and summarized program participation. We quantified the total number of projects, the total capacity (kW_{AC}) of projects, and the average cost per kW_{AC} of project capacity (approved and energized).

Energy Savings

The evaluation team produced hourly simulations to generate independently verified estimates of energy savings. We collected PV system configuration information (e.g., size, tilt, and azimuth) from the ILSFA program tracking data. We developed simulated PV production using the National Renewable Energy Laboratory (NREL) PVWatts Calculator API (version 8).[24] PVWatts estimates electricity production of grid-connected PV systems based on a few inputs. The API requires the following inputs to simulate hour-by-hour output over a period of one year for any PV system: nameplate capacity (DC), tilt, azimuth, latitude and longitude, system losses, array type (fixed – open rack, fixed – roof mounted, 1-axis, 1-axis backtracking, or 2-axis), desired climate dataset, and module type (standard, premium, or thin film). PVWatts also allows for several optional inputs, including the DC to AC ratio, the ground cover ratio, and the inverter efficiency at rated power.

We took most of these inputs directly from ILSFA program tracking data. PVWatts uses the system's location to choose the appropriate weather data from the selected climate dataset; for this study, we used the typical meteorological year (TMY) weather from the NREL National Solar Radiation Database (NSRDB).[25] We modeled all PV systems as standard modules.

[24] https://developer.nrel.gov/docs/solar/pvwatts/v8/

[25] https://nsrdb.nrel.gov/

Some projects in the tracking database contained modules with different specifications (e.g., tilt or azimuth). For this reason, we simulated each module individually with PVWatts, and calculated the hourly generation for a given project as the sum of each module's output within the hour. We calculated the annual electrical generation for each project from the results of the PVWatts simulations.

The evaluation team's study of customer energy consumption in another state has found that many customers increase their energy consumption following the installation of solar.[26] The analysis presented here assumes no change in consumption has taken place. However, if customers increase their energy consumption once the PV systems are installed, there would be a reduction in energy, environmental, and bill savings impacts relative to the assumption of no change in customer energy consumption. A review of the tracking data also showed that no projects were paired with storage, therefore we based energy savings solely on hourly solar PV simulations.

The Energy Savings section also includes estimates of capacity factor. Capacity factor is a metric of system utilization and is defined as the amount of energy generated during a given period divided by the maximum possible amount of energy that could have been generated during that period. Annual capacity factors are useful when comparing utilization across technology types or project sizes. The annual capacity factor was calculated as the annual PV generation during all 8,760 hours of a typical year divided by the product of the project's capacity and 8,760.

Demand Savings

Estimated coincident peak demand impacts are the generation from ILSFA systems during hours of grid-system peak demands. The largest annual grid-system peak hour provides a brief snapshot of program coincident demand impacts. However, analyzing peak demand over the top 100 peak hours can provide a greater insight into how ILSFA impacts the grid during hours of highest load.

By coincidentally generating during system peak hours, the ILSFA program's projects allow the electric utility to avoid the purchase of high-cost wholesale energy. At the same time, the electric utility reduces its transmission and distribution losses during hours of high system congestion. It should be noted however, that these hours are not necessarily when program systems have their highest output (i.e., during the middle of the day when irradiance peaks).

We used the estimated hourly PV production results to calculate demand impacts during hours of MISO and PJM peak demands. We analyzed peak demand over the top one and 100 hours to provide insight into how ILSFA projects impact the grid during the hours of highest load. We obtained the top hours in 2022 from publicly available hourly historical load data from the PJM and the MISO websites.[27,28] We used PJM load data specific to the ComEd load zone. For MISO, we used the load data specific to Illinois (Load Resource Zone 4).

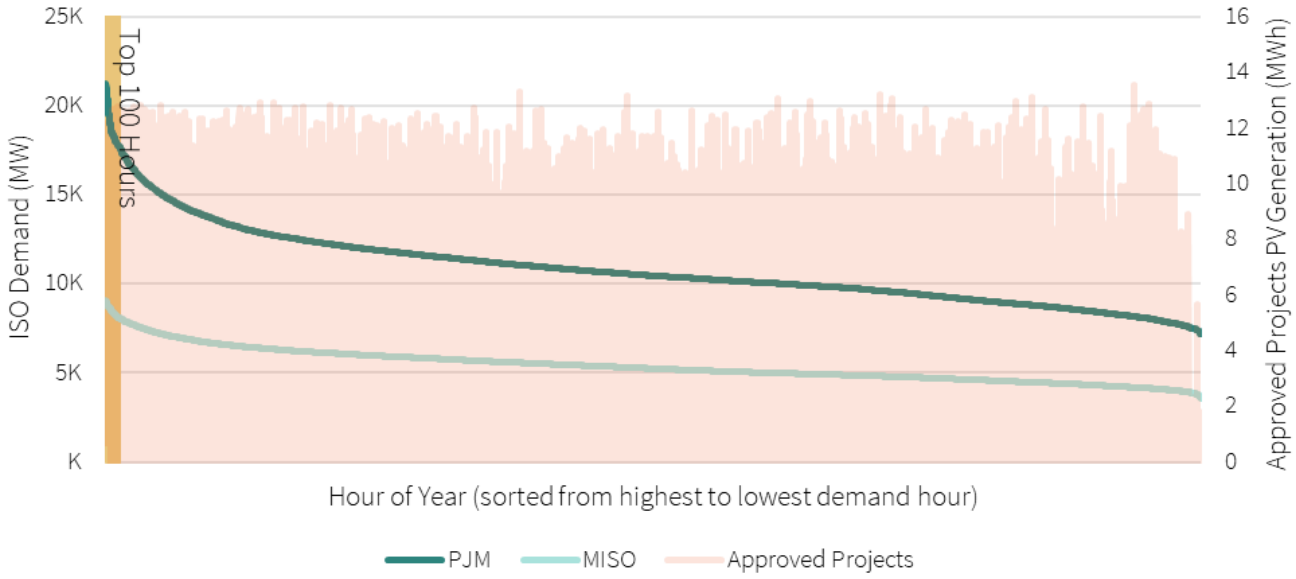
[26] https://verdantassoc.com/wp-content/uploads/IEPEC-2022_Residential-Solar-Consumption.pdf

