New York State Clean Energy Hubs Regional Assessment and Barriers Analysis

Summary

New York State has twelve Regional Clean Energy Hubs (hereafter referred to as a “Hub” singularly or as “the Hubs” collectively). The Hubs are local, trusted resources comprised of community-based organizations that support residents in reducing energy costs, improving the energy efficiency of their homes, and accessing clean energy job training and employment opportunities.

As part of their work, each Hub developed a Regional Assessment and Barriers Analysis (RABA). The Regional Assessment and Barriers Analysis documents regional conditions that affect participation in clean energy programs, with a focus on barriers, needs, and assets relevant to disadvantaged communities. These assessments draw on regional data, stakeholder engagement, and on-the-ground experience to provide a clear picture of the challenges residents face and the resources that can support equitable clean energy participation.

This document compiles all Regional Assessment and Barriers Analysis reports into a single, searchable document for public posting on the New York State Energy Research and Development Authority website. The purpose of this compilation is to make the Regional Assessment and Barriers Analysis reports more accessible and easier to reference for state agencies, Clean Energy Hub staff, partners, and the public.

The Hubs use the Regional Assessment and Barriers Analysis reports as working documents to inform their day-to-day activities and long-term planning. Specifically, the reports support the Hubs in shaping outreach and education strategies, identifying and strengthening partnerships, understanding regional barriers to clean energy adoption, and aligning services with community needs. The assessments also help the Hubs coordinate with other programs and organizations that serve the same communities.

Each Regional Assessment and Barriers Analysis reflects the unique context of its region and includes information such as regional characteristics, housing and building conditions, clean energy program participation, community engagement activities, regional partners and assets, and identified barriers and opportunities. While the content varies by region, all reports serve the same purpose of supporting equitable access to clean energy resources and benefits.

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Capital Region Clean Energy Hub

Regional Assessment and Barriers Analysis

October 2024

Regional Clean Energy Hubs were developed by the New York State Energy Research and Development Authority (NYSERDA) to support clean energy actions and a more inclusive clean energy economy that benefits historically marginalized communities. Among other activities, the Hubs are tasked with creating a Regional Assessment and Barriers Analysis (RABA) to identify barriers, needs and resources to inform development of the Hub's Outreach and Equitable Engagements Plans.

The Capital Region Clean Energy Hub (Capital Region Hub) serves **8 New York State counties**:

Albany, Columbia, Greene, Rensselaer, Saratoga, Schenectady, Warren and Washington

Capital Region Clean Energy Hub Partners:

Affordable Housing Partnership of the Capital Region

Cornell Cooperative Extension Albany County (CCE Albany)

Capital District Community Energy (CDCE)

Radix Ecological Sustainability Center

TAP, Inc.

Social Enterprise and Training Center (SEAT Center).

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Capital Region Clean Energy Hub

Regional Assessment and Barriers Analysis

October 2024

I. Executive Summary

The Capital Region Hub's Regional Assessment and Barriers Analysis (RABA) will inform delivery of services by the Capital Region Hub, including impactful outreach and education, strengthening of partnerships, and increasing opportunities for disinvested communities to take part in and benefit from the clean energy transition.

To complete the RABA, the Capital Region Hub relied on Census Data and reports from regional economic development organizations, but more importantly on the experiences of Capital Region Hub Energy Advisors in the field implementing NYSERDA programs, focus groups and interviews, as well as community surveys.

Key Findings

The Capital Region Hub's RABA documents barriers and opportunities for low-income communities to participate in the Clean Energy economy.

- Workforce: The Capital Region Hub found that potential Clean Energy workforce members such as Iron Workers, Solar Installers and Heating, Ventilation, Air Conditioning (HVAC) technicians recruited from New York State defined Disadvantaged Communities (DACs) have transportation, childcare and cultural barriers to successful workforce participation. Opportunities to address these barriers include building up successful workforce development programs that provide stipends for transportation, mentorship, and other services.
- Clean Energy Program Adoption - Physical Structures: Challenges include difficult-to-insulate housing stock and poor housing conditions that cause weatherization projects to be deferred. Opportunities exist to partner with other State funding sources to provide funds for housing renovation including rental rehabilitation programs.

- Clean Energy Program Adoption - Financial Resources: Low-income residents have insufficient resources to fund the difference between NYSERDA incentives and the cost of the energy measure; rental property owners face a similar challenge. Lack of financial resources also prevents residents from completing health and safety improvements (repair roof leak, abate mold or asbestos, etc.) that prevent an energy project from proceeding. An opportunity exists to shift from incentives to full funding of clean energy projects, leading to more project completions.
- Clean Energy Program Adoption - Perspectives & Information: Challenges in the Capital Region include misinformation campaigns about the impact of New York State climate goals on households as well as misleading information about NYSERDA program incentives. Many opportunities exist to clarify that consumers have choices and to improve NYSERDA messaging.
- Clean Energy Program Adoption - Programmatic Design: Challenges include lack of strong communication and training among all NYSERDA contractors responsible for implementing the programs which lead to project and funding delays and negative public perceptions of the program due to customer and contractor frustrations. Additional challenges include changing program guidelines and partial funding of energy improvements. An opportunity exists to promote program transparency and cross-contractor training of all staff not just program leadership.

Recommendations

The following recommendations inform the on-going work of the Capital Region Hub, including potential NYSERDA-funded Pilot Projects to address barriers and Community Campaigns to targeted populations to increase the number of clean energy installations.

Workforce: Ensure that holistic wrap around services are included with all On-the-Job-Training (OJT) programs funded by NYSERDA and others; Support the inclusion of DAC residents in the workforce through mentorship to address cultural differences and workplace Diversity, Equity and Inclusion (DEI) training; Support new EmPower+ participating contractors with NYSERDA-led trainings on project work scopes, program paperwork, NYSERDA processes including project review and funding, and use of online resources.

Partnerships: NYSERDA and the Capital Region Hub should continue to work with trusted community partners to promote the EmPower+ program; recognize and compensate the value of time of partners to market the program to their constituents; and assist with program implementation by building stronger connections to complementary state programs such as the NYS Office of Temporary and Disability Assistance (OTDA) which manages the Home Energy Assistance Program (HEAP) and NYS Homes and Community Renewal (HCR) which

manages home repair programs. OTDA serves households who would benefit the most from energy bill savings and who are automatically eligible for assistance from the EmPower+ programs; HCR provides repair programs which will fund energy efficiency program gaps as well as health and safety improvements that are needed to enable energy efficiency projects to proceed.

EmPower+ Program enhancements: To address the barrier of lack of funds available to low-income households to match NYSERDA incentives, the Capital Region Hub recommends increased flexibility to fully fund clean energy projects up to program limits without specific caps on measures. Similarly, the Hub recommends better integration of NYSERDA and other state agency programs to facilitate funding of health and safety measures such as roof repair or asbestos abatement that prevent energy projects from being completed.

Improved communication and transparency: Increased communication among all NYSERDA contractors and program participants would improve successful program implementation. Recommendations include NYSERDA-hosted joint trainings that include all staff from all subcontractors responsible for program implementation so that everyone has the same understanding when program features are rolled out; more detailed public facing descriptions of eligible measures and incentive caps on the NYSERDA website to help set customer expectations; NYSERDA funding of stronger homeowner education during energy audits to help set customer expectations.

The Capital Region Hub is proactively addressing program implementation challenges and looks forward to exploring these opportunities to help more low-income residents benefit from the Clean Energy transition.

II. Baseline Regional Characterization

The Capital Region has 1.1 million people living in eight counties: Albany, Columbia, Greene, Rensselaer, Saratoga, Schenectady, Warren and Washington. The region spans 5,336 square miles of rural, suburban and urban communities. Home to New York's capital city, Albany, the region has a strong government services sector (8% of all jobs) as well as important health care (12.7% of all jobs) and higher education sectors (10.2% of all jobs thanks in part to 23 higher education institutions in the region). Professional & business services and food services each comprise about 6.5% of all jobs and round out the top employment sectors in the Region *NYS DOL 2024 Significant Industries – Capital Region.* State and business economic development leaders in the Capital Region are focused on growing the Capital Region's most competitive industry clusters, including Semiconductors, Life Science, Software Development and Clean Energy

(specifically Wind and Green Hydrogen) *Capital Region Economic Development Council 2024-2028 Strategic Plan*.

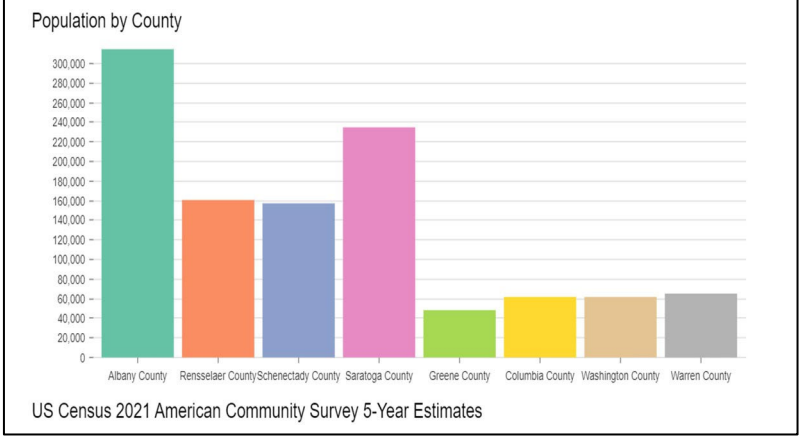
New York State is a leading agricultural state in the country. In the Capital Region, Washington County leads in agricultural sales due to the sale of livestock; Columbia and Albany counties lead the region in crop sales. The region's most valuable agricultural product is milk, followed by grains. Statewide, 98% of farms are family owned, and the average producer age is 57+ (and consistently increasing) *Capital District Regional Planning Commission, Spring 2017.*

Baseline Regional Sociodemographic

The 8-county Capital Region's total population in 2021 is just over 1.1 million people.

The Capital Region led NYS in population growth over the last 10 years and was the second fastest growing region over the last five years (2.4%) *Capital Region Economic Development Council, 2024-2028 Strategic Plan, 2023.*

Figure 1 Population by Capital Region County, 2021



Source: Capital Region Indicators.org

Age/Race

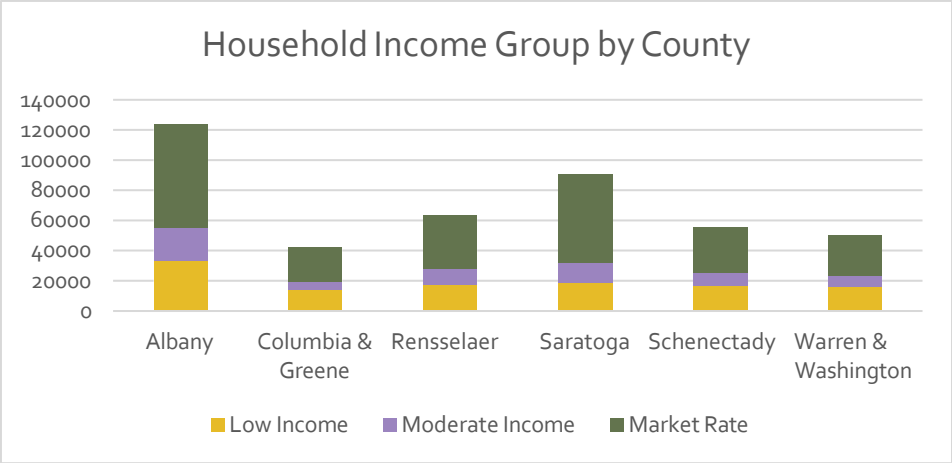
According to the Capital District Regional Planning Commission and the Capital Region Transportation Council, the population aged 60 and over is expected to increase to 22% of the overall regional population by 2040. The age groups of 0 to 24 years and 25 to 64 years will decrease to 29% and 49%, respectively.

Albany and Schenectady counties have significant non-white, low-income populations, over 32% in Albany and 27.5% in Schenectady, many of whom reside in DACs *NYSERDA NYS LMI Census Population Analysis, 2013-2015.* Community-based Black and Brown organizations are critical to the success of reaching these households.

Income

The regional median income for households is $72,468, with this number trending upwards. The poverty rate for the 8-county region is 10.1%. There are significant racial disparities in Capital Region poverty rates:26% of Black/African American households live in poverty; 21% of Hispanic/Latino residents are impoverished and 7.5% of Whites live below the poverty line. *American Community Survey 2022 5-Year Estimates.*

Figure 2 Number of Households by Income Group by County, 2015



Source: NYS Low- to Moderate-Income Census Population Analysis Tool: American Community Survey 2013-2015[1]

Nearly 116,000 households in the region are eligible for the Home Energy Assistance Program (HEAP) and therefore eligible for NYSERDA's low-income Empower+ program. Of those, 40% are homeowners.

An additional 66,000 Capital Region residents earn between 60% and 80% of area median income, and therefore qualify for NYSERDA's Moderate Income EmPower+ incentive programs. The majority of those households reside in Albany, Saratoga, Rensselaer and Schenectady counties.

Figure 3 Income Eligibility Guidelines EmPower+ Program 2024-25

CAPITAL REGION clean energy hub

NYSERDA Program Income Limits 2024-2025

NEW YORK STATE Regional Clean Energy Hub

Household Size	1	2	3	4	5	6
EmPower+ Below 60% AMI: Up to $10,000						
All Counties	$39,864	$52,140	$64,404	$76,680	$88,944	$101,208
EmPower + Between 60-80% AMI: Up to $5000						
Albany , Rensselaer, Saratoga, Schenectady	$66,000	$75,400	$85,872	$102,240	$118,592	$134,944
Columbia County	$57,800	$69,520	$85,872	$102,240	$118,592	$134,944
Greene, Warren, Washington	$53,152	$69,520	$85,872	$102,240	$118,592	$134,944

11.2024

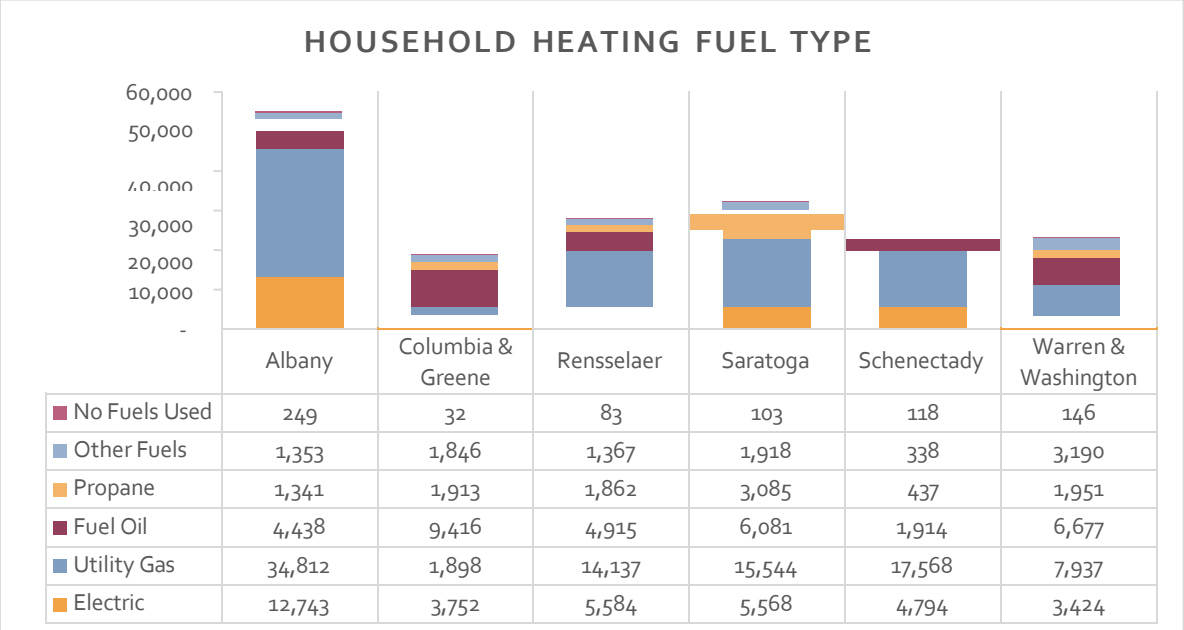
Fuel Use

Most households in the populated DAC areas in Albany, Rensselaer and Schenectady counties use utility gas to heat their home. For this population, the benefit of taking part in the EmPower+ program is to reduce energy use and make their homes more comfortable with insulation and air sealing. As shown in the figure below, in rural areas such as Columbia and Greene counties, 90% of low- and

[1] While this data is nearly 10 years old, we believe this data set is important to include in this report and that the analysis is still valid in 2024.

moderate-income households use delivered fuels or electric resistance heating. In these communities, messaging should highlight the benefits of getting homes heat pump ready to save money and eliminate combustion sources in their homes.

Figure 4 Household Heating Fuel Use by Low- and Moderate-Income Households by County, 2015



	Albany	Columbia & Greene	Rensselaer	Saratoga	Schenectady	Warren & Washington
No Fuels Used	249	32	83	103	118	146
Other Fuels	1,353	1,846	1,367	1,918	338	3,190
Propane	1,341	1,913	1,862	3,085	437	1,951
Fuel Oil	4,438	9,416	4,915	6,081	1,914	6,677
Utility Gas	34,812	1,898	14,137	15,544	17,568	7,937
Electric	12,743	3,752	5,584	5,568	4,794	3,424

Source: NYS Low- to Moderate-Income Census Population Analysis Tool: American Community Survey 2013-2015

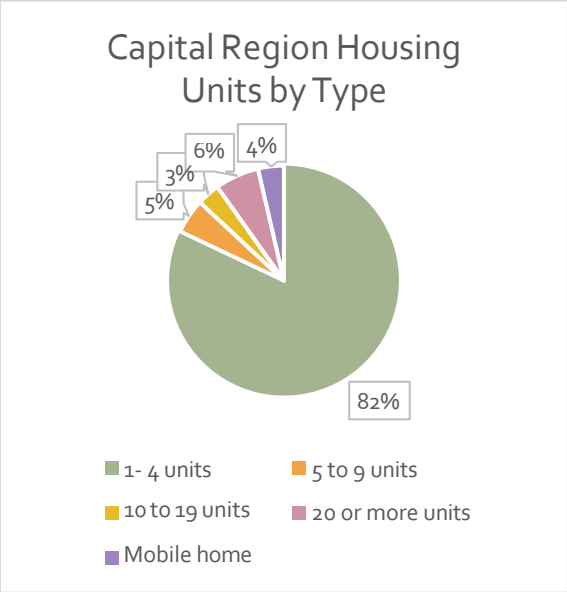
Languages

In the four-county area (Albany, Rensselaer, Saratoga, Schenectady) English is spoken at home in 90% of households. Spanish is spoken in 3% of households; Indo-European language is 4% of households; and Asian/Islander is 2% *Census Reporter, ACS 2022 1-year data.*

The Capital Region Hub is connecting with several Latino community organizations in the region. Based on the experiences of Hub members, connections to other immigrant communities commonly occur through their congregations or family members.

