Disadvantaged Communities Factor for Community Solar Projects

Technical Report

New York State Energy Research and Development Authority

Albany, NY

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March 2025

NYSERDA Record of Revision

Document Title
Disadvantaged Communities Factor for Community Solar Projects March 2025

Revision Date	Description of Changes	Revision on Page(s)
March 2025	Original Issue	Original Issue

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Background

New York State's 2019 Climate Leadership and Community Protection Act directs State entities to*:*

> *Invest or direct available and relevant programmatic resources in a manner designed to achieve a goal for disadvantaged communities to receive **forty percent** of overall benefits of spending on clean energy and energy efficiency programs, projects or investments in the areas of housing, workforce development, pollution reduction, low income energy assistance, energy, transportation and economic development, provided however, that disadvantaged communities shall receive **no less than thirty-five percent** of the overall benefits of spending on clean energy and energy efficiency programs, projects or investments.*[1]

Further, the implementation of New York Consolidated Laws, Public Service Law PBS § 66-p., *Establishment of a Renewable Energy Program*, requires:

> *(b) In pursuing the state's solar deployment goals, the New York state energy research and development authority shall consider enhanced incentive payments for solar and community distributed generation projects, focusing in particular but not limited to those serving disadvantaged communities, as defined in article seventy-five of the environmental conservation law, which result in energy cost savings or demonstrate community ownership models.*[2]

Per the Climate Act and final criteria developed by the Climate Justice Working Group, "disadvantaged communities" include designated census tracts and geographically dispersed low-income households, collectively referred to as "DAC(s)".[3] Regarding community solar DAC impact, the draft Disadvantaged Communities Investments and Benefits Reporting Guidance (Guidance) states:

> *The investments within a solar farm location are not where the benefits of the program are realized but rather benefits are to the individual subscribers of the program. For the tracking of community solar investment, New York State will therefore look to track the allocation of these funds to disadvantaged communities based on where the residents live as opposed to where the community solar project is located*.[4]

The Guidance allows program administrators to use an estimated DAC factor where actual subscriber data is missing and tasks entities to "improve data availability on community solar subscriber data moving forward." A 24% DAC factor for NYSERDA and NYGB projects was previously determined by an internal analysis using subscriber geo-location information for NYGB and NY-Sun community solar projects completed between 2020 and 2022 where developers agreed to share subscriber lists. Since 2022, the use of this factor continued for community solar projects where DAC or income status was not known.

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[1] https://www.nysenate.gov/legislation/bills/2019/S6599
[2] https://www.nysenate.gov/legislation/laws/PBS/66-P
[3] https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria
[4] https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria/Investments-and-Benefits-Reporting-Guidance

This report summarizes NYSERDA's work to 1) confirm the geographic DAC factor that has been used for community solar, 2) develop a factor to address low-income customers throughout the State, and 3) provide a combined factor representing both of these aspects for future DAC reporting.

To account for the percentage of geographically dispersed low-income subscribers, NYSERDA has developed a method to match the available subscriber addresses to estimated household income, using a third-party consumer demographic database (Data Axle). A comparable income-matching method was first applied on a smaller sample of NYSERDA data by researchers at Lawrence Berkeley National Laboratory as a follow-on technical service to NYSERDA after using the analyzed data in their 2024 *Nature Energy* article "Evaluating community solar as a measure to promote equitable clean energy access".[5] This unpublished component of the LBNL work served as a proof of concept and validation of the further NYSERDA analysis described herein.

Community Solar Data Sources for this Analysis

In community solar, customer subscriptions are sold by the company owning the project (or their subcontractor); the customer names, addresses, and utility account numbers are then passed on to the utility. There are several types of community solar projects, including those serving low-income customers in whole or in part (Solar For All and Inclusive Community Solar Adder) and those that are market-rate developments (which, in this analysis, are supported under NY Green Bank and the NY-Sun developer.)

There is not a universal requirement for all subscriber addresses to be provided to NYSERDA for all types of community solar currently supported. Data for this analysis encompasses NYGB and NY-Sun-supported community solar projects completed between 2020 and 2022 where developers agreed to share subscriber lists with the NY-Sun program. In addition, one NY-Sun-supported developer separately agreed to share data only for the purpose of the DAC factor analysis.

Solar for All

Expanded Solar For All and Statewide Solar For All are 100% low-income, and are reported as such. So as to not skew the data, Solar For All subscriber data are <u>not</u> included in the sample for this analysis.