[27] https://dataminer2.pjm.com/feed/hrl_load_metered

[28] https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports

Analyzing the top 100 peak hours results in a more robust measure of impacts during PJM-ComEd and MISO-Illinois peak grid loads. Representing just 1.1% of all the hours in a year, the top 100 peak hours capture the steepest part of load distribution curves. Figure 9 shows the 2022 PJM-ComEd and MISO-Illinois load duration curves and indicates the 100-hour mark as the solid yellow bar on the left side. The light orange curves on the chart indicate the coincident estimated PV generation from PY4 approved projects.

Figure 9. 2022 PJM-ComEd and MISO-Illinois Load Duration Curves alongside PY4 Approved Project PV Generation



The distribution of the top 100 hours over the course of a year differs between PJM-ComEd and MISO-Illinois. While generally summer afternoon occurrences, a top 100 hour can occur as early as May and as late as September, and occasionally on the weekend. Table 39 and Table 40 display the distribution of the top 100 peak hours for months and weekday types in 2022. During 2022, the top 100 peak hours occurred mostly in June, followed by July then August. For PJM-ComEd and MISO-Illinois, weekdays dominated top hours, but some top hours also occurred during the weekend.

Table 39. 2022 Top 100 Peak Hour Distribution by Month

ISO	May	June	July	August	September
			2022		
PJM	7	56	25	12	0
MISO	0	43	37	14	6

Table 40. 2022 Top 100 Peak Hours Distribution by Weekday

ISO	2022	
	Weekday	Weekend
PJM	96	4
MISO	91	9

Bill Impact Analysis

The bill impact analysis provided an estimate of customer savings as the difference between bill savings and the participant's costs to acquire solar PV (e.g., system costs, debt service payment, lease/PPA payments). We completed this analysis for all energized projects. The research questions addressed by the bill impact analysis are listed in Table 41 below.

Table 41. Bill Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Bill Impacts	How much bill savings can participants expect due to the energy produced by ILSFA projects? How do bill reductions compare to the participant's cost to acquire solar?

First- Year Bill Savings

The evaluation team calculated bill savings by estimating the difference between customer bills with and without PV benefits. As discussed in the previous section, this analysis assumes no increase in electrical consumption after PV installation. Three key inputs were necessary to calculate customer bills: 1) hourly PV system generation, 2) hourly customer load shapes, and 3) utility rate selection. We calculated bills using the hourly estimated PV production from the energy savings analysis (described above).

Since information about customer's load was not available, the evaluation team leveraged the statewide load profiles available from NREL's database of end-use load profiles.[29] These datasets provide an estimate of the total statewide energy usage from specific building types at 15-minute intervals for an entire year. The datasets also include information on the number of units modeled in the state. Therefore, an average load profile can be calculated by dividing the total energy usage by the number of units modeled. Note that this method provides a smoothed load profile and does not account for individual peaks and valleys that are typically present in an individual's load profile. We used the single-family detached, multi-family (5 units plus) load profiles for the 1-4 unit and 5+ unit Distributed Generation project types, respectively. We used the nonresidential small office load profile for the Non-Profit/Public Facilities projects. We also leveraged the single-family detached load profiles for the Community Solar projects. We then adjusted the load profiles so that they were sized appropriately for each customer in the ILSFA program. The evaluation team assumed that the PV systems were sized to cover 100% of the customer's load and adjusted the load profiles accordingly for each customer.[30]

[29] https://www.nrel.gov/buildings/end-use-load-profiles.html

[30] The evaluation team will explore in future reports whether information about PV size relative to load is available for energized projects. If available, the 100% assumption will be adjusted to more accurately reflect actual PV sizing.

In the case of Community Solar projects, the evaluation team adjusted the PV estimates to match the annual load for a single-family detached home to calculate the bill savings for an individual customer subscribed to Community Solar.

Historical rate selection information was not available, therefore the evaluation team made assumptions with respect to customer rates. Table 42 below presents the rate assumptions used to model customer bill savings. Note that we modeled the single MidAmerican project using Ameren Illinois bill assumptions for Non-Profit/Public Facilities projects. The evaluation team assumed that customers were not using hourly-based versions of these rates.