Buildings and Sector Assessment

Figure 5 Total of all Capital Region Housing Units by Type, 2022



Source: Cadmus Census ACS-2022 5-year estimate

Housing units in the Capital Region total 532,662. Of all units, 82% are in 1-4 unit buildings. Senior homeowners (age 65 and older) reside in 21.9% of all units. More than 58% of low- and moderate-income seniors live in a single-family home.

Twenty-five percent (25%) of all occupied units (just over 133,000) are in 1-4 unit buildings and also occupied by low- or moderate- income households – potential candidates for the EmPower+ program and other programs such as NYS home repair programs and the NYS Weatherization Assistance Program which is available in each county.

While 2/3rd of Capital Region occupied units are owner occupied, in Disadvantaged Communities, only 1/3rd of units are owner occupied.

Figure 6 Tenure for All Capital Region Units, 2022

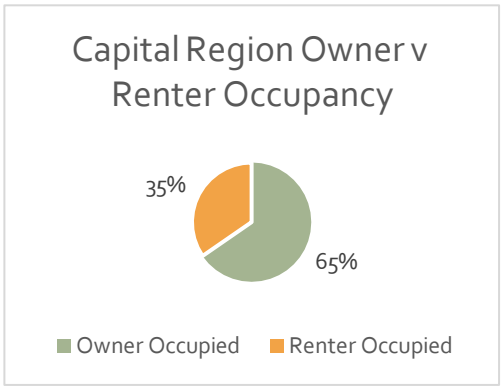
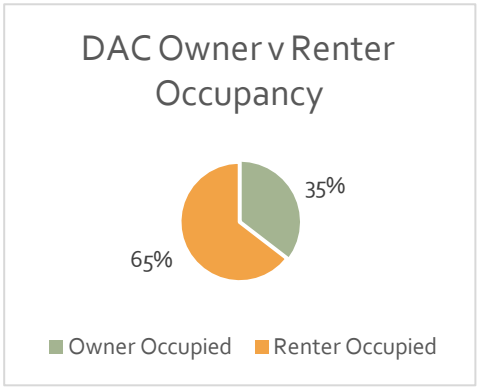


Figure 7 Tenure of DAC Units, 2022

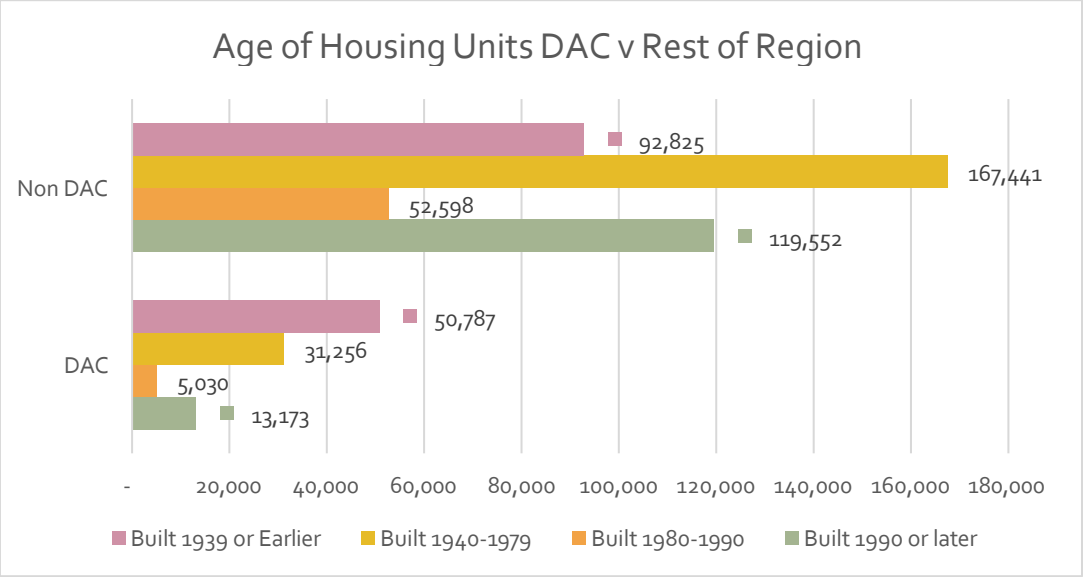


Source: Cadmus Census ACS-2022 5-year estimate

As detailed in the figure below, seventy-five percent (75%) of Capital Region housing units were built before 1990, translating to nearly 400,000 units that may benefit from energy efficiency measures. Of that number, 36% are located in DACs. Approximately 342,000 housing units were built prior to 1980 – suggesting plenty of opportunity to partner with lead abatement

programs to upgrade windows and doors, a common energy measure requested by consumers.

Figure 8 Comparative Age of Capital Region Housing Units, DAC Areas v Rest of Region 2022



Source: Cadmus Census ACS-2022 5-year estimate

Regional Clean Energy Workforce

Growth in the clean energy workforce sector within the Capital Region is promising but faces a very competitive landscape for businesses to attract good talent. According to the Capital Region Workforce Strategy Report 2022 from the Capital Region Economic Development Council (CREDC), the Capital Region has significant employment in clean and renewable energy. With a total of 23,522 jobs across 882 businesses, the sector makes up 4% of our region's total workforce.

Workforce challenges identified in CREDC's report include:

- Low or nonexistent pipeline of workers
- Difficulty offering remote job opportunities
- Competition for higher wages and benefits
- Bureaucracy and slow pace of state workforce training programs
- Lack of experienced workers, requiring in-house training programs
- Not enough journeymen to support apprentices filling trades pipelines (due to regulated ratios on job sites, especially electrical)

The CREDC report found that:

- Electricians are in extremely high demand, with the largest skill gap in clean energy.
- Engineers are needed to meet demand (industrial, electrical, civil, and mechanical).
- Entrepreneurial mindset is desired within existing companies and to maintain the pace of new venture creation for NY to lead on clean energy.

There are various pathways into the clean energy industry, facilitated by the Regional Workforce Development Boards and numerous partner organizations. Altogether, the Capital Region boasts more than twenty higher education institutions alongside numerous trade schools, workforce education programs, and apprenticeship options. Capital Region Hub workforce staff support career centers with up-to-date information on the clean energy industry to help job seekers make informed decisions on which career pathway to pursue.

The 2023 NY Clean Energy Industry Report prepared by NYSERDA reveals that 74% of all clean energy jobs and 88% of clean energy businesses focus on building decarbonization and energy efficiency. Since this building industry subsector comprises the vast majority of clean energy jobs, attracting new job seekers to the building trades is a priority for the Capital Region.

Across the State, installation businesses account for almost half of all clean energy establishments at 47%, while professional services is 8%, sales and distribution is 6%, public or private utility is 2%, and manufacturing is 2%. Other support services comprise the balance of the value chain. As the clean energy economy grows statewide, and to comply with federal American-made stipulations for certain clean energy projects, the manufacturing sector will expand. For example, parts for offshore wind turbines must be made in America to qualify for federal subsidy, and the Ports of Albany and Coeymans are ideal manufacturing locations. These manufacturing businesses will offer job opportunities that will be ideal for residents near port facilities, especially for low-income residents of the disadvantaged community bordering the Port of Albany. The community strongly supports the commitment of state and federal resources to enable these projects to move forward, with jobs that will allow residents of Disadvantaged Communities to benefit from the clean energy transition.

Regional Partners

The Capital Region Hub has worked to develop a strong network of partners who are well known and trusted in the community. The Capital Region Hub has leveraged these relationships for joint outreach opportunities.

Contractors: The Capital Region Hub is actively working with EmPower+ Contractors to assist our mutual customers in successfully completing a clean energy project. Open channels of communication have helped us align messaging about program benefits and opportunities. A key relationship benefit is referrals of deferred customers to the Hub for assistance with wrap around services.

- Weatherization Assistance Program (WAP) providers
- NYSERDA Empower+ Contractors
- Community solar providers
- HVAC contractor partners

Partnerships:

Capital Region Hub staff communicate regularly with an EmPower+ contractor to track progress of mutual customers.

The Hub has advertised job openings at Albany Community Action Partnership, a local WAP contractor, to help grow program capacity.

The Hub secured grant resources to complete a Commission on Economic Opportunity WAP and EmPower+ project.

Hub Member SEAT Center coordinates OJT training opportunities that lead to permanent Heating, Ventilation and Air Conditioning (HVAC) positions.

Organizations that serve low-income populations: The Capital Region Hub shares a commitment to serve the same customers as these organizations, who are well known, trusted outreach partners. These relationships hold potential for joint marketing of EmPower+ programs.

Partnerships:

Hub staff work closely with nonprofit housing agencies that promote Energy Efficiency programs to new, low-income homebuyers, and refer buyers to the Hub.

Hub staff speak at Neighborhood Association meetings, particularly those in DACs

The Hub participates in DAC neighborhood events to promote energy efficiency programs.

- Nonprofit housing organizations
- Home repair programs
- Food Pantries, Head Start Programs
- Neighborhood Associations located in DAC communities
- Social service and community-based organizations in DAC communities
- Capital District Rental Property Owners Association of small landlords
- Faith-based organizations

Public Sector

The Capital Region Hub has developed strong relationships with public sector agencies to support efforts to address climate change, including:

- Municipalities participating in Clean Energy and Climate Smart Communities campaigns
- Municipal offices of sustainability; local sustainability task forces
- Capital District Regional Planning Commission
- School districts especially in rural areas
- HEAP/DSS
- Utilities: National Grid/NYSEG/Central Hudson
- Cornell Cooperative Extension System
- Libraries

EmPower+ customers would benefit from a high-level NYS commitment to coordinate services among state and local government offices and utilities to improve delivery of energy efficiency programs.

Partnerships:

Hub staff support municipalities implementing Clean Energy Campaigns with community presentations to promote EmPower+ programs and encourage uptake of Heat Pump technology. The Hub facilitates contractor, code enforcement officer and residential self-reported data to show success of municipal outreach efforts

Hub staff offer workshops through school district community education programs

The Hub has connected with HEAP staff in some counties to facilitate EmPower+ referrals (stronger connections are needed)

The Capital Region Hub has established relationships with utilities to advocate for clients and table at utility sponsored consumer advocacy events

The Hub participated in the regional EPA Priority Climate Action Plan (PCAP) developed by CDRPC to bring LMI and DAC perspectives to the Plan, opening more funding for projects that benefit low income communities.

The Hub partners with libraries, a trusted community resource, for presentations and literature sharing.

Workforce and Small Business Development

Partnerships:

Hub promotion of workforce training opportunities at outreach events

Hub support to community-based organizations to recruit community members for energy related jobs

The Hub has raised awareness with career centers about clean energy jobs

The Capital Region Hub has over 48 working partnerships with community and public workforce development partners, including:

- Workforce Development Boards
- Unions
- Re-Entry programs
- BOCES and Community Colleges
- United Way

Advocacy and Other Community Groups

The Capital Region Hub has found it effective to partner with organizations like environmental advocacy groups that have marketed joint presentations to a broader public, giving the HUB the opportunity to provide up-to-date information on NYSERDA programs. Partners include:

- Environmental advocates
- Climate Justice groups (often church affiliated)
- League of Women Voters
- Sanctuary for Independent Media
- Sustainable PR – Glens Falls public relations firm

Partnerships

Environmental groups carry Hub literature to events that attract market rate customers

The Hub presents at jointly marketed events with groups like Climate Reality Project which provides information on federal programs

Environmental groups are a strong referral source

Regional Clean Energy Assets

In addition to the partnerships mentioned above, the Capital Region has several local and regional initiatives that support the transition to an inclusive clean energy economy:

- Municipal and citizen led campaigns:
    - Solarize Albany is a volunteer led group that has promoted uptake of Community and Residential solar
    - Clean Energy Community campaigns have been embraced by local municipalities, particularly rural communities that have benefited from resident uptake of clean energy technologies. Successful campaigns have installed clean energy solutions that help municipalities reduce operating costs.
    - The region has a network of faith-based communities who have "Eco-Teams" or "Green Committees" that seek to make their facilities more energy efficient as well as inform their members about steps they can take to reduce energy use.
- Corporate and institutional support for Clean Energy sector:
    - Capital Region economic development agencies have identified Clean Energy as one of four growth sectors for the regional economy. Companies like the Port of Albany have connected with community organizations to build support for funding applications to further the development of the Port's proposed wind turbine manufacturing business. Capital Region Hub partners are promoting training for DAC residents to prepare for jobs at the Port such as welding, construction, etc.
    - Regional assets include several major companies that are leaders in the clean energy sector such as Plug Power's hydrogen power program and GE Vernova's wind turbine business.

    - The region's universities and community colleges are strong partners to prepare the workforce at all skill levels.
- Nonprofit infrastructure:
    - The region has a strong, collaborative network of nonprofit organizations that serve members of DAC communities. This has positioned the region to attract State and Federal resources to help families with pre-electrification home repair programs.
    - The Unite Us referral platform connects nonprofit programs, medical offices, transportation services, food providers and other programs targeted to DAC communities.

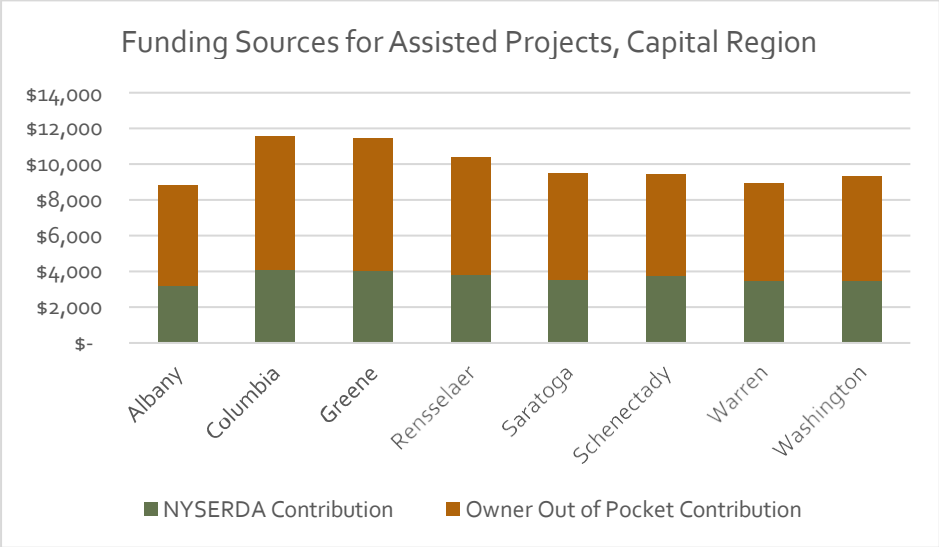
III. Baseline Assessment of Clean Energy Program Participation

Baseline of Regional Clean Energy Programs

To assess Clean Energy Program Participation, the Capital Region Hub analyzed data from Open Source NY: Energy Efficiency Projects completed from 2010 to June 2023 in 1-4 unit homes. In the 8-county Capital Region, 2,745 projects have been completed of which 42.5% are considered "Assisted", participating in the Home Performance (now called EmPower+) program. The Open Source data does not break down project location by DAC, but if zip code location is used as a rough indicator, 20% of all projects were located in DACs.

According to the Open Source NY data, the average incentive provided by NYSERDA for Assisted Projects for the past 13 years of the program has been $3,673. Projects benefiting low-income households needed an average of $6,259 in Owner out-of-pocket funds (see figure below). Forty-two percent (42%) of all projects, market and assisted, used NYSERDA low-interest rate financing. NYSERDA staff state that due to program changes, the current average project contribution from the EmPower+ program is $7,500. The Capital Region Hub recommends that messaging about program incentives highlight average amounts of NYSERDA assistance rather than 'up to $10,000'.

Figure 9 Average Funding Contributions for Energy Projects by NYSERDA v Customer Out of Pocket by County, 2023

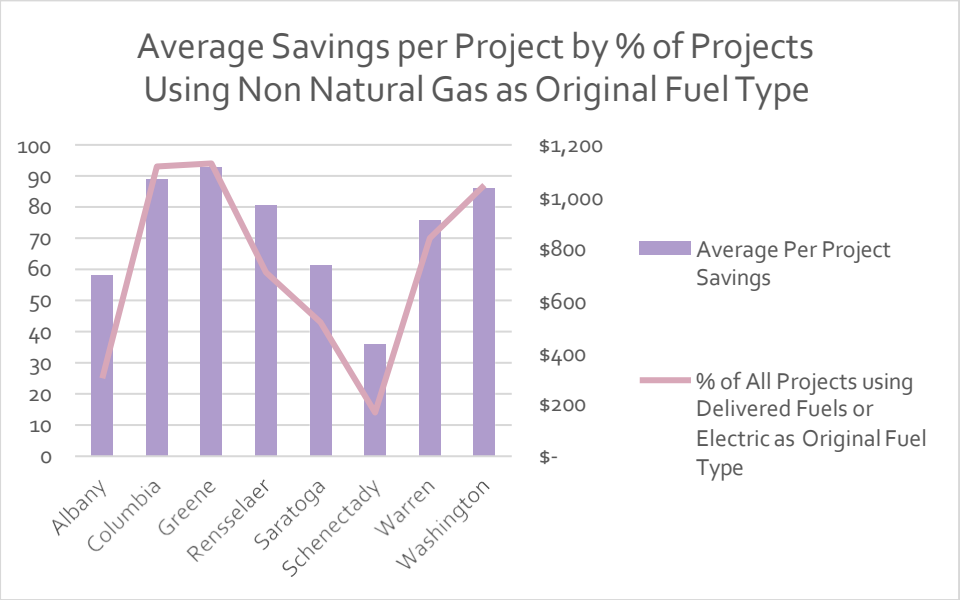


Source: Open Source NY: Energy Efficiency Projects completed from 2010 to June 2023 in 1-4 unit homes

All 2,745 completed Capital Region energy efficiency projects resulted in 1.852 million in estimated annual kWh savings. Total estimated annual MMBtu savings was 89,406. Capital Region program participants realized a combined $2.106 million in estimated first year energy savings.