[5] https://doi.org/10.1038/s41560-024-01546-2

Inclusive Community Solar Adder (ICSA)

The ICSA is a more recent strategy whereby NYSERDA administers incentives for community solar projects with 40% –100% of project capacity dedicated to eligible Residential and Affordable Housing/Nonresidential subscribers.[6] On April 14, 2022, the Public Service Commission directed the ICSA program be expanded to better serve disadvantaged communities and low-to-moderate-income populations and drive further distributed solar development. While ICSA has always required subscriber lists as standard business practice, the program was in its infancy during the time period covered by this analysis (2020–2022) with minimal data available; for this reason, ICSA data was not included in the analysis.

NYGB

Between 2020 and 2022, NYGB required all participants with community distributed generation projects to provide subscriber lists. These projects were not designed to be specifically LMI or Market Rate targeted during this period. The NYGB community solar data used in this analysis includes both LMI and Market Rate projects, with an emphasis on Market Rate.

Methodology

Sample Characteristics

For this analysis, three subscriber datasets were merged: available 2022 data for NY-Sun projects, available 2020–2022 data for NYGB-funded community solar projects, and one list directly from a NY-Sun-funded, non-ICSA project developer. Each of the sets has large gaps in geographic distribution but together they represent the wider picture of community solar development located across the state (Figure 1), with only the list directly from the developer including addresses in the Consolidated Edison territory.

[6] For eligibility requirements, see p. 29 https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/NY-Sun/Contractor-Resources/program-manual.pdf

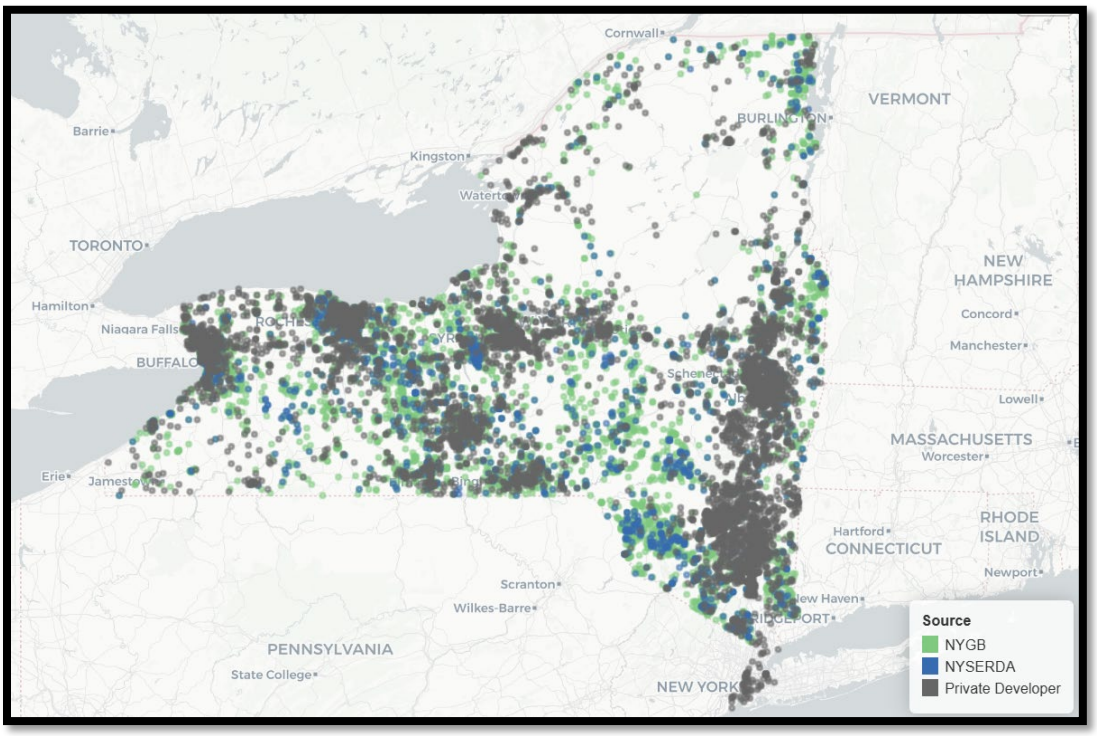

Figure 1. Geographic distribution of subscribers represented by the three datasets

The distribution of the sample data, provided in Figure 1, roughly aligns with the overall characterization of the community solar market statewide for this analysis period through 2024 (Table 1), though Con Edison and Long Island territories are still underrepresented.