Table 42. Customer Rate Selection Assumptions

UTILITY SERVICE AREA	PROJECT TYPE	NUMBER OF PROJECTS	ASSUMED CUSTOMER RATE SELECTION
ComEd	1-4 Unit Distributed Generation	63	BES
	5+ Unit Distributed Generation	1	BES
	Non-Profit/Public Facilities	18	BES
Ameren Illinois	Non-Profit/Public Facilities	22	DS3 – General Delivery Service
	Community Solar	2	DS1 – Residential Delivery Service
MidAmerican	Non-Profit/Public Facilities	1	[Ameren Illinois DS3]*

*Due to the limited number of energized MidAmerican projects (1 project), the evaluation team estimated bill savings for this project.

The evaluation team calculated monthly bills under two scenarios, pre-solar installation and post-solar installation. The following equations show how the monthly bills were calculated based on energy (kWh) delivered and the energy (kWh) received (i.e., solar generation). The fixed rates, delivery charges, fees, and taxes were sourced from the ComEd [31] and Ameren Illinois [32] online rate definitions. The supply costs (including the purchased electricity adjustment, electricity supply charge, and transmission services charge) vary throughout the year and the historical values from June 2021 through May 2022 were used, per data available from Plug In Illinois.[33]

$$Pre - Solar\ Monthly\ Bill = fixed\ rate + delivered\ kwh * (supply\ costs + delivery\ charge + fees + taxes)$$

$$Post - Solar\ Monthly\ Bill = fixed\ rate + delivered\ kwh * (supply\ costs + delivery\ charge + fees + taxes) - received\ kwh * (supply\ costs + delivery\ charge + fees)$$

[31] ComEd Rate Definitions: https://www.comed.com/my-account/my-dashboard/rates-tariffs/current-rates-tariffs

[32] Ameren Illinois Rate Definitions: https://www.ameren.com/illinois/residential/rates/electric-rates

[33] https://plugin.illinois.gov/understanding-the-price-to-compare/price-to-compare-comed.html

Lifetime Bill Savings Compared to Cost

The evaluation team estimated the lifetime bill savings over 20 years. We made several assumptions regarding how bill calculation inputs would change over time. We assumed that the PV production estimates will decline by 1.36% each year.[34] We did not assume that the customer's load would change over the lifetime of the system. Finally, we assumed retail rates will increase by 4% annually based on our review of ComEd and Ameren rates from 2017 through 2023. ComEd rates increased by an average of 3% per year and Ameren rates increased by an average of 8%. Based on each utility territory's proportional representation in energized projects, we used the weighted average annual rate increase of 4%.[35]

We also estimated the lifetime costs associated with the project. Cost assumptions were taken from ILSFA tracking data, where information was available about purchase terms, including: The ownership type (Purchase, Lease, or PPA), the number of years of the contract terms, and the payment (per month, or per kWh for PPA terms). Sixty-three systems (59%) had no payments (i.e., payments of $0).[36] We present results as the net present value (NPV) of bill savings and customers' costs. We calculated the NPV using a 3% discount rate.[37]

Environmental Impact Analysis

The environmental impact analysis evaluated the avoided emissions of approved PY4 projects and energized projects. Approved PY4 projects are projects that applied for the ILSFA program in PY4 and received Part I approval by May 31, 2022 (including all subsequent project stages). Energized Projects are projects that applied for the ILSFA program in PY1 through PY4 and received Part II approval by May 31, 2022. Table 43 below lists the research question addressed by the environmental impact analysis.

Table 43. Environmental Impact Analysis Research Questions

CATEGORY	PRIMARY RESEARCH QUESTIONS
Environmental Impacts	What are the first-year and lifetime emissions reductions associated with approved and energized ILSFA projects?

Environmental impacts from solar PV generation are a result of reduced utility power plant operation. The evaluation team used two methods to estimate avoided emissions using eGrid data and NREL data. The eGrid methods and results are described in Appendix B.

[34] The 1.36% annual degradation rate is based on findings from Itron and Verdant's 2020 California Solar Initiative Final Impact Evaluation Report (https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/csi-progress-reports/csi-2/csi_evaluation-report.pdf). IPA uses an annual degradation rate of 0.5% for the purposes of program planning. IPA and the evaluation team are conducting further research into the degradation rate which should be used by the program moving forward, and will incorporate any results into the annual evaluations for PY5 and PY6.

[35] These data were obtained from: https://plugin.illinois.gov/understanding-the-price-to-compare/price-to-compare-comed.html

[36] The customer's payment terms were not available for one Non-profit/Public Facility project.

[37] The 3% discount rate was used for consistency with past evaluations.