Participating households using heating fuel other than natural gas realized the most energy savings. The average energy savings in each county correlated with the original fuel use, i.e., 94% of all energy projects in Greene County were completed in homes using delivered fuels which saw the highest after project first year estimated savings of $1,112 per project. See figure below that illustrates this impact by county.

Figure 10 Annual Customer Savings Amount Compared to Original Fuel Type by County, 2023



Source: Open Source NY: Energy Efficiency Projects completed from 2010 to June 2023 in 1-4 unit homes

Energy Programs in the Capital Region

Capital Region residents can access a variety of clean energy incentive programs to increase energy efficiency:

NYSERDA:

- **EmPower+** provides low- and moderate-income households throughout NYS no-cost home energy assessments and incentives to offset the cost of energy efficiency upgrades with the emphasis on making homes heat-pump ready. NYSERDA serves an average of 18,000 NYS EmPower+ customers annually through a network of 200 Participating Contractors.
- The **Comfort Home** program incentivizes market rate consumers to add insulation and improve air sealing.
- NYSERDA partners with utilities to offer the **Clean Heat** program of incentives to switch to heat pump heating and hot water systems.
- NYSERDA's **NY Sun** program has offered state incentives for installation of residential solar panels. They also market community solar projects.

Office of Temporary and Disability Assistance (OTDA)

- OTDA administers the federally funded **Home Energy Assistance Program (HEAP)** which provides varying levels of home heating assistance depending on fuel type. Households need to earn less than 60% of State median income to qualify.

  HEAP also offers:

- Heating Equipment Repair and Replacement (HERR): available to eligible homeowners with non-operational heating equipment in need of repair or replacement.
- Heating Equipment Clean and Tune (C&T): available to eligible homeowners to have their primary heating equipment cleaned and tuned.
- Cooling Assistance Component: provides an air conditioner to eligible households that have someone with a medical condition made worse by heat.

OTDA has also secured federal American Rescue Plan Act funds used to supplement EmPower+ projects to more fully fund weatherization projects for low-income NYS residents.

NYS Department of Public Services (PSC)

- The PSC established a statewide low-income bill discount program for major electric and gas investor-owned utilities called the **Energy Affordability Program (EAP)**. Discounts are for low-income customers and help households reduce their energy burden. All customers are automatically enrolled when participating in HEAP.

NYS Homes and Community Renewal (HCR)

- HCR administers the **Weatherization Assistance Program (WAP)**. This federal Department of Energy funded program is intended to increase energy efficiency in low-income households. All building types may be assisted (single- and multi-family, owner- or tenant-occupied, mobile homes) when 66% of building residents are considered low-income (HEAP eligible, less than 60% AMI). The average assistance per unit is $8,000. WAP prioritizes seniors, people with disabilities, and families with children. Typical measures include heating systems, air-sealing and insulation.

  In the Capital Region, there are 6 WAP providers: Albany Community Action Partnership (Albany County); Columbia Opportunities (Columbia County); Community Action of Greene County (Greene); Commission on Economic Opportunity (Rensselaer County); LifeWorks Community Action (Schenectady and Saratoga Counties); Warren-Hamilton Counties Action Committee (Warren and Washington Counties)

Federal Tax Incentives and Rebates

New Yorkers can take advantage of the **Inflation Reduction Act (IRA)** federal tax incentives to electrify their homes. Tax credits of varying amounts are offered based upon the energy measure taken and most incentives are subject to an annual cap of 30% of project cost up to $2,000 per year for a heat pump/heat pump hot water project and $1,200 per year cap for other upgrades. Residents who install solar panels, battery storage or geothermal heating may receive an uncapped 30% of project cost tax credit.

Existing NYSERDA Community Campaigns

The Capital Region Hub accessed information on the Clean Energy Communities (CEC) Municipal Campaigns from the 2023 Cadmus Clean Heating & Cooling Final Report. Locally, the campaign was managed region-wide by the Capital District Regional Planning Commission (CDRPC). Generally, the Capital Region Clean Heat Campaign was successful at raising awareness and identifying contractors, but installation data was difficult to obtain from consumers and/or contractors. The Capital Region campaign started during the height of COVID, and was most active during 2021-2022. According to the Cadmus report, the CDRPC Heat Smart Campaign tracked 6 energy efficiency projects, 48 air source heat pump projects, 1

ground source heat pump project and 4 heat pump water heater projects. CDRPC built strong relationships with area municipalities and continues to provide needed support to the municipalities currently involved in the CEC 3.0 campaign. One strategy to track installations is to coordinate the program with local building code offices to track permits opened to install new technologies (heat pump HVAC systems; rooftop solar, etc.)

Capital Region Hub Heat Smart Campaign

In December 2022, the Capital Region Hub took over management of the Heat Smart Capital Region campaign. Hub partner Capital District Community Energy partnered with the Columbia County Climate Smart Communities Task Force on a targeted and localized campaign. The campaign emphasized energy efficiency first and highlighted the most appropriate building stock for heat pump technology. The Capital Region Hub worked closely with local and Empower+ participating HVAC contractors.

Building off the work of CDRPC, the campaign's outreach resulted in 102 heat pump installations. Most of the projects incorporated energy efficiency measures to improve financial savings and 'right size' heat pump systems for consumers. During the campaign, Hub staff met several consumers who installed heat pumps prior to efficiency work and found their systems unaffordable. Once connected to building performance contractors, these households were able to decrease the operating costs of their system.

> Recommendation: Incentivize energy efficiency metrics so that market rate incentives increase as energy efficiency increases

The Capital Region Hub has found that due to Clean Heat incentives that increase as heat pump system sizes increase, market-rate customers can have unnecessarily large and inefficient heat pump systems installed. Participants in EmPower+ assisted programs undergo a savings to investment analysis to help 'right size' new systems. Market rate consumers will benefit from the recent NYSERDA move away from providing incentives based on system sizes to increasing incentives as energy efficiency increases. For example, one measure of energy efficiency is the number of air changes in a home per hour. A more efficient home has fewer air changes. If an energy project reduced air changes by 3 air changes an hour, it would receive a base level of incentive. If a project reduced air changes by 6 changes an hour, it would receive a higher incentive.

The Clean Energy Communities program can encourage more Capital Region based contractors to become NYSERDA participating contractors. Local municipalities have experience working with local contractors and can encourage them to become NYSERDA participating contractors and benefit from program participation.

The Capital Region Hub encourages the continuation and expansion of the Clean Energy Communities program to the benefit of other groups such as nonprofit organizations. For example, in exchange for marketing NYSERDA programs to their program participants, the nonprofit may receive an energy upgrade for their building once milestones are met.

IV. Stakeholder and Community Engagement

Outreach Tools and Methods

The Capital Region Hub used a variety of outreach tools and methods to gain stakeholder and community feedback. Techniques varied depending on the audience:

- Surveys: Capital Region Hub staff used paper surveys to collect information at community events from low-income residents of DACs and other communities with a large proportion of low-income households. Participants completed a survey to be entered into a raffle to win a prize (gift card, light bulb/night light, etc.). Surveys were collected at community events such as Toys for Tots parties, DAC neighborhood events, and lunch time events at Senior Centers. Surveys were also collected from Landlords. The Capital Region Hub did not use online surveys because it was difficult to target specific populations for feedback. Additionally, the Capital Region Hub has found that people are experiencing 'survey fatigue' from being asked to participate in surveys with no feedback on how their insights will impact programs. In-person surveys that directly connect the respondent with the organization and the opportunity for a raffle prize, have worked well.
- Focus Groups: The Capital Region Hub's workforce team held focus groups with young people aged 16-30 participating in workforce programs to gain insights into the challenges of the workplace.
- Individual Interviews: This technique was used with contractors. Staff worked from a survey format but used it as an opportunity to gain information about contractor perceptions of barriers and opportunities for energy efficiency project uptake.
- Direct experiences: Over the past two years, Capital Region Hub staff have documented customer experiences with energy efficiency projects, including low-, moderate- and market-rate customers.

Stakeholder and Community Engagement Feedback

The Capital Region Hub identified the following stakeholders and community members for specific feedback and input on barriers and opportunities:

- Contractors

- Members of low-income communities
- Seniors
- Farmers
- Landlords
- Workforce development participants

Contractors

The Capital Region Hub surveyed and interviewed contractors about barriers and opportunities to clean energy adoption. Staff also joined contractors on energy audits to understand building issues, procedures and customer education. Most of the barriers identified are specific to the NYSERDA EmPower+ program and generally fall into the following categories:

Survey Highlights

Contractors:

Desire to expand by adding another crew

Want to expand services to become a 'one-stop' shop

Are challenged with staffing and capital requirements

Prefer to train new hires themselves

- Program administrative burden: Many participating EmPower+ contractors interviewed are small businesses with minimal administrative staff to complete the required paperwork. Contractors that considered program participation reported that the administrative burden was the reason they don't become a NYSERDA participating contractor – there is not enough money in an EmPower+ project to pay for the extra administrative costs and potential call back burdens.
- Need for stronger communication between NYSERDA, program support contractors and EmPower+ installation contractors. Contractors expressed concerns about the negative impact of decisions made by inexperienced third party program support staff and mentioned a lack of understanding of the impact of decision delays on contractor cash flow. Regular communication and training programs jointly held with contractors, Hubs and staff of TRC, CleaResult, and Honeywell will facilitate understanding of different perspectives and best practices among all parties responsible for successful implementation of the program. Programmatic changes should be communicated clearly to joint meetings of all staff of all participating contractors responsible for program implementation.

Recommendation: Facilitate joint program trainings among all NYSERDA contractors participating in or supporting the EmPower+ program

Communication could be strengthened with additional help line hours; project 'ride-alongs' by non-field staff (support contractors, Hub staff, etc.) to heighten awareness of project implementation issues and customer interactions; and contractor/Building Performance Contractors Association (BPCA) consultations throughout the development of program modifications (not just at the beginning stages of program design).

- Connecting customers with appropriate contractors: NYSERDA-managed Participating Contractor lists should be up to date and more detailed about contractor availability, location of offices/territories and services provided. For example, mobile homeowners should be able to search and find contractors who service mobile homes, or families with health issues should be able to locate contractors who offer insulation other than spray foam. This would reduce delays due to contractor reassignments and increase customer satisfaction. The ability to search the contractor list as well as posting a list of questions to ask contractors before selecting them would be very useful to consumers.
- Increase scope and pricing/value of energy audits: An energy audit can be a great resident education tool concerning home energy use and health hazard mitigation (importance of ventilation, problems with mold, etc.) Assessments are often considered a loss leader in that the expense of the audit including paperwork processing time can exceed reimbursement rates. However, if an energy efficiency project results from the audit, the processing time can be better absorbed into overall project costs. Contractors should be incentivized to provide comprehensive home energy education even if they identify a building issue that prevents a project from proceeding.

Recommendation: Increase reimbursement rate of Energy Assessment so that home-owners receive more comprehensive energy and hazard mitigation education

- Increased contractor incentives for difficult projects: In communities with few energy contractors, projects can be rejected by contractors due to their location or building issues. To increase the number of successfully completed projects, NYSERDA could share project information from prior audits, better match contractors to projects based on contractor strengths, and offer bonus incentives for long deferred projects.
- Incentives for new participating contractors: To grow the contractor pool, Building Performance Institute (BPI) and installation/program administration training incentives as well as discounted energy audit equipment may attract potential contractors. Women- and minority-owned business entrepreneurs should be incentivized to become participating contractors to diversify the contractor pool.

- Clearer, more transparent messaging about program guidelines: Contractors requested better messaging about program limitations, including clearer EmPower+ website information about limits to program funding for individual measures and project type limitations given building structure and current heating fuel. Clear messaging about program caps to certain measures such as heat pump hot water heaters or why windows are not funded would build trust in the program and the EmPower+ implementation contractors. A frequently-asked-questions webpage could address this concern.

Case Example: The Hub assisted a Tier 1 Empower+ customer with her application. She received notice that she was approved for up to $10,000. The energy audit revealed that she only needed a new hot water heater. Because of the programmatic cap on measures, she needed to pay $1700 out of pocket. The customer could not afford this and was extremely disappointed the program did not allow her to use any more of the 'full budget' for this measure. The contractor could not point to official consumer facing NYSERDA information to show that the measure was capped. The project was not completed, and the customer is not a program advocate.

EmPower+ Customers

The Capital Region Hub has had 2+ years of experience working with low- and moderate-income customers eligible for the EmPower+ program and share the following observations:

- Information Gaps: As the 'person in the middle' between NYSERDA, the EmPower+ contractor and the customer, Hub staff benefit from having up to date information on program deadlines and rule changes as well as project status and/or issues. With more information, Hub staff can help set customer expectations and identify resources to move a project forward. Hub staff can share how age and condition of the home will impact eligibility and describe potential issues such as caps on specific measures.
- Projects are not proceeding due to low incentive caps: Lower income households have few resources to complete projects that exceed the incentive caps. Borrowing money may not be an option; projecting energy savings to pay for improvements can be difficult. The impact of the formula to determine customer contributions should be regularly evaluated to see how many projects are deferred as a result.

- Pre-weatherization home repairs are needed: Low-income households tend to live in the lowest quality housing that need more substantial measures. Mold, roof leaks and asbestos (vermiculite) often halt potential projects. Prior to electrification, electrical system upgrades may be needed.

Case Example: The Hub assisted a Tier 3 Empower+ customer who had her insulation project deferred due to vermiculite in her attic. The homeowner paid to have it removed. When the EmPower+ contractor returned they discovered the abatement job was incomplete. When full abatement was finally achieved, disconnected duct work was revealed. This 'add insulation to my attic' project soon became overwhelming. The Hub advisor outlined the customer's options to proceed, and the customer chose to move forward with the insulation project. The Contractor stated he would have walked away from such a complicated project and appreciated the Hub's work to outline customer options. The home is now ready for heat pumps.

- Gap funding not consistently available: Repair grants are not consistently available throughout the Capital Region; due to staffing and other issues, home repair agencies can be difficult to connect with; home repair grant processes, such as requiring multiple bids for work, may not be compatible with NYSERDA program processes.
- Complicated and time-consuming process: Successful projects often involve the coordination of many different programs including HEAP, home repair programs, and EmPower+. The process involves sharing a lot of personal financial information and time off work for energy audits, disruptive repair work, post work inspections etc.

Case Example: The Hub assisted a mobile homeowner with no heat and few resources left after recently replacing her hot water heater. She was unaware of the EmPower+ program. Her first NYSERDA contractor was a poor fit, and the Hub helped her reapply. The home was already well insulated, but she struggled with the gap funding to match the NYSERDA EmPower+ incentive. With the help of her Energy Advisor and new contractor, she accessed the NYS Clean Heat rebate, the mod-ASHP study money and a home repair grant. Her out-of-pocket cost was $2,000, and she is happy with her heat pumps and how much money she saved on fuel oil costs.

- Need for more comprehensive Quality Assurance reviews: The Hub has come across homes with prior weatherization efforts that have resulted in mold post-installation. A Quality Assurance check to make sure that the project work scope is appropriate given building conditions such as poor ventilation or dirt floors would benefit consumers. Incentives for

the control of moisture in tight homes should be increased and not tied to cost-effectiveness metrics.

- Opportunities to switch to clean heat at technology end-of-life: Homes built in the 1990s and early 2000s have heating systems that need to be changed out. Campaigns can be developed to promote the transition to clean energy systems.
- Misinformation Campaigns: Active misinformation campaigns are targeting primarily rural populations claiming that the government will soon come into their home and take out their existing gas stove, resulting in mistrust of programs. Local public officials are sending out disinformation mailers and not promoting availability of incentives to their constituents.

Seniors

Capital Region Hub staff have visited Senior Centers and found a receptive audience for incentives to increase energy efficiency in their homes. The Capital Region Hub offers the following observations:

- Income: Seniors face income challenges including fixed, low incomes; limited desire to borrow money; insufficient tax liability to take advantage of tax credits; needed retirement savings that disqualify them for some home repair programs.
- Need for application assistance: seniors have varying levels of ability or desire to use internet application programs; some do not use email; some need help with paper forms due to poor eyesight.
- Housing stock: Seniors often live in housing ideal for energy efficiency improvements. One challenge is the perception that the house they have lived in for years is fine as is.
- Scams: Seniors are rightly concerned about falling prey to scams including contractors who want to take advantage. Partnering with trusted organizations such as senior centers and libraries add legitimacy to Hub messaging. Stronger and clearer official NYSERDA website information will also reassure seniors about program guidelines and opportunities.

Rural and Farm Customers

The Capital Region Hub believes rural communities offer great potential for participation in the move to clean energy, as most households rely on delivered fuels.

- Outreach: Reaching low-income rural consumers requires different strategies than urban customers and may involve deeper connections with town and village offices, elected officials, libraries, and churches. Farm communities also rely on the Cornell Cooperative Extension network, and newsletters including Ag Clips.
- Messaging: Capital Region rural communities have been the targets of aggressive misinformation campaigns by delivered fuel companies that oppose clean energy measures. A move to clean energy should focus on pragmatic energy efficiency measures and savings.