Table 1. Community Solar Market in 2022 and 2024 (Source: NY-Sun data)

MW Installed Capacity of Community Solar by Region				
	Upstate	**Con Edison**	**Long Island**	**Total**
2022	1,703	88	12	1,802
As of November 2024	2,736	133	17	2,885

% Installed Capacity of Community Solar by Region				
	Upstate	**Con Edison**	**Long Island**	**Total**
2022	94.5%	4.9%	0.6%	100%
As of November 2024	94.8%	4.6%	0.6%	100%

The sample datasets were geocoded to determine which subscriber addresses are within DAC-designated census tracts (Table 2). Overlapping addresses between the NYSERDA and NYGB sets were removed; there was minimal overlap with the independent data provided from the NY-Sun-funded developer (Table 3). For simplicity, the overlap was removed from the NYSERDA line, but this is not

intended to imply attribution of overlapping subscribers in either direction. Con Ed subscribers are highlighted as a data point of interest to the Department of Public Service.

Table 2. Characterization of Sample Data

Source	Count	Con Ed	Geographic DAC		Data Axle demographics available [a]	
NYSERDA	9,514	0	2,611	27.4%	6,480	68.1%
NY-Sun Developer	7,123	90	1,243	17.5%	5,136	72.1%
NYGB	9,235	0	2,534	27.4%	6,908	74.8%

Table 3. Characterization of Sample Data – Duplicates Removed

Source	Count [b]	Con Ed	Geographic DAC		Data Axle demographics available	
NYSERDA	2,239	0	587	26.2%	653	29.2%
NY-Sun Developer	7,109	90	1,243	17.5%	5,126	72.1%
NYGB	9,235	0	2,534	27.4%	6,908	74.8%
Total	18,583	90	4,364	23.5%	12,687	68.3%

[a] Data Axle provides family income and household size, enabling Low Income DAC designation; geographic DAC designation is available for all records.

[b] Duplicates between datasets were removed. There was significant overlap between NYSERDA and NYGB data. For simplicity, overlapping subscribers were removed from the NYSERDA line, but this is not intended to imply attribution.

Addresses that did not match to Data Axle were not excluded from the analysis, as they were successfully geocoded as DAC or Non-DAC. In such cases, they cannot be characterized as low-income; these are assumed to largely be non-residential subscribers and are counted toward the percentage of subscribers tallied as DAC or Non-DAC. Approximately 68% of the geocoded addresses in the master set did match to Data Axle's household demographics data.

Household Income Analysis

"Low-income" eligibility for NYSERDA programs is aligned with LIHEAP criteria, which applies the <60% State Median Income eligibility to household size (Table 4).[7]

Table 4. LIHEAP Eligibility FY 2021-2022

LIHEAP FY 2021–2022	
Household Count	**Monthly Income**
1	$2,729
2	$3,569
3	$4,409
4	$5,249
5	$6,088
6	$6,928
7	$7,086
8	$7,243
9	$7,401
10	$7,558
11	$7,715
12	$7,873
13	$8,420

Leveraging estimated household demographics provided by the consumer database Data Axle, SAS code was used to match addresses to estimated household income, first by applying a "fixed logic", assuming all households have an average family size of 3.[8] A second round of analysis used a "dynamic logic" in which both household income and household size were gathered from Data Axle (Table 5). The dynamic logic approach was deemed to be both more accurate and more conservative; NYSERDA will continue to use the dynamic logic method for this type of analysis moving forward.

[7] State Median Income (SMI) by Household Size for Optional Use in FY 2021 and Mandatory Use in LIHEAP for FFY 2022. https://www.acf.hhs.gov/sites/default/files/documents/ocs/COMM_LIHEAP_IM03%20Attachment1%20SMITable_FY2022.pdf

[8] LIHEAP guidance issued for 2022 is based on the ACS 2015-2019 5-year tables, which estimate the average household size as 3.2. For a family size of 3, the LIHEAP table calculates 60% of SMI as $52,906.

Table 5. Data Axle Variables Used in Dynamic Logic Method

Variable	Description	Sources	Factors
Estimated Household Income [a,b]	A modeled variable provided by Data Axle that represents the projected total income of a household	Combination of publicly available data sources, including U.S. Census Bureau data, property records, consumer surveys, and proprietary predictive modeling	Home value, mortgage data, geographic income trends, and self-reported financial data
Household Count	Estimated demographic attributes that indicate the number of adults and children residing in a household	Data aggregation methods that incorporate Census data, consumer surveys, and third-party sources	Family composition patterns, residential stability, and inferred relationships based on purchasing behaviors and address histories

[a] Since this is a modeled variable rather than a directly reported income figure, it should be interpreted as an approximation rather than an exact income level.
[b] Modeled household income as of 2024, not adjusted for 2022 values, resulting in a conservative estimate of "low-income" households for the purposes of this analysis.