We estimated avoided emissions using NREL's 2022 Standard Scenarios Report Data. The Standard Scenarios are comprised of 70 forward-looking scenarios of the U.S. electricity sector designed to capture a wide range of possible futures. Our analysis uses the Mid-case scenario; This scenario utilizes central or median values for technology costs and fuel prices, moderately paced demand growth averaging 1.3% per year, and electricity sector policies as they existed in September 2022 (including the Inflation Reduction Act). The standard scenarios show electricity sector emissions decreasing significantly through the 2030s. Compared to 2021 emissions, annual U.S. national electricity-sector CO_2 emissions in 2035 are reduced by 77% in the Mid-case scenario.[38] Hourly marginal emissions forecasts for Illinois are available for CO_2 emissions, while NO_x and SO_2 are provided at the annual level for the state.

The evaluation team used the Standard Scenarios data to estimate first-year and lifetime avoided CO_2-equivalent emissions, NO_x and SO_2 emission impacts. We calculated lifetime avoided emissions were calculated for 20 years with an assumed annual PV degradation of 1.36%.

Jobs and Economic Impact Analysis

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.

The development of inputs for the economic analysis relied on data inputs from other aspects of the evaluation project team's work, including ILSFA tracking data, total project costs, on-bill impacts, and subscriber data.

Table 44 tabulates the methods for the calculation of each of the identified economic impacts, broken out by impact category, key inputs, an overview of the technical method, and key outputs.

[38] 2022 Standard Scenarios Report: A U.S. Electricity Sector Outlook (https://www.nrel.gov/docs/fy23osti/84327.pdf)

Table 44. Methodology and Key Outputs

IMPACT CATEGORY	KEY INPUTS	ANALYTIC METHOD	KEY OUTPUTS
Near-term impacts from new solar installations	• Project tracking data, including project expenditures and location by project type.	• Project expenditures (as well as any program-related local employment, expenditure assumptions) serve as key input to IMPLAN input/output model. • IMPLAN calculates employment impacts for new activity in the New Construction of Power and Communication Structures industry.	• Direct, Indirect, and Induced employment impacts across sectors. • Incremental earned income and GDP impacts. • Impacts to taxes resulting from new near-term economic output
Ongoing impacts from energy bill savings	• Average bill savings by project type and geography, estimated by Verdant. • Assumptions for household savings rates from the literature.	• On-bill savings serve as key input to IMPLAN input/output model. • IMPLAN calculates new household spending following gains in household disposable income.	• Distribution of new household spending by economic sector

Social Impact Analysis

In PY4, the ILLUME team conducted a baseline geospatial analysis to understand PY4 project locations and they compare with geographically based *disadvantaged communities' designations*. Note that for the purposes of this evaluation plan, we use the term *disadvantaged communities' designations* to broadly refer to indicators or criteria used to identify a geographic area that has been (and may continue to be) marginalized. Our analysis included the following steps:

Landscape analysis of Disadvantaged Communities designations and indicators

First, our team synthesized geographically based *disadvantaged communities' designations* in use across the state and at the federal level. Comparing IPA's Environmental Justice Communities (EJC) designation to other designations that are in use across the state and at the federal level provides a more holistic understanding of the ways in which IPA has identified *disadvantaged communities* to date, and where there may be gaps in that approach. Table 45 summarizes the designations we reviewed.

Table 45. Disadvantaged Communities Designations

DISADVANTAGED COMMUNITIES' DESIGNATIONS	SOURCE
Environmental Justice Communities (EJCs)	Illinois Power Agency
Equity Investment Eligible Communities (EIEC)	Climate and Equitable Jobs Act (CEJA)
Restore Renew Reinvest (R3) Areas	2019 Cannabis Regulation and Tax Act (CRTA)
Disproportionately Impacted Areas	Illinois Department of Commerce and Economic Opportunity (DCEO)
Historically Redlined Grade C and Grade D	National Community Reinvestment Coalition
Justice40 Disadvantaged Communities (DACs)	Justice40 Initiative

For each designation the indicators used in the criteria define geographic areas where communities may face disproportionate impacts from climate change and/or inequitable energy services. Some designations have overlap – for example, the EIEC definition consists of R3 Areas and EJCs. However, cataloging and comparing indicators provides a foundation to understand EJCs. For each designation, we also reviewed data sources and level of granularity. Table 46 highlights a selection of indicator categories and sample indicators to illustrate the types of indicators we will review:

Table 46. Example Indicators Included in Disadvantaged Communities Criteria

CATEGORY	SAMPLE INDICATORS
Social vulnerability	BIPOC, Income, SNAP Linguistic Isolation
Environmental	Air toxics cancer risk, drinking water contaminants, indoor air quality, pesticide use
Workforce and industry	Agricultural land use, employment change, high school degree, length, unemployment
Housing conditions	Energy burden, housing cost burden, lead paint
Health vulnerability	Access to healthy food, asthma, diabetes, heart disease, low birth rate
Climate risk and hazard	90-degree days, drought, expected agriculture loss rate, extreme storms, inland flooding
Environmental services and benefits	Open space, tree cover

Map priority disadvantaged communities' definitions in use.

ILLUME shared preliminary results with the IPA team and defined which designations are of key interest. From here, we conducted a geospatial analysis to map the designations across Illinois. The purpose of this mapping exercise was to overlay the different designations across the state to understand where there is overlap across designations – and where there is not. Our team produced an interactive map with different designations, and users can 'toggle' between different designations to see where it identified *disadvantaged communities* across the state.[39] This illustrated where the IPA EJC definition demarcates areas that may experience disadvantage, and how this compares to another designations.