Survey Highlights

Farmers:

55% of respondents have not taken energy efficiency measures

Nearly all use delivered fuels.

All are interested in more information on NYSERDA and National Grid incentives

- Incentives: Continue LED farm lighting upgrade incentives (set to end in 2024); incentivize energy efficient new construction farm buildings

Tenant Survey Highlights

73% pay their own utilities

66% have hot water heating systems

35% had a repair issue with their home

50% said their landlord would be willing to make repairs

Landlords-Tenants

Capital Region DACs are heavily renter occupied – two-thirds of occupied units in Albany, Schenectady and Rensselaer County DACs (nearly 50,000 units) are rental units. The vast majority of DAC housing units (87%) were built before 1990 and 77% of all units in DACs are found in 1-4 unit properties. The Hub has found that households who would most benefit from energy efficiency projects are often living in the housing the most difficult to weatherize.

- Housing Stock difficulties: The EmPower+ program is designed to retrofit occupied homes, making interior improvements difficult and disruptive. Brick buildings have limited opportunities for attic and wall insulation. Wood frame buildings on narrow lots prevent easy access to exterior blown in insulation. Consider allowing vacant rental properties to be more fully insulated with a commitment to rent to eligible tenants.
- Financing: Landlords stated the biggest barrier to completing energy upgrades to rental properties was the upfront expense. Few grant programs are available for repair of rental units. The Capital Region is experiencing a very tight rental market, so investing in energy upgrades to units is not needed to command top rental rates.

- Project coordination: Landlords identified issues such as length of time involved in completing a project (not an emergency program), coordinating with tenants, and paperwork. A Hub campaign could assist with incentives for tenants to participate.

Case Example: The Hub assisted a tenant who was reluctant to have upgrades completed to her home for fear of a rent increase. Hub staff communicated the tenant protections with the Landlord Agreement to both the tenant and landlord. In the application process, the tenant discovered they were eligible for HEAP. Given the amount of envelope work needed for her home, qualifying for HEAP and extended OTDA funding was important to also assist with a new heating system. The customer was extremely concerned that the OTDA funding would expire while waiting for HEAP season to open and then waiting for HEAP approval (which came 6 months after she applied). She decided to proceed without extra funding, and had her home well insulated, realizing cost savings and other benefits. The landlord has discussed increasing the rent, however, and the Hub has provided the tenant with talking points regarding tenant protections. Thanks to a recent change in policies, the tenant was able to reapply for assistance and now has heat pumps installed in her home.

Workforce

The Capital Region Hub's workforce team has worked to build relationships and map the workforce development space in the Region. The Capital Region Hub is engaged in community outreach to connect people to training opportunities, wrap around services and job placement in clean energy careers.

Workforce Survey Highlights

Barriers include:

Transportation

Inflexible work hours

Mental Health

Family Responsibilities/Child Care

The Capital Region's SEAT Center is a model of community-oriented workforce development. Working with young adults aged 18-24, SEAT helps participants obtain their General Educational Development (GED) diploma, offers leadership training, and graduates young people to HVAC, construction, culinary and other opportunities. Building on relationships with HVAC employers, SEAT Center graduates receive on-the-job training with local companies leading to permanent employment.

The Hub also supported the Albany Community Land Trust's Ironworkers Cohort. This program targeted a slightly older population, and the group was provided with transportation services, work boots,

tools, stipends, mentorship and mental health support. A focus group of program participants revealed the following issues:

- Lack of communication, both about time between training and actual job starts (jobs were promised but did not materialize) and the amount of classroom v. on-the-job training opportunities.
- Transportation issues
- Employer expectations of being on-time for the job was a challenge for some who have not had a stable job
- Uncertain work locations and schedules that commonly occur with building trades jobs made transportation and child care planning difficult.
- Cultural differences (race and age) that make worksites extremely difficult for new workers, for example when an apprentice is a young Black man and the balance of workers at the job site are older white men.

The primary metric of the Capital Region Hub's workforce development effort is to increase participation in Clean Energy Internships, Climate Justice Fellowships, and On-the-Job Trainings through NYSERDA approved contractors. Contractor interviews reveal that these programs are opaque and unviable for busy contractors without administrative staff. Programmatic consistency and integration of all NYSERDA workforce programs into one seamless initiative would allow contractors and their training partners to more easily collaborate and transfer trainees into the workforce.

For many workforce recruits living in DACs without a college degree or who were previously incarcerated, the jobs that are available in Clean Energy are difficult – insulation jobs working in extremely hot, confined spaces or building trades jobs that are inconsistently available. These are jobs that our region struggles to fill. In addition, a disconnect exists where most of these entry-level workers come home to buildings they do not own, that are in need of energy efficiency services and lack cooperation from landlords or resources to improve units. Participants in the clean energy economy do not realize the benefits of NYSERDA programs in their own homes.

V. Barriers and Opportunities

The following analysis of Barriers and Opportunities for DAC Market Segments is based on the Capital Region Hub's research, conversations with stakeholders and experiences implementing NYSERDA programs.

Participation in Clean Energy Work Force	
Barriers	Opportunities
Jobs/training not easily accessible due to transportation barriers/childcare issues	Provide stipends for transportation services; drivers training courses; childcare supports
Cultural barrier at job sites; negative mindset of job seekers due to poor mental health/self-esteem, lack of soft skills	Support mentorship programs to help new workforce members address cultural differences, manage job expectations, support cohort/peer mentoring programs including DEI training
Poor communication about training requirements and work opportunities/schedules in the building trades	Partner with existing Black Building Trades Council for peer sharing of apprenticeship experience
NYSERDA workforce development program not easy to access by smaller implementation contractors due to administrative burden	Integrate OJT/Internships/Fellowships into one program; unlock training funds to non-union organizations (EmPower+ contractors not unionized)

Engaging Regional Partners	
Barriers	Opportunities
Weak Hub connections with State funded programs such as local WAP and DSS agencies	High level NYS commitment to coordinate services
Agencies serving low-income populations are at capacity and not able to assist with marketing	Offer agencies financial incentives to market and engage their customers in NYSERDA programs

Clean Energy Program Adoption: Physical & Economic Structures	
Barriers	Opportunities
Existing housing stock in DACs is difficult to fully insulate (brick buildings, row houses, buildings with narrow side alleys)	In DACs, permit EmPower+ funds to be used to fully insulate unoccupied buildings during renovation (including privately owned)

Buildings cannot be weatherized due to poor condition of properties, including deferred maintenance, mold, asbestos, lead	Partner with NYS HCR and nonprofits to leverage repair funds, especially for energy projects, including rentals, in DACs
Poorly designed insulation projects result in mold post installation	Prioritize review of the impact of ventilation, dirt basements on house after installation; broaden QA checks to include work scope review in addition to installation review
Unmotivated rental property owners to improve properties due to tight rental market, few repair incentives	Increase rental rehab funding programs in DACs.
Few incentives for buildings built after 1990 to switch to clean energy technologies	Develop programs, marketing to promote clean energy/highly efficient replacement systems

Clean Energy Program Adoption: Financial and Knowledge Resources & Capacity	
Barriers	Opportunities
Lack of resources to fund project gap after measures meet incentive caps	Allow EmPower+ to fully fund projects up to program maximum with more flexible caps on specific measures; fully fund health and safety measures
Low-income consumers, including farmers often do not have time to facilitate projects	Work to braid wrap around programs so that fewer site visits are required; increase incentives for evening and weekend work; identify industry 'down' times to target when to connect with farmers, small businesses.

Clean Energy Program Adoption: Perspectives and Information	
Barriers	Opportunities
Current messaging leads consumers to believe they will receive more funding and measures than they will qualify for; leads to lack of trust in agencies	Opportunity to promote average funding awards (i.e., typical project funding of $7,500 v. "up to $10,000"); clarify that not all housing types/ages/fuel sources qualify for incentives
Lack of knowledge of program availability	Continue to analyze market segments for ways they obtain trusted information and partner with organizations to deliver messages that resonate with that market segment

Active misinformation campaigns result in mistrust of programs	Continue to acknowledge consumers have choice, but note incentives, savings, and health benefits to clean energy projects

Clean Energy Program Adoption: Programmatic Design and Implementation	
Barriers	Opportunities
Lack of transparency on program requirements	Offer FAQs on NYSERDA website that contractors can point to regarding program limits
Lack of system-wide contractor accountability	Improve review of all NYSERDA program implementation contractors; encourage cross training among EmPower+ contractors/CleaResult/TRC/Hubs so that all contractors understand implementation barriers
Projects which would benefit low-income customers are not completed due to program rules such as caps on measures	Ensure opportunities for program exception reviews; increase program flexibility
Customers are being paired with inappropriate contractors	Improve contractor selection webpage to show contractor location and specialties (i.e., insulation v HVAC)

VI. Next Steps

The Capital Region Hub recommends prioritization of the following sets of opportunities and recommendations:

Opportunity	Lead Entity	Timeframe/Ease of Implementation
Increase home repair resources available in the Capital Region to address funding gaps, i.e. apply for funding from NYS Homes and Community Renewal specifically to match NYSERDA incentives	Capital Region Hub home repair programs: Affordable Housing Partnership (AHP)Targeted Home Improvement Program; TAP Inc. application to NYS HCR; Radix/AHP application to the Environmental Protection Agency	Q3 2024-Q4 2024
Incentivize referrals from nonprofit agencies	Capital Region Hub pilot project/community campaign	Q4 2024

Improve messaging to advertise average incentive amounts rather than total funding potential	Capital Region Hub with help from NYSERDA	Q3 2024
FAQs to aid understanding of program guidelines	Hubs and NYSERDA	Q3 2024
Better connections to WAP/DSS agencies	NYSERDA facilitated agency introductions	Q4 2024
Joint contractor trainings/forums so that all NYSERDA and contractor staff are on the same page/understand decision impacts on program implementation	NYSERDA hosted forums which include NYSERDA program design and Hub staff as well as TRC, Honeywell, CLEAResult, and installation contractors	Q4 2024
Improve community connections to workforce development programs with wrap around services	Hub Outreach	Q4 2024
Consider programmatic changes to address deferred projects, funding gaps, funding for vacant buildings etc.	NYSERDA review of statewide RABA program recommendations	Q4 2024 – Q1 2025

Conclusion:

The Capital Region Clean Energy Hub is dedicated to working with NYSERDA and EmPower+ contractors on the successful implementation of clean energy projects. The Capital Region Hub recognizes the efforts that are continually being made to improve the implementation of these very impactful programs. Recommendations in the Capital Region's RABA are made in the spirit of supporting greater consumer uptake of NYSERDA programs.

The Capital Region Hub will continue to update the RABA and will use the findings to develop a strong equitable engagement outreach plan.

Additional supporting documentation (survey and focus group results, data sets, lists of workforce development partners, etc.) can be found on our website

https://www.cleanenergycapitalregion.org/regional-barriers

DATA SOURCES

Capital Region Economic Development Council 2024-2028 Strategic Plan
https://regionalcouncils.ny.gov/sites/default/files/2024-01/REDC%20Strategic%20Plan%202023_High%20Rez.pdf

NYS Department of Labor 2024 Significant Industries – Capital Region
https://dol.ny.gov/system/files/documents/2024/08/2024-significant-industries-capital-region.pdf

Capital District Regional Planning Commission Capital District Data Spring 2017, Agricultural Economy of the Greater Capital Region Foodshed
https://cdrpc.org/wp-content/uploads/2015/07/v40_n1.pdf

New York State Low- to Moderate-Income Census Population Analysis Tool
https://www.nyserda.ny.gov/About/Publications/Evaluation-Reports/Low--to-Moderate-Income/LMI-Census-Population-Tool

NYS DATA.NY.GOV Residential Existing Homes Energy Efficiency Projects
https://data.ny.gov/Energy-Environment/Residential-Existing-Homes-One-to-Four-Units-Energ/4a2x-yp8g/about_data

Capital Region Indicators
https://www.capitalregionindicators.org/

Census Reporter
https://censusreporter.org/

US Census Data, American Communities Survey 2022 5-year estimates
Source: Cadmus data provided to Clean Energy Hubs

ACRONYMS

ACAP: Albany Community Action Partnership

AHP: Affordable Housing Partnership of the Capital Region Inc.

CCE Albany: Cornell Cooperative Extension Albany County

CDCE: Capital District Community Energy

CDRPC: Capital District Regional Planning Commission

CEO: Commission on Economic Opportunity

CREDC: Capital Region Economic Development Council

DAC: Disadvantaged Community

DSS: Department of Social Services

HEAP: Home Energy Assistance Program

HERR: Heating Equipment Repair and Replacement Program

HVAC: Heating Ventilation and Air Conditioning

NYS HCR: New York State Homes and Community Renewal

NYSERDA: New York State Energy Research and Development Authority

OJT: On the Job Training

OTDA: NYS Office of Temporary and Disability Assistance

RABA: Regional Assessment and Barriers Analysis

Radix: Radix Ecological Sustainability Center

SEAT Center: Social Enterprise and Training Center

WAP: Weatherization Assistance Program

November 2024

CENTRAL NEW YORK REGIONAL CLEAN ENERGY HUB REGIONAL ASSESSMENT AND BARRIERS ANALYSIS

EnergySmart CNY
Central New York Regional Clean Energy Hub

About EnergySmart CNY

New York State is embarking on a transition to an inclusive clean energy powered economy. All residents, businesses and communities across the State will have access to new opportunities to benefit from this transition including clean energy careers, home improvements, and clean transportation options. But there is a lot of information out there, and people may not know where to start. To help New Yorkers access and navigate these opportunities, the New York State Energy Research and Development Authority (NYSERDA) created the Regional Clean Energy Hubs. Clean Energy Hubs connect people to the growing clean energy economy.

EnergySmart CNY is the Regional Clean Energy Hub serving the Central New York (CNY) counties of Cayuga, Cortland, Madison, Onondaga, and Oswego as well as assisting the Haudenosaunee nations in our region. It is a collaborative project of the CNY Regional Planning and Development Board (CNY RPDB), Alliance for a Green Economy (AGREE), and Greater Syracuse Works (GSW), the evolution and combination of the prior Solarize, HeatSmart CNY, and other energy education programs. EnergySmart CNY provides information to individuals, small businesses, and affordable housing owners about the benefits of the clean energy economy, ways to reduce energy use and costs, and how to make more informed energy decisions.

Central New York Regional Planning & Development Board

AGREE
Alliance for a Green Economy

GSW
GREATER SYRACUSE WORKS

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Executive Summary

Purpose and Objectives

This Regional Assessment and Barriers Analysis (RABA) will guide the development of EnergySmart CNY. EnergySmart CNY is a partnership between local organizations with on-the-ground expertise, knowledge, and relationships and NYSERDA, a state agency with public resources and expertise in clean energy technologies, economics, and program design. The RABA provides regional context for our program operations, identifies trends and other important factors that impact our work in the region, develops recommendations for local and state program administrators, and outlines next steps for our program to maximize our reach and impact.

Key Findings

- The region is on the cusp of two major projects: a New York State Department of Transportation (NYSDOT) intensive highway reconfiguration project (I-81), and the siting of a gigantic microchip fabrication facility for Micron Technology (hereafter referred to as Micron). Both projects will change the region, creating generational opportunities for economic development and enormous challenges as the region undergoes population growth and new demands on local resources. This development will have major energy, housing, transportation, workforce, and environmental implications that intersect with our work.
- There is a great need for the information provided by EnergySmart CNY – many residents have not heard about the programs we can connect them with. Longstanding programs like Home Energy Assistance Program (HEAP) and the Weatherization Assistance Program (WAP) are most known by residents while newer programs like EmPower+ or Comfort Home have less name recognition. There is a general lack of knowledge about program eligibility, project costs/benefits, and how to access programs, and many residents assume programs are not for them due to a variety of factors detailed in this report.
- Old housing stock and a lack of resources for home investments make our work to help residents insulate their homes and adopt clean heating and electricity sources challenging, especially when working to prioritize low-income residents and residents living in DACs. At the same time, projects completed for these residents can dramatically improve quality of life.

Community Engagement

EnergySmart CNY used a variety of quantitative and qualitative methods to gain insight into our region's access to clean energy barriers and opportunities, including one-to-one conversations with local organizations, community-based conversations with residents, surveys, stakeholder meetings, and roundtables. In all, our engagement activities gathered feedback by reaching well over 1,100 Central New York residents, the majority of whom live in disadvantaged communities (DACs) as defined by New York's Climate Justice Working Group.

- Program incentives have not kept up with inflation and are insufficient to cover the measures that many homes need to become adequately insulated and efficient. Our program struggles to find solutions for situations involving broken, unsafe, or inadequate heating systems for low-income residents due to gaps in the programs covering heating systems.
- Our region's clean energy employers struggle to recruit and retain employees in a tough job market, while residents who could benefit from available jobs face transportation, childcare, and other resource constraints that make employment difficult. Clean energy employers such as home performance and heating, ventilation, and air conditioning (HVAC) contractors who work with state and utility incentive programs like EmPower+ face challenges with high administrative burdens and sudden program rule changes that decrease the economic viability of projects.
- Despite these challenges, our region has many assets to draw upon and build from as we seek to better serve residents and scale our outreach and operations. Central New York has a rich history of energy and technological innovation, and previous Solarize and HeatSmart campaigns have built familiarity with clean energy technologies and established strong relationships with contractors. The region offers numerous redevelopment sites, including brownfields and capped landfills for community solar, and approximately 56 publicly owned wastewater treatment facilities that could support thermal energy networks. Notably, National Grid's Thermal Energy Network pilot project at the Metropolitan Syracuse Wastewater Treatment Plant aims to harness wastewater heat exchange technology for heating and cooling new residential and commercial buildings.