Given that the Data Axle variables are estimates, they are meant to be used for aggregate or trend analysis and comparative modeling rather than for precise individual household profiling. In the course of this analysis, the dynamic income matching method was tested against a large set of NY-Sun subscriber data for the all-low-income Solar for All program. The results accurately matched 100% of the addresses as low-income. In a separate internal NYSERDA analysis, demographic matching was done using Infogroup (now Data Axle) and surveys sent to participants confirmed the accuracy of address-matching when aggregating results across a sample, even when the household-level results did not match. For these reasons, NYSERDA considers the income matching element of this work to be reliable, given the size of the sample. Inaccuracies in the household count are deemed acceptable, as they are expected to average out across the population.

Results

The analysis calculated the percentage of subscribers of both low-income and non-low-income residing within geographically designated DAC census tracts, as well as the percentage of low-income subscribers outside a DAC census tract (Table 6).

Table 6. SAS Output by Strata

Strata	Count	Percentage	Confidence	Relative Precision
Subscribers in a Geographic DAC	**4,364**	**23.5%**	**95%**	**1.5%**
Low-Income Subscribers Outside of a Geographic DAC	**5,965**	**32.1%**	**95%**	**1.3%**
Total DAC – Geographic and Low-Income	**10,329**	**55.6%**	**-**	**-**
Non-DAC	**8,254**	**44.4%**	**95%**	**1.1%**
Total Statewide	**18,583**	**100%**		

The geographic DAC percentage of low-income and non-low-income subscribers within a DAC census tract was 23.48%, nearly the same as the previous internal analysis that resulted in the 24% DAC factor NYSERDA has applied to date—despite incorporating a large number of additional subscriber records into this most recent effort. The new, additional income-based analysis identified an additional 32.1% of subscribers as "geographically dispersed" low-income households residing outside of a DAC census tract. Therefore, a total of 55.6% of community solar subscribers can be considered DAC subscribers on the basis of location or income. Confidence and precision estimates are based on an estimated population of 145,000 total residential community solar subscribers in New York during the period 2020–2022.[9] Figure 2 shows the geographic distribution of these subscribers and their matched DAC-designation.