Map Illinois Solar for All participation on the DACs map.

We mapped Illinois Solar for All participation over our DAC map. This enabled the evaluation team to characterize where Solar for All project penetration exists and how program benefits have been received geographically. This then helped our team assess where communities of interest exist (i.e., disadvantaged communities who may be under-represented in current ILSFA programming) for the PY5 social impacts evaluation. We provide an additional heatmap[40] that allows to evaluate the concentration of DAC Designations across the state by block group and compare it with the project locations.

Process Evaluation

The primary focus of the first process evaluation of this three-year evaluation cycle was to map key actors who implement and participate in the ILSFA program, clarify their respective roles and responsibilities, and identify touchpoints between these key players in the ILSFA program ecosystem. The process evaluation cataloged updates to ILSFA between PY4 and PY5, including those due to CEJA, and assesses their effects on program processes and administration. We documented program successes and challenges during PY4 and used this information to contextualize findings from the PY4 impact analyses.

Our team interviewed IPA staff and key Elevate staff on vendor management, grassroots education, and job training teams. We also reviewed findings from stakeholder interviews and considered their input on program processes to inform the PY4 process evaluation. The team conducted a full review of ILSFA materials, documentation, and program tracking database. Table 47 is a list of primary research questions our team used to guide the PY4 process evaluation.

[39] https://illumeadvising.com/2024/ilsfa-py4-projects-and-dacs-map/
[40] https://illumeadvising.com/2024/ilsfa-py4-projects-and-dacs-heatmap/

Table 47. Process Evaluation Research Questions

RESEARCH THEMES	PRIMARY RESEARCH QUESTIONS
Program design and delivery	What are the roles and responsibilities of program administrator, IPA, and other key players? What is the participation for each of the sub-programs for end-users, Approved Vendors, and grassroots educators? What changes have been made to the ILSFA program since PY4? Are there any parts of ILSFA processes that may be inefficient or confusing for customers?
Program actors	What role does each key actor play (including Approved Vendors, grassroots educators, job training organizations, and related efforts) and how do they work together? Are there any opportunities to improve or streamline coordination?
Program goals	What were the goals of the ILSFA program in PY4? What are program goals or Key Performance Indicators (KPIs)? What strategies or interventions did ILSFA use to achieve these goals and KPIs?
Program performance	Did the ILSFA program meet its goals in PY4? Which aspects of implementation went well, and where did the ILSFA program run into challenges? What barriers might prevent participation? How can PY4 process results be used to contextualize PY4 impact findings?
Marketing and outreach	Are there specific KPI or guidelines for marketing and outreach? What channels does the ILSFA program use for outreach? What is working well with program outreach and where is the ILSFA program facing challenges?
Data tracking	What does the ILSFA program track, and who is responsible for tracking and reporting? How does program data get QC'ed?

Appendix B. Environmental Impacts per eGrid Data

The evaluation team calculated environmental impacts using the Environmental Protection Agency (EPA) Emissions & Generation Resource Integrated Database (eGrid) for consistency with past evaluations.[41] We estimated avoided emissions by combining the annual PV generation estimates with eGRID subregion annual CO_2-equivalent (CO_2e), SO_2, and NO_x, non-baseload output emission rates (lb/MWh) to estimate first-year lifetime avoided emissions.[42] The eGRID datasets are developed retrospectively providing a historical view of emissions. At the time of analysis, the latest available dataset was for the calendar year 2021.

Using the eGrid approach we estimated that the first-year avoided emissions of PY4 approved projects have the potential to reduce emissions by 49.1 million pounds, NO_x emissions by 28.6 thousand pounds, and SO2 emissions by 30.6 thousand pounds. Table 48 shows the distribution of estimated eGrid-based emissions impacts by project type. Community Solar projects contributed the largest proportion of estimated avoided emissions for PY4 approved projects.

Table 48. PY4 Approved Projects Estimated First-Year Avoided Emissions per eGrid Data

PROJECT TYPE		FIRST-YEAR ESTIMATED AVOIDED LBS OF CO_2E	FIRST-YEAR ESTIMATED AVOIDED LBS OF NO_X	FIRST-YEAR ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	2,637,803	1,537	1,643
	5+ Units	976,791	569	609
	Non-Profit/Public Facilities	16,802,001	9,791	10,468
	Total	**20,416,595**	**11,897**	**12,720**
Community Solar	**Total**	**28,705,888**	**16,727**	**17,885**
All PY4 Approved Projects		**49,122,483**	**28,624**	**30,605**

Using the eGrid approach we estimated that the first-year avoided emissions of Energized projects have the potential to reduce emissions by 22.5 million pounds, NO_x emissions by 13.1 thousand pounds, and SO_2 emissions by 14 thousand pounds. Table 49 shows the distribution of estimated eGrid-based emissions impacts by project type for Energized Projects. Non-Profit/Public Facilities Distributed Generation projects contributed the largest proportion of estimated avoided emissions for Energized Projects.