Recommendations and Next Steps

The RABA identifies multiple strategies for addressing these barriers through strengthening our local partnerships, focusing and honing our marketing, streamlining our processes, and providing workforce connections and wraparound services. Some highlights include:

- Strengthening local clean energy knowledge through development of a newsletter, energy literacy workshops, and webinars that are customized to address the regional characteristics, demographics, interests, and trends;
- Enhancing outreach through the development of a community advocate/volunteer/influencer program and incorporation of multiple languages;
- Developing outreach materials and strategies specific to priority audiences such as renters, landlords, retired homeowners, new homeowners, HEAP recipients, households on delivered fuels, moderate income households;
- Relaunching updated HeatSmart and Solarize campaigns in response to community-identified interests in clean energy and building on previous success and brand recognition;
- Identifying needs of jobseekers and connecting them with on-the-job training when needed, connect them with childcare and/or older adult care, General Education Development (GED) programs, regional on-demand transport where available, driver's license programs etc.; and
- Providing training to contractors who seek to diversify their workforce and customer base; highlighting employers who are diversifying their workforce.

It is also clear in the findings of the RABA that overcoming our identified barriers will require strong collaboration and responsiveness from our state partners in this work. Some of the solutions identified will need technical and material support from NYSERDA and/or programmatic changes developed in consultation with our program, our sister hubs across the state, and other stakeholders.

II. Baseline Regional Characterization

Central New York (CNY) is geographically centered in Upstate New York and includes the counties of Cayuga, Cortland, Madison, Onondaga, and Oswego. The region covers an area of 4,146 square miles, centered on the Syracuse metropolitan area with surrounding suburban areas, small cities and towns, and rural farming communities. It spans the territories of three nations of the Haudenosaunee, namely the Oneida, Onondaga, and Cayuga Nations.

Sociodemographic Data

According to the 2020 U.S. Census, the region has a population of approximately 785,000 residents, with 61% located in Onondaga County. For the past 30 years, the region has had a relatively stable population, a trend that is likely to change in the next decade due to the siting of a large microchip fabrication facility in the northern suburbs of Syracuse, which is expected to bring 125,000 new people to Onondaga County in the next decade (Coin & Weiner, 2023).

There are approximately 326,619 households in CNY, and the average household size is 2.3. The median age for the region is 40.8 years. The average household income in CNY is $64,623. Over 51% of CNY households are considered low-to-moderate income (LMI), defined by NYSERDA as those with incomes at or below the higher of 80% of area median income (AMI) and 80% of state median income (SMI).

According to CNY Vitals:

> "Within counties, poverty rates vary widely. The region's highest concentrations of poverty lie within Syracuse census tracts with large populations of immigrants, African Americans, and Hispanics. The city's poverty rate, which was over 30% in 2020, and the racial disparities in poverty, are problems which many organizations are working to examine and address.
>
> Rural poverty is also a concern, as shown by the high poverty rates in many small cities and towns. Auburn, Cortland, and the City of Oswego have poverty rates of 18%, 23%, and 28%, respectively. Even in Madison County, which has the lowest countywide poverty rate in Central New York, there are pockets of high poverty such as the village of Morrisville, where over 21 percent of residents lived below poverty in 2020."

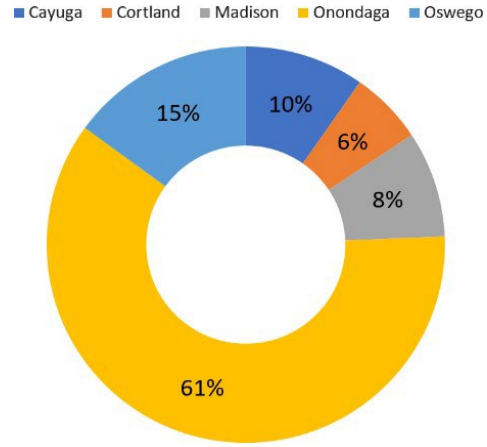


FIGURE 1: CNY POPULATION

Data on this page comes from the 2020 U.S. Census, and the 2017-2021 American Communities Survey Public Use Microdata Sample (PUMS)

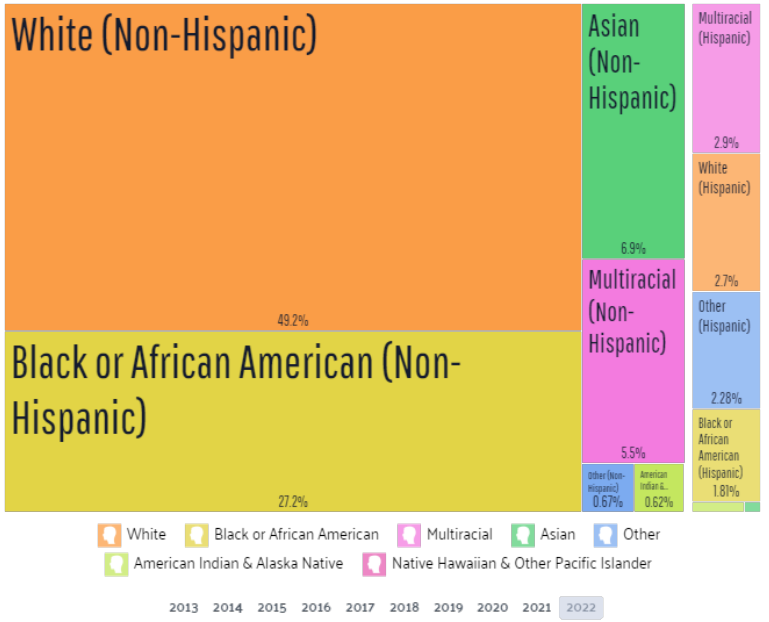
Racial and Ethnic Diversity

Across CNY, approximately 79% of the population identifies as non-Hispanic white. The City of Syracuse has a more diverse population, with less than half the population (49%) identifying as non-Hispanic white.

TABLE 1: RACE/ETHNICITY IN CENTRAL NEW YORK (2020 US CENSUS)

Race/Ethnicity	Population #	Population %
American Indian and Alaska Native	4,169	0.53%
Asian	23,050	2.94%
Black or African American	60,407	7.69%
Hispanic or Latino	36,155	4.61%
Native Hawaiian and Other Pacific Islander alone	196	0.02%
Some other race	2,901	0.37%
Two or more races, not Hispanic or Latino	37,157	4.73%
White	621,079	79.11%
Total	785,114	100.00%

FIGURE 2: RACIAL DEMOGRAPHICS IN CITY OF SYRACUSE (DATAUSA)



Languages Spoken

While 91.7% of CNY residents speak only English at home, there are still over 60,000 people who speak another language and 22,500 people in CNY who report that they speak English less than "very well." Nearly 5,000 who say they do not speak English well are Spanish speakers. Over half of these Spanish speakers live in the City of Syracuse, and 84% are located in Onondaga County. "Other Indo-European Languages" are the most prevalent language group in the surrounding counties. Syracuse has always been a city of immigrants and continues to welcome people from around the world to resettle here. The Syracuse City School District (SCSD) reports that there are 74 languages spoken by students in the district. Regionally, the most prevalent languages other than Spanish are Chinese, Arabic, Vietnamese, Ukrainian,

Data on this page comes from the 2020 U.S. Census, the U.S. Census 2022 ACS 5-year Estimate Subject Tables and the Syracuse City School District

Swahili, and Amharic, Somali or other African languages. See Appendix C. 1 for details.

Communities of Particular Focus for EnergySmart CNY

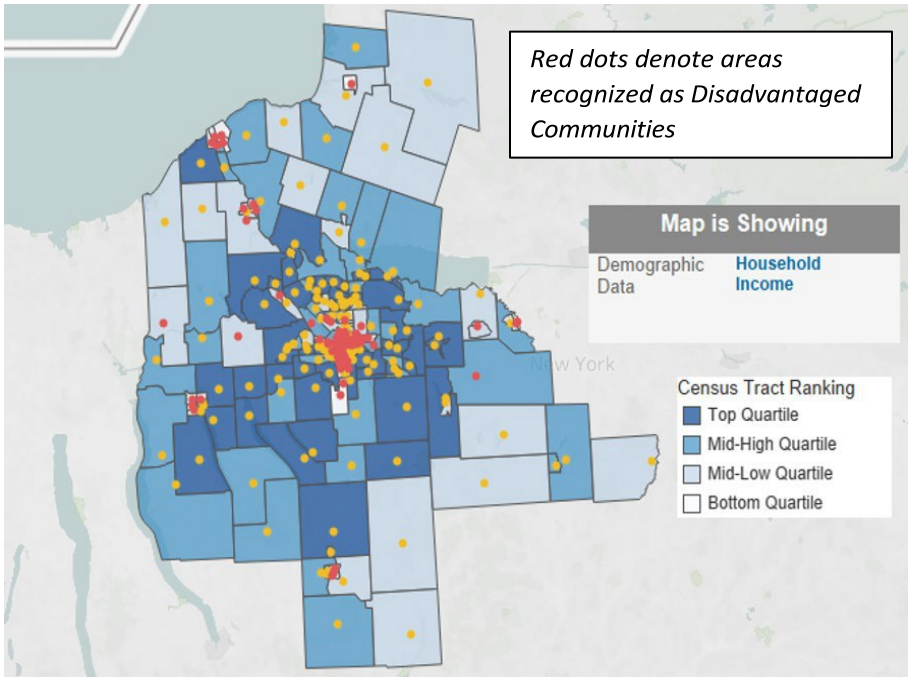
Regional Clean Energy Hubs focus especially on helping people in DACs as defined by NYS, while also serving people throughout CNY as well as the Haudenosaunee nations in our region.

TABLE 2: DACS IN CNY

Name	County	Portion
City of Auburn	Cayuga	All but SE 1/4 of city
Town of Conquest	Cayuga	Entire
Town of Mentz	Cayuga	Entire
City of Cortland	Cortland	All but western section north of SUNY Cortland
Town of Fenner	Madison	Entire
Town of Lincoln	Madison	Entire
Town of Smithfield	Madison	Entire
Town of Stockbridge	Madison	Entire
Village of Canastota	Madison	Entire. DAC is larger than village boundaries
City of Syracuse	Onondaga	About half of the city
Town of Dewitt	Onondaga	East Syracuse and other portions of the town
Town of Elbridge	Onondaga	Entire
Town of Geddes	Onondaga	Solvay and northern part of town
Town of Onondaga	Onondaga	Nedrow and area near Onondaga Hill
Town of Salina	Onondaga	Most of the town, except Lyncourt and Liverpool
Village of Baldwinsville	Onondaga	Portions of village and adjacent area
City of Fulton	Oswego	All but the SW ¼ of the city
City of Oswego	Oswego	Entire
Town of Granby	Oswego	Entire
Village of Pulaski	Oswego	Entire

New York's Climate Leadership and Community Protection Act (CLCPA or simply "NY's Climate Law") recognizes that low-to-moderate income households are not limited to the geographically identified DACs and need to be served wherever they are located. In addition to the geographically delineated DACs, there are 35 other census tracts in CNY where the average household income is in the mid-low quartile, indicating a high proportion of the population that is low to moderate income. These include the sections of the City of Auburn, Cortland, Fulton that are not official DACs, and significant remaining portions of the City of Syracuse. See Appendix C.2 for the full list.

FIGURE 3: HOUSEHOLD INCOMES IN CNY BY CENSUS TRACT



SOURCE: GAGNON & PODAPATI (2023).

Buildings and Sector Assessment (Dominant land uses, building typologies)

Onondaga County is significantly urban and suburban, while still retaining rural areas. Cayuga, Cortland, Madison and Oswego Counties are predominantly rural, each with at least one small city and many villages and hamlets surrounded by farmland and forests.

Housing

The number of housing units in CNY is estimated at 353,838. 90% of units are occupied. Regionally, 68% of units are owner occupied, while 32% are renter occupied. In Syracuse, the owner-occupancy rate is lower at 43%. Racial disparities in home ownership and mortgage lending persist, with home ownership rates much higher and mortgage and refinance application denial rates much lower for white households as documented by the New York Attorney General's Office. While there are some high-rise apartment buildings in the City of Syracuse, most apartments are three stories or less, often garden apartment style. Single family housing is the predominant housing type in the region. Most of the single family attached 2-4 units and multifamily buildings are located in DACs, as is most of the renter occupied housing.

Typical of communities in the Northeast, the housing stock in the region is old, with 27% of the units built before 1939 and 59% built before 1969. In DACs, 38% were built before 1939. Most of the housing is located in Onondaga County, including 47,500 homes built before 1939, the majority of which are located in DAC census tracts. Over ¼ of the homes in each county are located in DACs.

The median housing value in CNY is $187,113 and the median rent is $890, less than the national average. However, rents in Syracuse have jumped dramatically since 2020, climbing a whopping 27%, faster than any other city in the U.S. (Tampone, 2023). In the City of Syracuse DACs, the median home value is only $98,324. In Oswego and Canastota, it is $118,000, in Cortland $110,000. In Madison County, the Towns of Lincoln, Stockbridge, Smithfield, and Fenner are all designated as DACs, but collectively have 88.5% homeownership and a median home value of $198,019.

Data on this page comes from the 2020 U.S. Census, the U.S. Census 2022 ACS 5-year Estimate Subject Tables, and Gagnon & Podapati, 2023.

FIGURE 4: HOUSING OCCUPANCY IN CNY

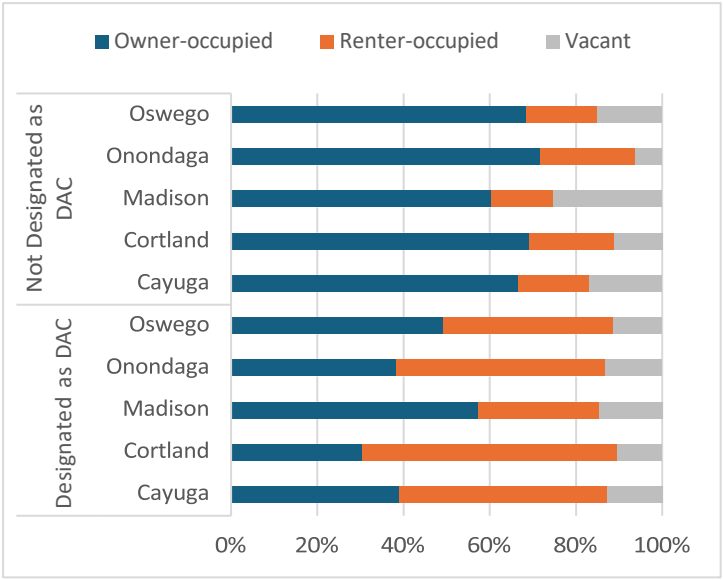
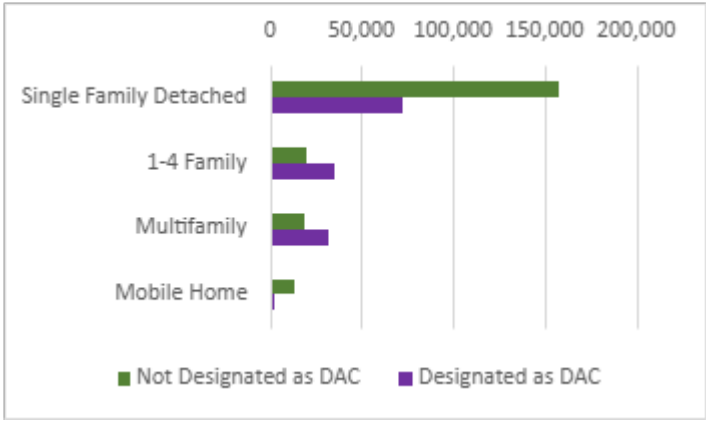


FIGURE 5: HOUSING TYPES IN CNY



Other Buildings

Sixty-nine percent (69%) of the commercial and industrial buildings in CNY are located in Onondaga County. Over fifty-nine percent (59%) of the buildings in CNY were built before the first national energy codes went into effect in 1975. (Parker, 2023)

"Other fuel" use (propane or oil, for example) is almost entirely attributable to properties in the other four counties. Buildings in Onondaga County are almost all heating with gas or electric.

Buildings in the food service sector represent the largest energy users in buildings smaller than 10,000 sq ft (Figure 8). These buildings have large refrigerators, many commercial-grade appliances, including substantial gas-driven ranges. Their HVAC systems are almost entirely "small packaged units." Observations around CNY indicate that many of these are already ductless minisplits, a form of air source heat pump. Other building types of this size are office and mercantile. Offices may include buildings owned by nonprofit organizations.