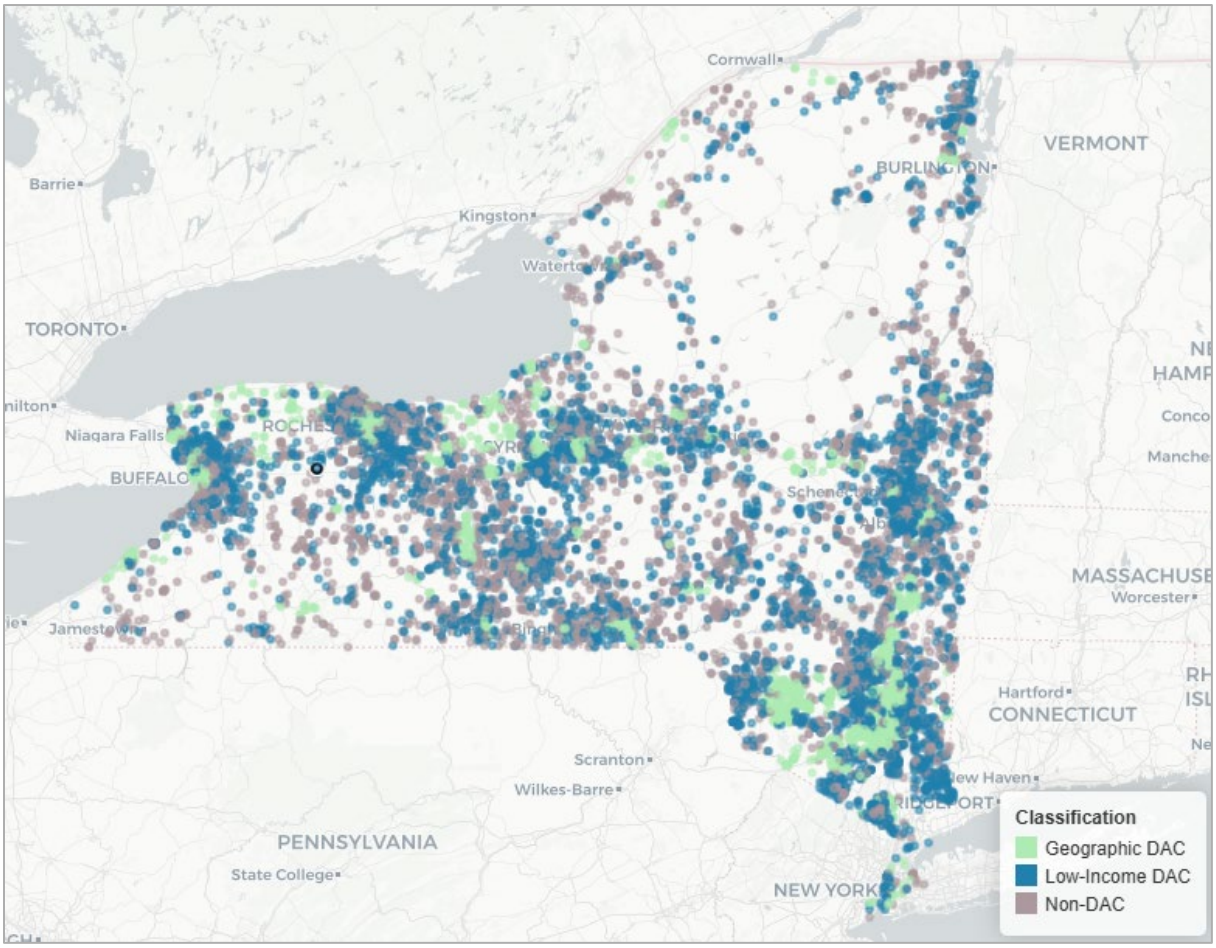

Figure 2. Geographic distribution of DAC, non-DAC, and low-income subscribers

[9]Assuming 80% of the 1,419 MWdc of installed community solar in New York state was allocated to residential customers with an average allocation of 8kW each.

Recommendations

NYSERDA intends to use this updated 55.6% DAC (geographic DAC plus geographically distributed low-income DAC) to:

1) Permanently replace the 24% placeholder used previously for projects reported up through 2022 where data remain unknown or unclear, and
2) Apply provisionally, as a temporary placeholder for post-2022 data until such a time when these numbers can be trued up using verified subscriber lists.

To the extent possible, NYSERDA will true up the subscriber DAC percentage for projects which had previously reported the 24% factor using more recently available subscriber data.

Future Work

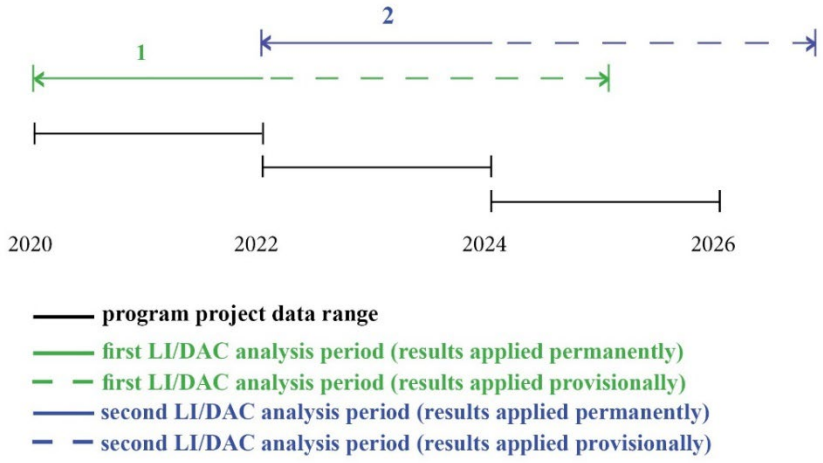

Figure 3. Proposed DAC factor analysis cycle

As depicted in Figure 3, NYSERDA will use these methods to reassess the DAC subscriber percentage every two years (using available data from that discrete time period.) The results of each analysis will be used to update the community solar factor used for projects in the previous two-year period where actual data is permanently lacking. The resulting percentage will also be used as the current placeholder until the numbers can be trued using actual data as it flows in, or until the next analysis provides a more accurate proxy number based on actual data acquired from that period.

To further enhance program and policymakers' understanding of populations served, additional breakouts for "Low-Income within a DAC" and "Low-Income outside of a DAC" can be generated using the methods described.