[41] https://www.epa.gov/egrid

[42] eGRID subregion RFCW was used for analysis.

Table 49. Energized Projects Estimated First-Year Avoided Emissions per eGrid Data

PROJECT TYPE		FIRST-YEAR ESTIMATED AVOIDED LBS OF CO_2E	FIRST-YEAR ESTIMATED AVOIDED LBS OF NO_X	FIRST-YEAR ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	922,773	538	575
	5+ Units	7,631,108	4,447	4,754
	Non-Profit/Public Facilities	13,735,012	8,004	8,557
	Total	**22,288,893**	**12,988**	**13,887**
Community Solar	**Total**	**191,055**	**111**	**119**
All Energized Projects		**22,479,949**	**13,099**	**14,006**

We calculated the lifetime avoided emissions for 20 years with an assumed annual PV degradation of 1.36%. We estimated that the lifetime emissions of PY4 approved projects have the potential to reduce emissions by 865.3 million pounds, NO_x emissions by 504.2 thousand pounds, and SO_2 emissions by 539.1 thousand pounds. Table 50 shows the distribution of estimated eGrid-based emissions impacts by project type for PY4 approved projects.

Table 50. PY4 Approved Projects Estimated Lifetime Avoided Emissions per eGrid Data

PROJECT TYPE		LIFETIME ESTIMATED AVOIDED LBS OF CO_2E	LIFETIME ESTIMATED AVOIDED LBS OF NO_X	LIFETIME ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	46,465,373	27,076	28,949
	5+ Units	17,206,351	10,026	10,720
	Non-Profit/Public Facilities	295,970,264	172,466	184,399
	Total	**359,641,987**	**209,568**	**224,069**
Community Solar	**Total**	**505,659,378**	**294,654**	**315,042**
All Approved Projects		**865,301,366**	**504,222**	**539,111**

Using the eGrid method, we estimate the lifetime emissions of Energized Projects will have the potential to reduce emissions by 396 million pounds, NO_x emissions by 230.7 thousand pounds, and SO_2 emissions by 246.7 thousand pounds. Table 51 shows the distribution of estimated eGrid-based emissions impacts by project type for Energized Projects.

Table 51. Energized Projects Estimated Lifetime Avoided Emissions per eGrid Data

PROJECT TYPE		LIFETIME ESTIMATED AVOIDED LBS OF CO_2E	LIFETIME ESTIMATED AVOIDED LBS OF NO_X	LIFETIME ESTIMATED AVOIDED LBS OF SO_2
Distributed Generation	**1-4 Units**	16,254,810	9,472	10,127
	5+ Units	134,423,347	78,330	83,750
	Non-Profit/Public Facilities	241,944,710	140,984	150,739
	Total	**392,622,867**	**228,786**	**244,617**
Community Solar	**Total**	**3,365,469**	**1,961**	**2,097**
All Energized Projects		**395,988,337**	**230,747**	**246,714**

Appendix C. Social Impacts: Detailed Findings

ILSFA Program Eligibility

All Illinois residents who are income-eligible (IE) may participate in ILSFA. Income-eligible households (previously referred to as 'low-income households') are those "whose gross income does not exceed 80% area medium income (AMI)."[43,44]

While ILSFA eligibility is not based on location inside or outside of an environmental justice community (EJC), there are stipulations for program funds and project selection criteria that are connected to EJCs. We describe these below.

ILSFA Environmental Justice Communities (EJCs)

Purpose of Identifying EJCs

The Illinois Power Agency believes that "all people should be protected from pollution and that all populations have a right to a clean and healthy environment."[45] Therefore, ILSFA as a program is tasked with overcoming the historic barriers that prevent solar adoption in income-eligible (IE) and environmental justice communities (EJCs). (We discuss this definition in greater detail in "Definition and Criteria of EJCs" below.) These historic barriers include limited access to capital and workforce development to complete solar projects in these communities.

One of ILSFA's goals is to allocate at least 25% of program funds for projects in or serving EJCs.[46] ILSFA also works with community-based organizations and grassroots educators to make sure that people living and working in EJCs are aware of opportunities for ILSFA program participation.

Definition and Criteria of EJCs

IPA uses the USEPA's *EJSCREEN* tool as a framework for designating EJCs.[47] Several environmental and demographic indicators are measured at the census block group level. These are described in Table 52 below.

[43] Illinois Solar For All. "Income Verification." Accessed at https://www.illinoissfa.com/income-verification-for-residential-solar-small/

[44] The guidelines for what comprises area median income are from the US Department of Housing and Urban Development (HUD). The Climate and Equitable Jobs Act (CEJA) does not define 'area' in area median income, or AMI. Therefore, the Illinois Power Agency uses HUD's definition, which is a Metropolitan Statistical Area (MSA), a Fair Market Rate (FMR) Area, or a county not in an MSA or FMR.

[45] Illinois Solar For All. "Environmental Justice Communities." Accessed at https://www.illinoissfa.com/environmental-justice-communities/

[46] Ibid.