FIGURE 8: SITE ENERGY USE BY BUILDING TYPE

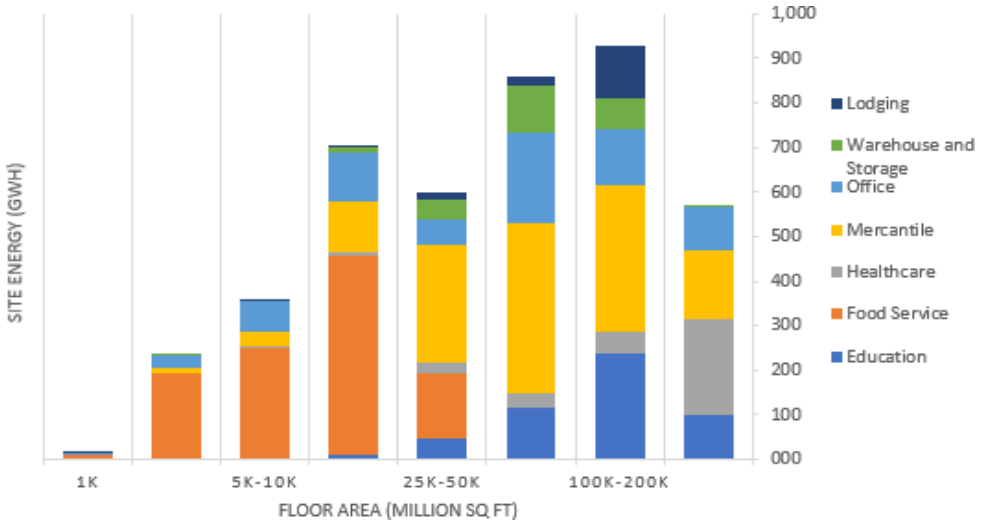


FIGURE 6: NUMBER OF COMMERCIAL & INDUSTRIAL BUILDINGS IN CNY BY BUILDING SIZE (SQ FT)

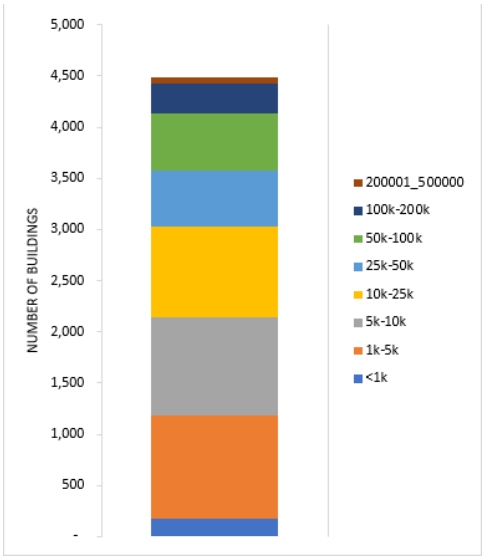
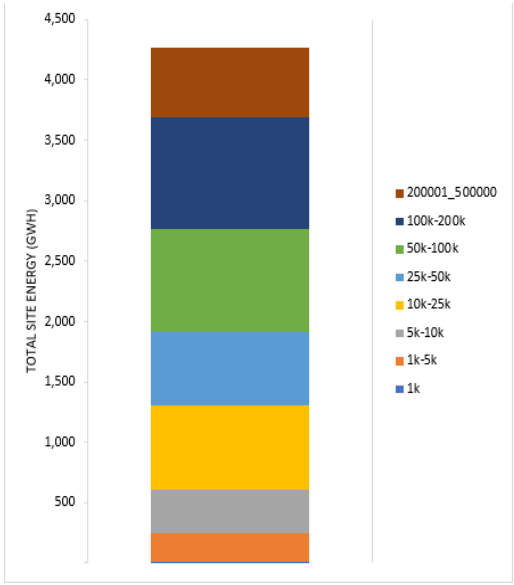


FIGURE 7: SITE ENERGY USE BY C&I BUILDINGS IN CNY BY BUILDING SIZE (SQ FT)



Buildings under 10,000 sq ft comprise nearly half of the non-residential buildings in CNY (Figure 6), but only 14% of the energy use (Figure 7). **Buildings greater than 50,000 sq ft represent 20% of the buildings but 55% of the energy use.**

See Appendix D.2 for more information.

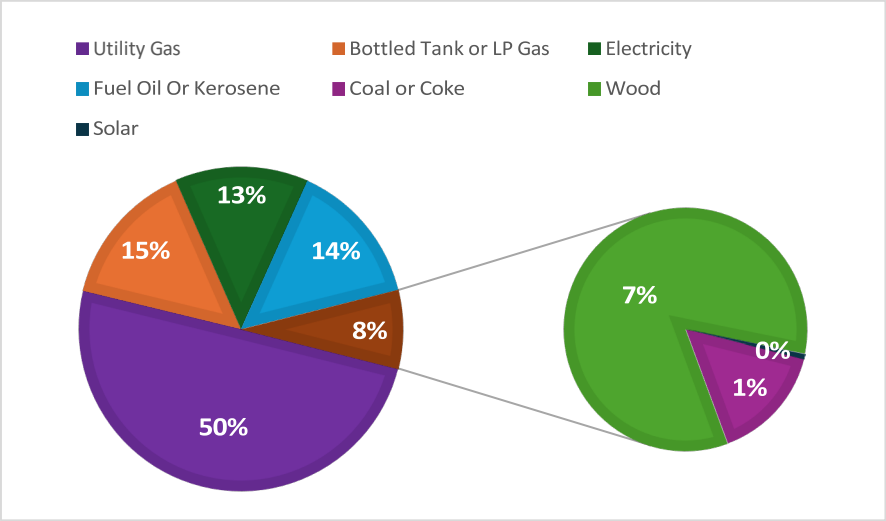
C&I Data on this page includes information from the ComStock™ dataset developed by the National Renewable Energy Laboratory (NREL) with funding from the U.S. Department of Energy (DOE).

Utilities Serving CNY

The major utilities serving CNY include National Grid, New York State Electric & Gas (NYSEG), and Rochester Gas & Electric (RG&E). Customers of these utilities pay into the System Benefits Charge (SBC) and benefit from the greatest number of energy efficiency programs. There are also municipal electric companies serving Hamilton, Solvay, Marathon, and Skaneateles, and the Oneida-Madison Electric Cooperative. Customers of these utilities have a more limited range of energy efficiency programs available to them. See Appendix D. 1 for a map of utility territories.

Heating Fuels

FIGURE 9: RESIDENTIAL HEATING SOURCES IN CNY



The dominant heating fuel source used in Central New York is utility gas (also known as "natural gas," "fracked gas," "fossil gas," or "methane gas") supplied by utilities. In Onondaga County, 70% of homes use utility gas as their primary heating source. In other, more rural counties, utility gas use is still prominent; however, many homes use electric, liquid propane gas, fuel oil, kerosene, and wood and even a small population still use coal to heat their homes. The data does not distinguish between electric resistance heat and heat pumps.

While the data above characterizes primary heating fuels, many CNY homes use multiple heating systems, especially rural or older houses. Two common causes include: houses that have been expanded over time or with cold spots and additional heating systems installed to serve those areas; and rural electrical outages and/or high delivered fuel costs encouraging the use of multiple systems to choose from based on current conditions. The latter is commonly seen in rural homes that rely on wood heat to reduce their use of expensive delivered fuels.

TABLE 3: HOUSEHOLD FUEL USE BY COUNTY

Fuel:	Utility Gas	Electricity	Propane	Fuel Oil or Kerosene	Wood	Coal or Coke	Solar	Other	No Fuel Used
Cayuga	14848	3934	4361	4281	1936	358	16	773	97
Cortland	8760	2323	2110	2777	1484	455	33	247	71
Madison	10148	3280	3527	5342	1560	518	2	323	69
Onondaga	134047	36514	6234	7164	1953	874	97	2025	1445
Oswego	19036	6679	9469	5326	4464	562	52	976	185
Total	186839	52730	25701	24890	11397	2767	200	4344	1867
Total %	60%	17%	8%	8%	4%	0.9%	0.1%	1.4%	0.6%

Data on this page comes from NYSERDA's Patterns and Trends: New York State Energy Profiles, 2007–2021

Regional Clean Energy Workforce

General Regional Workforce Overview

In the CNY region, the four top industries listed in Figure 7 (*Government; Trade, Transportation & Utilities; Private Education & Health Services; and Professional & Business Services*) make up 68% of the total nonfarm jobs.

For those four top industries, over-the-year change in employment (*2024, August*), the number of jobs in the Government, Private Education & Health Services, and Professional & Business Services industries grew significantly (*1,200, 2,300, and 400 jobs respectively*), but the Trade, Transportation & Utilities industry lost 300 jobs.

Across CNY, 76% of the population between 20-64 years old participates in the workforce. In the City of Syracuse and the City of Auburn these workforce participation numbers are lower, with Syracuse at 67% and Auburn at 62%.

Average commute times to work in the CNY region is 23 minutes, four-minutes lower than the national average of 27 minutes.

The biggest transportation difference when comparing statewide are the methods for commuting. As seen in Figure 7, most people in CNY drive individually to work because convenient public transit is not widely available in the region, especially compared to NYS as a whole (23.5%). Only in Syracuse and Onondaga County do we see more than 1% use of public transit (*5.4% and 2.4% respectively*). Carpooling, working from home, and walking are more prevalent in Syracuse (and likely the other urban centers) than throughout the region. (Appendix E.1)

Data includes information from the Labor Market Briefing for Central NY report (2024, August) developed by the New York State Department of Labor (NYSDOL) and the American Community Survey 2017-2021 dataset released (2022) by the U.S. Census Bureau.

FIGURE 10: INDUSTRIES IN CNY AS REPORTED BY THE 2024 NYS DEPARTMENT OF LABOR MARKET BRIEFING

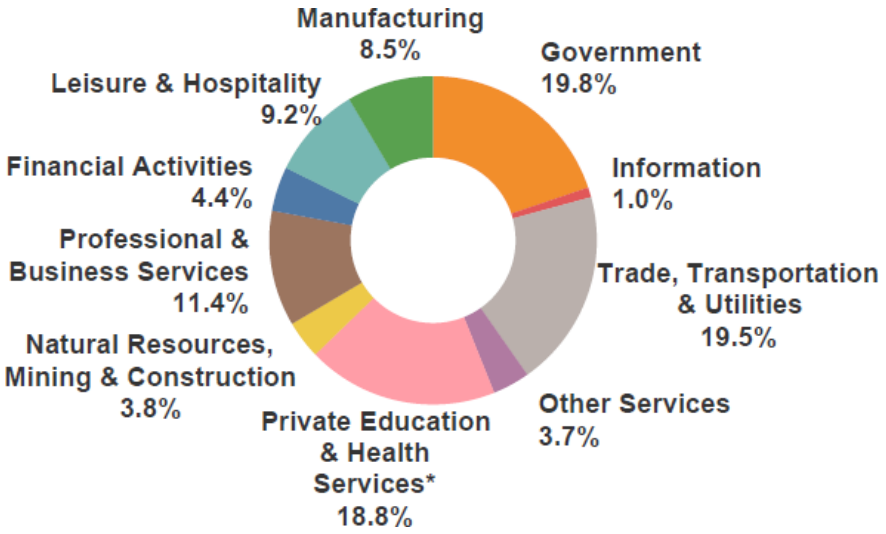
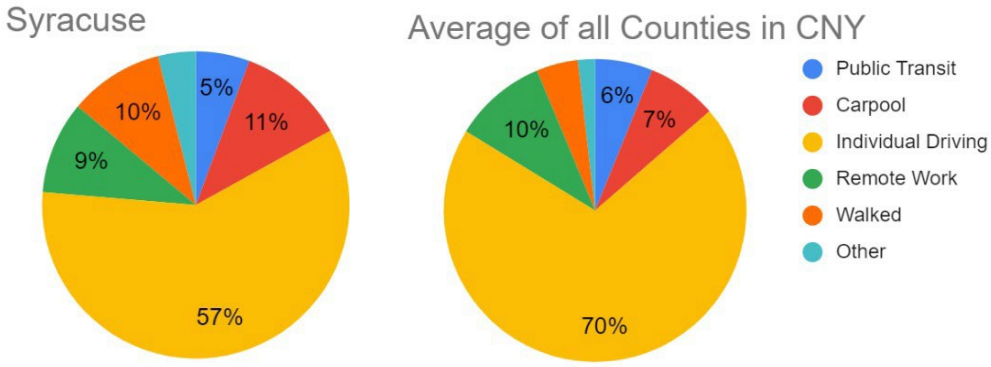


FIGURE 11: TRANSPORTATION METHODS IN SYRACUSE AND AVERAGE OF ALL COUNTIES IN CNY AS REPORTED BY THE U.S. CENSUS BUREAU AMERICAN COMMUNITY SURVEY 2017-2021



Clean Energy Workforce

The clean energy workforce in the CNY region is a small, but growing share of the regional economy. This growth is represented both by the share of clean energy jobs relative to the total jobs regionally as well as the share of clean energy workers relative to the total labor pool.

According to the 2021-2025 Onondaga Local Workforce Development Plan, "Central New York has one of the highest concentrations of private sector "green jobs" of any region in the country."

Statewide in 2022, 72% of clean energy industry employees identified as white, 15% as Hispanic/Latinx, and 9% as Black. Individuals identified as Black and individuals identified as Asian increased 1% between 2021 – 2022, while Hispanic/Latinx and White employees had no increase. The proportion of women in the workforce grew from 25% in 2021 to 26% in 2022, but this industry is still predominately male. (NYSERDA Clean Energy Industry Report, 2023) See Appendix E.3.

There are a greater number of clean energy jobs in DACs relative to the DAC populations in Onondaga County (1.5%) and Cayuga County (1.1%) than there are statewide (0.9%), but there are fewer clean energy jobs located in DACs in Madison, Cortland and Oswego counties. However, the number of individuals who reside in DACs and are employed in clean energy jobs in each county is less than the statewide average (0.88%), except for Cayuga County (1.1%). (NYSERDA Clean Energy Industry Report, 2023) This signifies that while these jobs are located near the individuals residing in DACs, these individuals are not well represented in the clean energy workforce.

Data includes information from the 2023 NYSERDA Clean Energy Industry Report and the Clean Jobs America Interactive Map developed by E2, based on 2023 United States Energy and Employment Report

Trends according to the Clean Jobs America Interactive Map (E2, 2023)

Positive trends:

- Onondaga County massively outperforms the state in *Renewable Generation Job* growth (22.1% vs. 6.2%).
- All five counties outperform the state in *Electric Vehicle* job growth (between 7.6% and 13.80% vs 3.2% statewide).

Negative Trends:

1. *Energy Efficiency* job growth in all five counties is flat to negative, compared to a 1.70% statewide average growth.
2. *Grid & Storage* job growth in Central New York is outpaced by the statewide rate (8.30%). Onondaga County has the highest growth rate (2.9%) in this job category out of the five counties within CNY.
3. Besides Onondaga County with a high growth of 22.1%, the other four counties have seen flat to middling *Renewable Generation* job growth rates.
4. Onondaga County has consistently outperformed the more rural, less populated counties in the growth rate from 2021. The other four counties have seen tepid growth rates in most clean energy subcategories.

See Appendix E.2 for more details.

EXISTING EMPLOYERS

EnergySmart CNY has identified over 200 employers in the region that can be considered clean energy employers, in fields ranging from HVAC, home performance, geothermal well drilling, electrical, electric vehicle mechanics, sales, consulting, solar installation, and more. In the EmPower+ program alone there are 36 companies who have completed 1,774 projects in CNY since July 2023 (Appendix E.4). There are over 50 businesses, institutions and organizations who are approved to participate in at least one of NYSERDA's Workforce Development Programs: Clean Energy Internship (PON 4000), On-the-Job Training (OJT) (PON 3982), and Climate Justice Fellowship (PON 4772). As we continue to identify more clean energy businesses who serve the CNY region, as well as promote and assist navigating the programs, this list will grow. The list of approved Workforce Development Program Participants is in Appendix E.5.

OPPORTUNITIES AND TRENDS

After Government, the Trade, Transportation & Utilities sector is the largest employer in the CNY region and the sector with the most clean energy jobs, demonstrating that workers in this sector could be upskilled and trained to meet the demand of the growing clean energy economy. For example, there are opportunities to train HVAC contractors who install gas or oil furnaces to install heat pumps. There is also potential for utility workers who install gas pipelines to build thermal energy networks, which utilize the same materials and skills.

Offshore Wind Training Institute (OWTI) - The wind energy market, both land-based and offshore, is expected to grow significantly over the next few decades, increasing the need for employment in the industry. SUNY Morrisville, among eight SUNY institutions, was awarded $500,000 for offshore wind training and workforce development to prepare students for careers in the emerging offshore wind industry. SUNY Morrisville began a Renewable Energy Fundamentals and Wind Technician course, offering micro credentials, certificates, and technical degrees at no-cost or reduced cost to students. Their efforts include outreach by K-12 STEM workshops, renewable energy career exploration, and teach professional development. (Appendix E.6)

Bitzer Scroll Inc. is getting a $5 million federal grant to increase its production of electric heat pump components at its factory in DeWitt. The expansion is expected to create 20 new jobs. The company currently employs 150 people at its factory. The funding comes from the U.S. Department of Energy's Heat Pump Defense Production Act Program, which is designed to boost U.S. production of energy-efficient heat pumps. (NYSDOL, 2024 and Moriarty, 2024)

New York Bus Sales, a bus dealer for 53 counties in NYS and longtime leader in alternative fuel buses, announced it will move its longtime headquarters in Chittenango (non-DAC location) to East Syracuse (DAC location) by the end of 2025. Their move is motivated by NYS legislature requiring school bus operators to exclusively purchase electric powered buses starting in July 2027 and removing all internal combustion engine school buses from the road before 2035. The move was driven by proximity to the necessary electrical grid infrastructure. Construction of the new facility is to be completed by the end of 2025. Once the move is complete there will be 70+ full-time employees (New York Bus Sales, 2024).

Clean Energy Workforce Development Assets

INTERNSHIPS

The NYSERDA Clean Energy Internship Program (PON 4000) helps individuals gain real-world clean energy experience and earn money through a paid internship. In the CNY region, from 2023 to currently, there are 19 prospective interns in the internship directory, a directory where participating businesses can select a prospective intern to begin working with. Education and promotion to clean energy businesses about existing workforce opportunities like the Clean Energy Internship Program is critical to grow the clean energy workforce by using these individuals who applied, have been approved, and are waiting in a directory.

HIGHER EDUCATION

SUNY Clean Energy Consortium is comprised of SUNY institutions who share a common goal of offering training and educational programs designed to meet the growing needs of the clean and renewable energy industry. **SUNY College of Environmental Science and Forestry (ESF)**, **SUNY Morrisville** and **SUNY Oswego** are members of this consortium. These schools have *many* different clean energy related degree programs with some being Renewable Energy, Renewable Energy Technology, Sustainable Energy, Environmental Science, Construction Management, Mechanical Engineering Technology, Sustainable Resource Management, Electrical and Computer Engineering, Technology Management, and more.

In 2021, **SUNY Morrisville**, located in Madison County, built a $16 million **Agricultural and Clean Energy Technology (ACET) Center**. This new 30,000-square-foot applied learning technology building serves as the home to their renewable energy program. Lab facilities in the ACET Center include a Solar Lab (PV and thermal), 85 kW solar PV array, Wind & Hydro Lab, Tower Climbing Lab, Thermal Energy Lab, classrooms, and more. Their new Offshore Wind Technician Training integrates existing courses and curriculum for a Wind Turbine Technician micro-credential and a new 2-semester certificate program.

At the forefront of groundbreaking clean technology research, **Syracuse Center of Excellence in Environmental and Energy Systems (CoE)**, located within Syracuse University (SU), is a collaborative organization that engages more than 200 private companies, organizations, and academic institutions to create new products and services in indoor environmental quality, clean and renewable energy, and water resource management. Syracuse CoE connects academic and industry researchers to innovate products and technologies for the marketplace, works with collaborators to secure funding for environmental and energy research, and catalyzes partnerships for large research projects by assembling advantageous, interdisciplinary teams.

SUNY Onondaga Community College (SUNY OCC) is located in Syracuse and has a second campus in Liverpool. Some of their degree programs with education transferable to the clean energy industry are: Advanced Manufacturing, Architectural Design Studies, Automotive Technology, Construction Management, Electromechanical Technology, Engineering Science, and Mechanical Technology.

SUNY Cayuga Community College has two campuses, one in Auburn and the other in Fulton. This college has multiple degree programs with education transferable to the clean energy industry: Advanced Manufacturing, Industrial Maintenance Technology, Environmental Studies, and Mechanical Technology.

SUNY Tompkins Cortland Community College (TC3) is supported by both Cortland and Tompkins Counties and has extension sites located in Cortland and Ithaca. They have multiple degree programs with education transferable to the clean energy industry are: Applied Science and Technology, Construction and Environmental Technology, Engineering Science, Environmental Studies degrees.

The **Board of Cooperative Education Services (BOCES)** provides training programs for high school students and adult learners. The following BOCES locations are in CNY counties: Onondaga-Cortland-Madison (OCM), Cayuga-Onondaga (CO), and Oswego Center for Instruction, Technology & Innovation (CiTi). Trades such as Electrical/Electronic work and HVAC installation and maintenance, are critical skills for workers to help transform the region to adopting cleaner forms of energy. Madison County is also connected to BOCES in bordering counties located outside of CNY.

TRAINING OPPORTUNITIES

In addition to existing county Workforce Development Boards and Career and Technical Education programs offered by both Syracuse City School Districts and BOCES, there are other training opportunities in the CNY region as well:

New York State Weatherization Directors Association (NYSWDA), a 501c3 nonprofit organization, is the leading provider of building science training in New York State and New England. NYSWADA's Energy Efficiency Training Center is in East Syracuse, NY. Established in 2006, the expanded training facility provides a modern, state-of-the-art site for training weatherization staff and home performance contractors from around the country. The training center includes two classroom spaces which can accommodate up to 54 individuals.

Joint Apprenticeship Training Centers (JATC) offer on-the-job training and off-the-job training at an education center. These centers offer apprenticeships in a variety of trades. These apprenticeships provide several benefits, including the opportunity to earn a living while learning a trade, gaining qualifications, and receiving support from others. Compared to every county in NYS, ranked below Queens (New York City) of having 22 training centers, Onondaga County is tied for second place with Erie County of having 14 Joint Apprenticeship Training Center locations. With Onondaga, Oswego, and Cortland Counties, CNY has 18 union training centers. Having these 18 training centers in our region is a great asset to unions and to build more of the workforce with skills and career pathways into the clean energy industry. The full list of Joint Apprenticeship Training Centers in CNY is in Appendix E.7. (Palacios, 2024)

OTHER WORKFORCE DEVELOPMENT INITIATIVES

In preparation for the large-scale construction projects of both the development of Micron, a microchip fabrication facility, and the NYSDOT I-81 Viaduct Project, creating an improved corridor through the city of Syracuse, New York State has implemented training initiatives that could further grow the number of individuals with skill sets transferrable to the clean energy workforce, including the Future-Ready Workforce Innovation Consortium, the One Network for Advanced Manufacturing Partnerships (ON-RAMP), and NYSDOT WorkSmart NY through Syracuse Educational Opportunity Center (EOC) that prepares students for various construction jobs. See Appendix E.8.

Central New York Regional Partners

EnergySmart CNY is developing a dense network of partnerships with contractors, regional utilities, workforce development agencies, educational institutions, city, county and state agencies, community-based organizations, non-profit organizations, environmental and environmental justice organizations. These partnerships may take the form of one-off collaborations that are limited in scope, or they may extend to coordinated and ongoing campaigns. Apart from utilities and government agencies, our partner list is composed of more than 200 entities (consisting largely of Community Based Organizations); our Employer/Business Partner list consists of 207 current/potential regional and local partners. **Below is a non-comprehensive list that is suggestive of the kinds of partnerships and resulting opportunities and shared activities.**

Sector	Current & Potential Partners*	Opportunities	Examples
Contractors	HVAC, electricians, solar, weatherization contractors, especially those participating with Empower+, Comfort Home, NY Clean Heat, NYSERDA OJT and Internship programs, and associated professional organizations.	Share opportunities, expectations and standards regarding training and employment.	Several contractors have participated in EnergySmart CNY-hosted job fairs including two hosted at the annual NY State Green Building Conference.
Utilities & Industry	National Grid, NYSEG, RG&E, municipal electric utilities.	Partner with utility consumer advocates on community outreach.	EnergySmart CNY has held joint office hours with National Grid consumer advocates at libraries in Oswego County
Workforce Development	BOCES, SUNY Morrisville, SUNY ESF, SUNY Oswego, CNY Works, Urban Jobs Task Force, CenterState Corporation for Economic Opportunity, Onondaga Earth Corps, Supported Employment Program, Manufacturers Association of CNY, Technology Alliance of CNY, NYS Weatherization Directors Association training center, local high schools.	Job fairs, career counseling. Shared training programs to develop welcoming workplaces. Partner with BOCES to enroll students and contractors into NYSERDA Internship Program.	Partnered with local school districts and SUNY Morrisville for a “Clean Energy Careers Exploration Day” in 2024. Tabling at various career fairs and public events hosted by schools and workforce development organizations.
Government Agencies & Social Service Providers	New York State Office for the Aging, Affiliated County Agencies, Planning Departments, NYSERDA Clean Energy Communities (CEC) and NYS Department of Environmental Conservation (DEC), Climate Smart Communities (CSC).	Assistance in braiding resources and coordinating support for clients	Partnering with HEAP administrators to facilitate connecting clients to each other's services and outreach events. Partnering with local municipalities on CEC/CSC Community Campaigns

Education	Higher Education including SUNY Morrisville, SUNY Oswego, SUNY College of Environmental Science and Forestry, SUNY Cortland, SUNY EOC, Community Colleges (e.g., Onondaga Community College), Syracuse University, Le Moyne University, Hamilton College, Colgate University City and County Schools, including Syracuse City School Districts, Public Libraries	Research collaborations, assisting graduating students. Reaching parents and community members affiliated with schools. Enroll students in education programs which require internships to enroll eligible students in NYSERDA Internship Program.	Working with students in the SU Dynamic Sustainability Lab at Syracuse University's Center of Excellence in Energy and Environmental Systems. Participation in "Community Conversations" hosted by the Syracuse City School District, Summer 2023.
Community-Based & Local Development Organizations	Home HeadQuarters, P.E.A.C.E. Inc., Jubilee Homes of Syracuse, Community Action Partnerships, CNY Community Foundation, Syracuse Housing Authority, Huntington Family Center, RISE (Refugee & Immigrant Self-Empowerment), Syracuse Northeast Community Center, Southern Hills Preservation Association, Fulton Community Development, Westcott Community Center, Northside Learning Center, Syracuse Community Connection, Food Bank of Central New York, Syracuse-Onondaga Food Systems Alliance, Food Access Healthy Neighborhoods Now (FAHNN), Blueprint 15.	Coordinated campaigns to reach members and participants in each other's programs	We enrolled Mobile Food Pantry participants in EmPower+ since November 2023. In April 2024, we attended food pantries in all 5 CNY counties for the in-person administration of our RABA survey. Partnering with FAHNN to reach residents in a DAC in Syracuse's southside.
Faith-based & Other Non-profit Organizations	Catholic Charities of Onondaga County, Brady Faith Center, Interfaith Works of CNY, Jubilee Homes, Syracuse Tenants Association, Syracuse Tenants Network, Northside Learning Center, Public Utility Law Project (PULP), Refugee & Immigrant Self-Empowerment (RISE), Clear Path for Veterans	Collaborate and share resources to reach and serve constituencies	In preparing a community conversation in March 2024, we phone-banked Syracuse Tenants Union members to participate and address any immediate energy-related concerns.
Environmental, Energy, and Environmental Justice Organizations	Climate Change Awareness and Action, GreeningUSA, NY Renews Coalition, Sierra Club, Clean Communities of CNY, Citizens Campaign for the Environment	Mutual support in opportunities to reach an environmentally aware constituency	In August-September 2023, we partnered with environmental organizations to staff a booth at the NY State Fair (12 hrs/day over 2 weeks).

III. Baseline Assessment of Clean Energy Program Participation

NYSERDA Program Participation

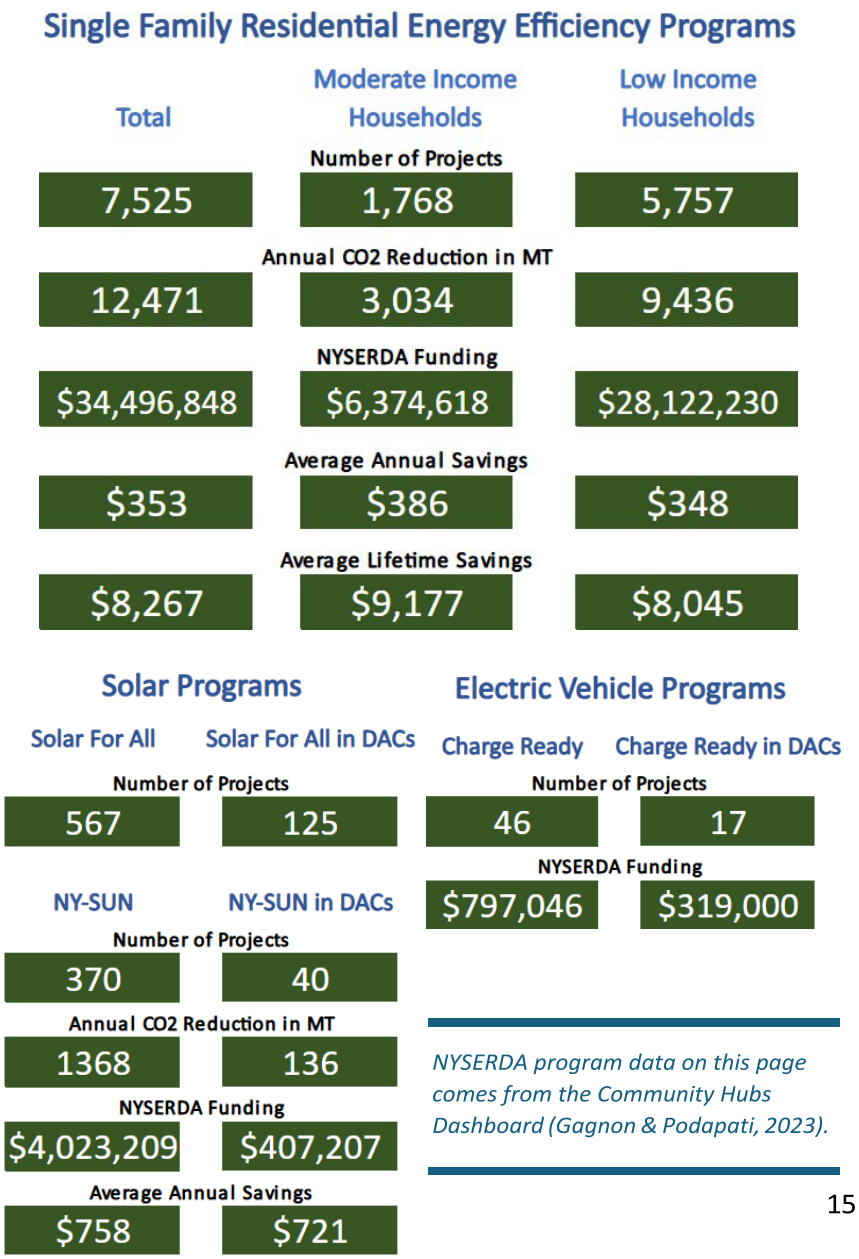
Over the last five years, NYSERDA has invested $39 Million in CNY projects for residential energy efficiency, electric vehicle charging, and solar projects. Most funding went to improving the insulation and energy efficiency of 7,525 LMI households, providing an average of $4,885 in funding resulting in an average of $8,267 in lifetime savings per household. Solar programs are being underutilized in DACs, with only 22% of Solar for All enrollments and 11% of NY-SUN solar projects being installed in DACs.

Available Clean Energy Programs

There are a variety of programs and funding sources to assist NY residents and building owners control their energy costs and become more energy efficient. Key programs that EnergySmart CNY refers people to include:

- EmPower+ (NYSERDA)
- Comfort Home (NYSERDA)
- NY Clean Heat (Utilities)
- Energy Affordability Program (Utilities)
- HEAP (NYS Office of Temporary and Disability Assistance)
- Federal and State Tax Credits
- Inflation Reduction Act rebates (Federal)
- Healthy Neighborhoods Program (NYS Department of Health)
- Rural Energy for America Program (REAP) and Section 504 Single Family Housing Repair Loans & Grants (USDA)
- Other home improvement funding sources. See Appendix F for a more comprehensive list.

FIGURE 12: CNY UTILIZATION OF SELECT NYSERDA PROGRAMS, 2018-2023



NYSERDA program data on this page comes from the Community Hubs Dashboard (Gagnon & Podapati, 2023).

Prior & Existing NYSERDA Community Campaigns

The CNY RPDB's Energy Program and AGREE facilitated many regional and local community campaigns, including Solarize Syracuse, Solarize CNY, and HeatSmart CNY which educated over 1,700 participants and improved the energy efficiency of 363 homes through better insulation, cold climate air source heat pumps (CCASHPs), ground source or geothermal heat pumps (GSHP), and heat pump water heaters (HPWHs). The net annual emissions reduction achieved was second highest in the state, at 778.4 MT CO_2e. (Cadmus, 2023).

CNY RPDB also acts as the regional Clean Energy Communities (CEC) and Climate Smart Communities (CSC) contractor, providing no cost technical assistance to municipalities. CNYRPDB's coordinator assistance in the CEC and CSC programs has helped improve local attitudes on clean energy, provided a network of municipalities working on similar clean energy initiatives, allowed municipalities to act as examples for community members, and has distributed over $2.4M in grant funds for clean energy projects earned through the CEC program.

The CEC program has leveraged the knowledge and assets developed in the Solarize and HeatSmart CNY campaigns in support of the three types of community campaigns which municipalities can earn credit for: Clean Heating and Cooling, Community Solar, and Electric Vehicles.

Communities who have participated in CEC heat pump campaigns include the towns of Pompey, Cazenovia, Manlius, Hamilton, Owasco, Richland, and the Village of Pulaski. Communities who have participated in community solar campaigns include the towns of LaFayette, Manlius, Scipio, Richland, Clay, and Geddes and the villages of Homer, Fayetteville, Pulaski, Minoa, and the City of Auburn. The Town of Manlius is the only municipality in the region with an electric vehicle campaign. Some are complete; others could earn more points. All that can become active again would benefit from assistance from EnergySmart CNY community campaigns for education, outreach, and technical assistance.

Community Heat Pump Systems

A thermal energy network (TEN) uses a network of pipes to connect multiple buildings together and to thermal sources and sinks, such as geothermal, surface water, and operations with waste heat to provide space heating cooling and domestic hot water. This technology is one of the most efficient ways to install heat pumps and an effective way for municipalities and campuses to reduce greenhouse gas emissions.

NYSERDA is supporting the evaluation of three "Community Heat Pump Systems" in Syracuse, including the Urban Villages project in Syracuse, a Syracuse University project that would also serve homes, and the Inner Harbor project where National Grid proposes to harness wastewater heat exchange technology at the Metropolitan Syracuse Wastewater Treatment Plant to provide heating and cooling to a variety of new residential and commercial buildings nearby.

Much potential exists in the region. There are approximately 56 publicly owned wastewater treatment facilities that may be suitable for the development of thermal energy networks. Waste heat from treatment plant processes may be harvested and used to heat commercial, industrial, and multifamily structures. Treatment facilities are located in most cities in the region. Many publicly owned wastewater treatment facilities are located within a 1.5-mile radius of large industrial and commercial parcels, which are prime candidates for thermal energy networks.

There are several large sites primed for adaptive reuse or new development in the region where thermal energy networks should be considered, including the redevelopment of Shoppingtown Mall and Great Northern Mall into mixed use development, and the sites listed in CNY RPDB's Central New York Real Estate Site Profile Database.

IV. Stakeholder and Community Engagement

Outreach Objectives, Tools, and Methods

How we engaged our community

EnergySmart CNY used a variety of methods over the past year and a half to gain insight into our region's access to clean energy opportunities:

- **One-to-one conversations** with local partners and potential partners (approximately 30 meetings)
- **Community-based conversations**, in which residents were engaged at events, local businesses, and institutions (such as churches, libraries and laundromats) and asked questions about their knowledge and interest in clean energy and clean energy jobs (700 people reached, 317 filled out written questionnaire)
- Documentations of questions and challenges during **EnergySmart outreach events**, such as tabling at local markets and community events
- **Stakeholder meetings** (14 between November 2023 and March 2024) in which a brief presentation was provided, followed by small group conversations and the opportunity for participants to ask questions and provide other verbal and written feedback (several dozen participants)
- A **written community survey** (AGREE Survey) administered online and in-person at events and food pantries in all five counties. (349 responses)
- A **contractor roundtable**, in which local clean energy providers were invited and asked a series of questions (6 companies represented)
- A **contractor survey**, in which local companies answered a series of questions through an online form (13 contractors completed the survey)

In all, our engagement activities gathered feedback by reaching well over 1,100 CNY residents. Half the respondents of the Community Survey were low-income residents (with annual household incomes <$50,000, not corrected for household size), 59% lived in DACs, and approximately 20% were people of color. Seventy-two percent (72%) of the respondents owned their own homes while renters made up 28%. Eighty-two percent (82%) of respondents live in single-family homes, including 42% of renters. The Community Conversations did not collect demographic information about respondents, but the conversations were held in largely DACs and in locations selected to reach low-income residents and people of color. A majority of the stakeholder meetings and public event activities took place in disadvantaged communities.