[47] Illinois Power Agency. 2023. "Long-Term Renewable Resources Procurement Plan (Modified)." Accessed at https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/modified-2022-long-term-plan-upon-reopening-9-may-2022-final.pdf

Table 52. Indicators Used to Determine ILSFA EJCs

ENVIRONMENTAL INDICATORS	DEMOGRAPHIC INDICATORS
National-Scale Air Toxics Assessment (NATA) air toxics cancer risk	Percent Low-Income
NATA respiratory hazard index	Percent Minority
NATA diesel PM	Less than high school education
Particulate matter	Linguistic isolation
Ozone	Individuals under the age of 5
Traffic proximity and volume	Individuals over the age of 64
Lead paint indicator	
Proximity to Risk Management Plan sites	
Proximity to Hazardous Waste Treatment, Storage and Disposal Facilities	
Proximity to National Priorities List sites	
Wastewater Dischargers Indicator	

IPA then uses the *CalEnviroScreen* model to weigh and rank census blocks within each indicator.[48] Environmental and demographic scores are averaged, determining an Environmental Justice score for each census block group. The communities that score the highest 25% in the state "are defined as Environmental Justice Communities for the purpose of the Illinois Solar for All Program."[49]

The Illinois Power Agency also considered indicators used by the Illinois Department of Public Health and the Illinois Environmental Protection Agency to describe "Sensitive Populations."[50] These indicators are not used in the USEPA's *EJSCREEN*. These indicators are:

- Asthma Emergency Department Visits
- Low Birth Weight Infants
- Drinking Water Watch
- Site remediation program
- Leaking Underground Storage Tank Incident Tracking
- State Response Action Program
- Solid Waste Facilities

[48] Illinois Power Agency. 2023. "Long-Term Renewable Resources Procurement Plan (Modified)." Accessed at https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/modified-2022-long-term-plan-upon-reopening-9-may-2022-final.pdf

[49] Ibid.

[50] Ibid.

However, these indicators are measured on a larger scale (ZIP code- or county-level) and would need to be converted to census block group. As a result, "the Agency determined in the final methodology that these indicators would be too difficult to incorporate to provide meaningful impact on the evaluation criteria."[51] Therefore, ILSFA EJC criteria solely includes the environmental and demographic indicators used in the USEPA's *EJSCREEN.*

EJC Self-Designation

While the ILSFA Environmental Justice Community (EJC) designation contains a variety of indicators, its classification may not include all communities in need. For this reason, communities may apply to be designated as EJCs. According to the Long-Term Renewable Resource Procurement Plan (LTRRPP): "A community that is not in the top 25% of scores and thus is not initially defined as being an Environmental Justice Community may request that the Agency consider designating that community as such."[52]

Elevate convenes an Environmental Justice Community Self-Designation Committee to review proposals for self-designation. The Committee uses a rubric to assess proposals submitted by community designators. These proposals collect data that is used in calculating the EJ Score. Communities must receive a minimum score of 45 (out of 60 possible points) to be designated as an EJC.

[51] Illinois Power Agency. 2023. "Long-Term Renewable Resources Procurement Plan (Modified)." Accessed at https://ipa.illinois.gov/content/dam/soi/en/web/ipa/documents/modified-2022-long-term-plan-upon-reopening-9-may-2022-final.pdf

[52] Ibid.

Appendix D. Designations of Disadvantaged Communities (DACs)

The following table describes the different DAC designations used in our PY4 DAC indicator analysis. The table includes the name of the indicator, the type of indicator (based on the assessment team's evaluation), the geographic region in which the DAC designation is employed, and the source of the DAC designation.

There are some criteria (e.g., thresholds that apply when other standards, like low-income, are met) that are linked to specific indicators. These are found in the "Notes" column below.

Table 53. Indicators from Various Designations of Disadvantaged Communities (DACs)

DAC DESIGNATION	INDICATOR TYPE	INDICATOR	NOTES	REGION	SOURCE
Solar For All Environmental Justice Community (EJC)	Environmental	National-Scale Air Toxics Assessment (NATA) air toxics cancer		Illinois	Illinois Power Agency Act (IPAA)
		NATA respiratory hazard index			
		NATA diesel PM			
		Particulate matter			
		Ozone			
		Lead paint indicator			
		Proximity to Risk Management Plan sites			
		Proximity to Hazardous Waste Treatment, Storage and Disposal Facilities			
		Proximity to National Priorities List sites			
		Wastewater Dischargers Indicator			
	Transportation	Traffic proximity and volume			
	Economic	Percent Low-Income			
	Sociodemographic	Percent Minority			
		Less than high school education			
		Linguistic isolation			
		Individuals under the age of 5			
		Individuals over the age of 64			

DAC DESIGNATION	INDICATOR TYPE	INDICATOR	NOTES	REGION	SOURCE
DCEO Environmental Justice Community (EJC)	Environmental	National-Scale Air Toxics Assessment (NATA) air toxics cancer		Illinois	Climate and Equitable Jobs Act (CEJA)
		NATA respiratory hazard index			
		NATA diesel PM			
		Particulate matter			
		Ozone			
		Lead paint indicator			
		Proximity to Risk Management Plan sites			
		Proximity to Hazardous Waste Treatment, Storage and Disposal Facilities			
		Proximity to National Priorities List sites			
		Wastewater Dischargers Indicator			
	Transportation	Traffic proximity and volume			
	Economic	Percent Low-Income			
	Sociodemographic	Less than high school education			
		Linguistic isolation			
		Individuals under the age of 5			
		Individuals over the age of 64			
Disproportionately Impacted Area	Economic	20% Poverty Rate		Illinois	Cannabis Regulation and Tax Act (CRTA)
		Average area unemployment rate is >120% national unemployment average			
		Percent of children participating in federal free lunch program			
		Percent of households under the Supplemental Nutrition Assistance Program			
	Crime	High rates of arrest, conviction, and incarceration related to the sale, possession, use, cultivation, manufacture, or transport of cannabis			

DAC DESIGNATION	INDICATOR TYPE	INDICATOR	NOTES	REGION	SOURCE
Restore, Reinvest, Renew (R3) Area	Economic	Unemployment	*R3 includes DIAs, OR these criteria.*	Illinois	Cannabis Regulation and Tax Act (CRTA)
		Child poverty rates (children under 6 years old living at or below 100% of the FPL)			
	Crime	Highest rates of gun injury (gun injury hospitalization rate)			
		Commitments to and returns from the Illinois Department of Corrections			
Equity Investment Eligible Community**				Illinois	Climate and Equitable Jobs Act (CEJA)
Historically Redlined - Grade C or D	Economic	Income	*These indicators are high-level due to the non-specific documentation of redlining at the time it was used.*	National	Homeowners' Loan Corporation (HOLC) *(defunct)*
	Housing	Housing quality			
		Housing sale and rent values			
	Sociodemographic	Race/Ethnicity			
Justice 40 Disadvantaged Community	Environmental	Underground storage tanks and releases	*Also requires >=65th percentile for LI threshold.*	National	Justice 40 Initiative
		Wastewater discharge			
		PM2.5 in the air			
		Have at least one abandoned mine land			
		Formerly used defense sites			
		Proximity to hazardous waste facilities			
		Proximity to superfund sites			
		Proximity to risk management plan facilities			
	Climate	Expected agricultural loss rate	*Also requires >=65th percentile for LI threshold.*		
		Expected building loss rate			
		Expected population loss rate			
		Projected flood risk			
		Projected wildlife risk			
	Transportation	Diesel particulate matter exposure			

DAC DESIGNATION	INDICATOR TYPE	INDICATOR	NOTES	REGION	SOURCE
		Transportation barrier	*Also requires >=65th percentile for LI threshold.*		
		Traffic proximity and volume			
	Economic	Energy cost	*Also requires >=65th percentile for LI threshold.*		
		Low median income	*Also requires that < 10% people older than 25 have a high school diploma.*		
		Poverty			
		Unemployment			
	Health	Asthma	*Also requires >=65th percentile for LI threshold.*		
		Diabetes	*Also requires >=65th percentile for LI threshold.*		
		Heart disease			
		Low life expectancy			
Justice 40 Disadvantaged Community	Housing	Housing cost			
		Lack of green space			
		Lack of indoor plumbing			
		Lead			
	Sociodemographic	Linguistic isolation	*Also requires that < 10% people older than 25 have a high school diploma.*		
INVEST South/West Community Area	Transportation	Transit service	*These high-level indicators are based off the methodology that INVEST South/West presents on their website for choosing neighborhoods of interest for their initiative.*	Chicago	City of Chicago Initiative
	Economic	Business licenses			
	Sociodemographic	Historic resources			
		Community plans			
		Demographics			

**Eligible communities are either R3 areas or DCEO EJCs.

Appendix E. Direct Tax Impacts

The tables below show direct tax impacts by taxpayer at the federal, state, county, and municipal levels.

Table 54. Federal Direct Tax Impact by Taxpayer

TAXPAYER	FEDERAL TAX
EMPLOYEE COMPENSATION	$1,209,000
ENTERPRISES (CORPORATIONS)	$451,000
TAX ON PRODUCTION AND IMPORTS	$16,000
HOUSEHOLD INCOME > $200K	$0
HOUSEHOLD INCOME $100-200K	$155,000
HOUSEHOLDS INCOME $50-100K	$711,000
HOUSEHOLD INCOME < $50K	$495,000
TOTAL	**$3,037,000**

Table 55. State Direct Tax Impact by Taxpayer

TAXPAYER	STATE TAX
EMPLOYEE COMPENSATION	$1,000
ENTERPRISES (CORPORATIONS)	$240,000
TAX ON PRODUCTION AND IMPORTS	$162,000
HOUSEHOLD INCOME > $200K	$124,000
HOUSEHOLD INCOME $100-200K	$125,000
HOUSEHOLDS INCOME $50-100K	$53,000
HOUSEHOLD INCOME < $50K	$6,000
TOTAL	**$711,000**

Table 56. County and Municipal Direct Tax Impact by Taxpayer

TAXPAYER	COUNTY TAX	MUNICIPAL TAX
HOUSEHOLDS	$0	$0
TAX ON PRODUCTION AND IMPORTS	$22,000	$191,000
TOTAL	**$22,000**	**$191,000**