Purpose of engagement

Our stakeholder engagement and feedback gathering activities have focused on answering key questions such as:

- What do residents in our region know about clean energy home improvements, technologies, and opportunities and what are their perceptions of these technologies and opportunities?
- What do residents in our region know about programs that can assist them in accessing clean energy home improvements, technologies, and opportunities?

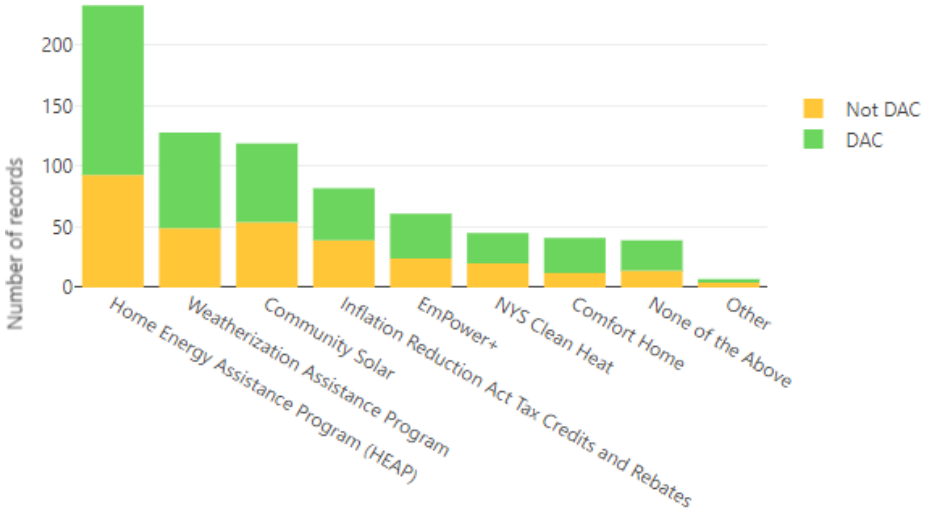
- How have residents in our region accessed information about clean energy home improvements, technologies, and opportunities?
- Which clean energy home improvements, technologies, and opportunities are residents in our region most interested in?
- What barriers have residents in our region faced when attempting to access clean energy home improvements, technologies, and opportunities, and what kinds of interventions have worked or could work in addressing those barriers?
- What challenges have program educators, program administers, and clean energy businesses faced while informing residents about and connecting residents to clean energy home improvements, technologies, and opportunities?
- What challenges have clean energy employers faced recruiting, hiring, and retaining a qualified and growing workforce committed to providing residents with clean energy home improvements, technologies, and opportunities?

By seeking answers to these crucial questions, EnergySmart CNY hopes to improve its own outreach methods, offerings, and programs and those of our local employers and partners. We also hope to provide feedback to our state partners so that they may benefit from this information as they develop and evolve both the Regional Clean Energy Hubs program and the incentives, marketing, and grants programs the hubs promote.

Stakeholder and Community Engagement Feedback

Knowledge about and interest in clean energy home opportunities

FIGURE 13: AGREE SURVEY RESPONDENTS INDICATING FAMILIARITY WITH PROGRAMS



- 93.7% of respondents selected that they know what clean energy is, but not all are able to identify clean energy sources and technologies. By far the most well-known sources of clean energy are solar panels and heat pumps. This suggests that our region's community campaigns, Solarize and HeatSmart CNY, may have successfully raised the profile of these energy sources in our region.
- When asked if the respondent would like more information about clean energy and available government programs, 65% of the respondents selected yes.
- When asked an open-ended question during community conversations if the respondent knew of any programs that can help them use clean energy/be more energy efficient, 91.2% selected that they did not know about any programs offered. (Source: Community Conversations, GSW). AGREE's community survey, administered later, asked people to choose from a list of programs they have heard of, and 88% selected at least one answer. Nearly all those surveyed have heard of HEAP, and about half have heard of the Weatherization Assistance Program and Community Solar,

with no significant variation based on whether they lived in a DAC or not. Less than 1/5th of those surveyed knew of EmPower+, Comfort Home, or NYS Clean Heat, although slightly more DAC residents had heard of them than those not living in DACs.

- Of 349 respondents to the community survey, 127 (37%) reported that they had applied for at least one of the programs listed in our survey. Of those, 57 (45%) reported being in the program currently or having benefited from the program, suggesting a large drop off between application and completion. Residents in DACs and those in other areas responded similarly. Though asked, most participants who applied but did not report benefiting from a program did not report a reason. (Community Survey, AGREE – See Appendix H).

Community Interests

- Most respondents to the AGREE Survey are interested in one or more energy efficiency improvements. A majority (53%) expressed interested in improving their homes' energy envelopes with smaller numbers selecting solar (37%), community solar (25%), a heat pump water heater (26%) or a heat pump to replace their furnace (28%). (Community Survey, AGREE). This suggests that our program's emphasis on heat-pump readiness by prioritizing insulation and other efficiency upgrades is well suited to community priorities.
- During GSW's Community Conversations, when homeowners, specifically, were asked if they would be interested in installing solar panels or heat pumps, 85% said no, indicating that interest in these measures among DAC residents is lower, a result that roughly matches the findings among DAC respondents to the AGREE Survey. (Source: Community Conversations, GSW – see Appendix G).
- Replacing windows rated second highest, after envelope improvements, as the most desired energy improvement. Window replacements is a measure that NYSERDA and utility programs rarely cover.

FIGURE 14: INTEREST IN ENERGY IMPROVEMENTS (AGREE SURVEY)

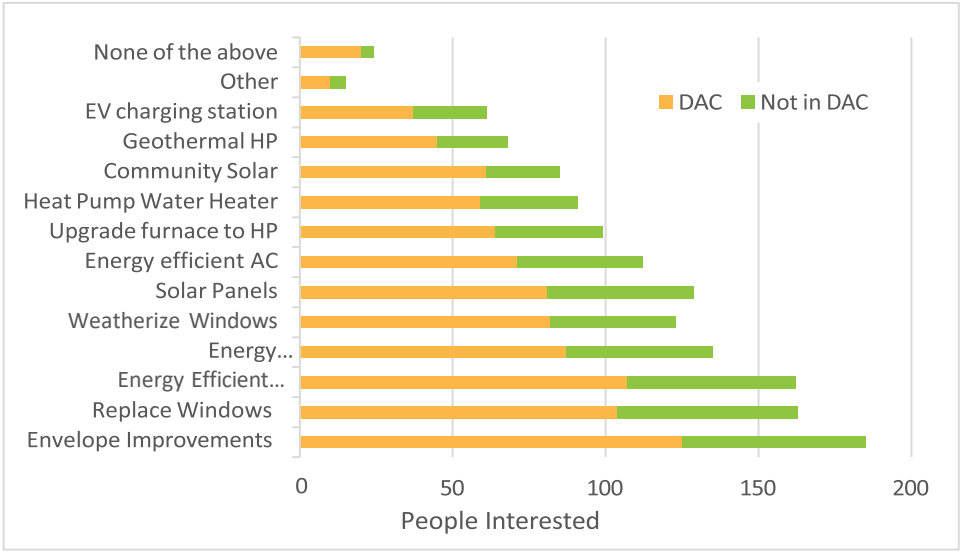
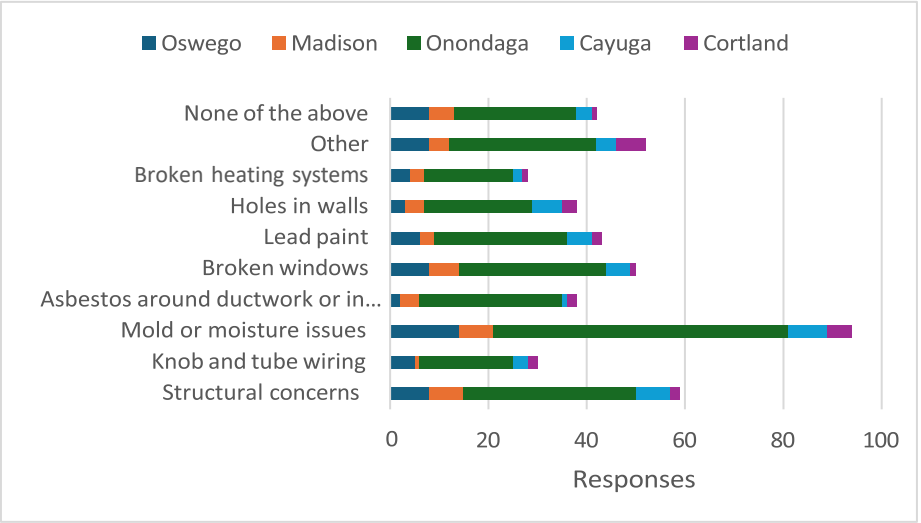


FIGURE 15: PRE-EXISTING CONDITIONS IN HOME (AGREE SURVEY)



V. Barriers, Opportunities, and Recommendations

The barriers, opportunities, and recommendations in this section reflect key takeaways from our regional analysis, the extensive stakeholder feedback gathered in preparation of this report, and years of experience helping market-rate and low-income residents' access clean energy technologies, programs, and opportunities.

Financial & Knowledge Resources & Capacity Barriers

- People do not know about most of the available programs.
- Contractors prefer direct referrals more than assignments through the EmPower+ system, because leads get lost in the referral system.
- The Independent Energy Efficiency Program (IEEP) incentives for municipal electric utilities are significantly less than those offered by investor-owned utilities and NYSERDA, and not offered by the Madison-Oneida Electric Coop.
- Most energy efficiency educational materials and providers only provide information and services in English, missing an opportunity to engage thousands of households for whom English is not their preferred or spoken language.
- There is a dearth of locally accurate information/tools to help residents anticipate how much accessing clean energy technologies will cost, making planning difficult. Online sources quoting costs are often not accurate for our region. This requires residents to go through the process of getting an energy audit and a quote from a contractor before gaining a ballpark understanding of anticipated costs.
- The home improvement process is daunting and time consuming. There are many programs to understand and many contractors to choose from. Residents may not be able to take paid time off to interact with contractors and have many competing priorities for their time.
- NYSERDA-published lists of contractors claiming to cover certain areas/offer certain services is inaccurate and overwhelming, and do not identify the contractor's specialties.
- Unless prompted by a particular issue such as a broken heating system or high energy bills, energy efficiency upgrades are not a priority for many CNY residents, and by the time they have time to follow up, programs or personnel may have changed.
- The GJGNY Energy Studies provided to nonprofits and small businesses dissuades building owners from making big energy improvements like heat pumps due to findings publishing payback periods do not take into account existing incentives and use statewide utility rates.
- Reducing the energy use of large buildings requires a much different skill set and level of expertise than residential or similar buildings.

Opportunities & Recommendations

EnergySmart CNY should:

- Build its reputation as a go-to resource to navigate current clean energy program funding for residential and small commercial / nonprofit buildings.
- Hire more multilingual staff when possible and create a local pilot program or community campaigns to work with translators.
- Improve its list of local contractors and their specialties.
- Develop a public-facing ongoing educational series, including "what to expect" materials.
- Focus on retirees and stay-at-home parents; they often are limited income but may have some financial resources and time and a vested interest in controlling energy costs.
- Develop a system for direct referrals to contractors for all programs and all market segments
- Create trainings to teach DIY techniques to make windows more energy efficient.

NYSERDA should:

- Facilitate program updates from IEEP to Hubs
- Provide training in how to work multilingually including using translation services and technology
- Assist with educational material translation
- Survey contractors for services provided and average costs per region as part of an RFQ response for community campaigns. Publish results and revise annually.
- Provide more case studies with cost breakdowns and operating costs, with adjustments for inflation.
- Direct GJGNY Energy Study to incorporate information on incentives, collaborate with Hub.
- Streamline applications across programs where possible.

Economic and Structural Barriers

- Pre-existing conditions and deferred maintenance limit the homes that can access EmPower+, Comfort Home, and WAP to improve air sealing and insulation enough to make homes electrification ready.
  - Key barriers preventing the insulation of a home include knob and tube wiring, mold and moisture issues, asbestos vermiculite insulation, and walls in disrepair. Removal of knob and tube wiring means a full rewiring of the house (estimates can be over $10,000), and mold means tightening up these homes will make this issue worse unless energy recovery ventilators or dehumidifiers are added to the work scope.
  - EnergySmart CNY's survey respondents, representing a full range of household incomes, report the following issues in their homes: 27% - issues with mold or moisture, 11% - known asbestos, 9% - knob and tube wiring, 17% - Structural issues, 14% - Broken Windows. *Only 12% of survey respondents reported no pre-existing issues.*
  - Hoarding and disinclination or inability to move things away from walls and out of spaces where work needs to be done is another challenge that prevents some CNY residents from moving forward or limits the scope of work to be performed in a house.
- Existing sources of additional funding are still not enough to address the pre-existing conditions in the homes that need energy upgrades the most.
  - Most home improvement programs are loan-based, unless households are very low income or elderly. Many LMI households already have high debt-to-income ratios.
  - Due to market and affordability gaps, the money invested in residences is unlikely to be recouped upon sale or from increased rents.
  - The City of Syracuse Housing Study (2023) found that disinvestment and deferred maintenance have been mounting in the city, especially in neighborhoods that bear the historical harm of redlining. These neighborhoods also correspond with areas recognized by NYS as Disadvantaged Communities. Low home values in these communities continue to limit the amount of money they can borrow for upgrades. The City of Syracuse estimates costs of rehab for basic code compliance for the average Syracuse home at between $35,000 to $150,000. While best documented by the City of Syracuse, similar dynamics exist in the other cities and villages of our region.
- Participants and contractors both indicate that cost of insulation, heat pumps, and labor have skyrocketed, leading to less improvement available for the cost, and often requiring out of pocket contributions from LMI households and deterring others.
- The tightening of program rules as part of the rollout of IRA HEAR rebates have reduced the incentive stack available to help fund heat pump installations in LMI homes (for example, prohibiting combining EmPower+ and NYS Clean Heat), and the homes that qualify for incentives. LMI households have less chance of converting to heat pumps now than in 2021.

Opportunities & Recommendations

EnergySmart CNY should:

- Continue developing referral processes to home improvement funding sources, including USDA, HCR grantees, and local CDFIs.
- Continue to braid programs together to help homes overcome barriers.
- Connect households with vermiculite with Zonolite Trust program.
- Screen for broken windows and refer those households to WAP and/or EmPower+ contractors that do windows.
- Coordinate with city and county governments to leverage housing repair funds.
- New IRA funding in EmPower+ does have some ability to address electrical upgrades and other health and safety measures.

NYSERDA should:

- Expand funding to cover ERV/HRV and more efficient dehumidifier installations.
- Either provide additional funding for the full rewiring of a house or provide a waiver for homes with knob and tube wiring in the walls for insulation requirements to heat pump funding.
- Allow LMI households to get multiple and detailed quotes from contractors in order to keep costs competitive.

New York Department of Public Service should:

- Allow a portion of energy efficiency funding to go toward retrofit readiness, such as moisture abatement, asbestos removal, and repairs.
- Create programs that provide additional pre-electrification funding in geographic DACs.
- Encourage utility thermal energy networks for urban areas, especially those that include residences.

Program Design and Implementation

- NYS programs for low to moderate income households are unsupportive of switching to heat pumps, leaving homes with failing heating systems with few options or without heat.
  - EmPower+ requires levels of insulation unattainable by many homes prior to approving a heat pump installation, or even in cases where a heat pump could be approved after insulation, available funding is inadequate to cover both the insulation and heat pumps.
  - EmPower+ does not provide adequate funding to fully cover the cost of most whole home heat pump installations, even with additional IRA funds.
  - EmPower+ / OTDA extra funding for heat pumps for recent HEAP recipients only is available after the heating season, not when no-heat customers need it, and enrollment periods for this funding have gotten shorter.
  - EmPower+ IRA funding does not fund heat pump conversions for natural gas customers.
  - HEAP penalizes switching from delivered fuels to heat pumps because electric heating customers receive lower benefit rates than those using delivered fuels. The HERR program does not officially support fuel switching when heating systems need to be replaced.
  - Program funding has not kept up with inflation and do not cover what households need.
  - EmPower+ and HERR funding for efficient fossil fuel systems has decreased, requiring significant out of pocket costs for customers, yet these customers usually also cannot obtain heat pumps through the programs, leaving low-income households without affordable heating appliances.
  - "No heat" funding is available in EmPower+ and HERR only for homes with heating systems that failed in the current heating season, excluding homes that have been limping by with inadequate, inefficient, and dangerous temporary measures such as space heaters and using gas stoves for heat for a season or more.
- Neither EmPower+ nor Clean Heat provide incentives for systems that electrify a portion of the home or a portion of the energy use. Many homes in upstate NY, especially those on delivered fuels, already have multiple heating systems and are used to piecemeal addition of new systems to control costs. Electrifying the home in stages can be more affordable.
- What DAC residents want most often is new windows and air conditioning, which are rarely covered through EmPower+.
- Many people with solar on their homes but not enough space to cover their entire energy needs are interested in community solar to cover the remaining needs - but currently are prohibited from doing so by program design.
- The LMI solar incentive is not close to the same amount people who can take the tax credits get.

Opportunities & Recommendations

EnergySmart CNY should:

- Upgrade the former HeatSmart CNY intake and referral system to include new installers.
- Refer eligible homes to local Lead Abatement programs for old windows.
- Explore marketing strategies and assistance that speak to residents most requested improvements

NYSERDA should:

- Work with hubs to develop a comprehensive and coherent policy and program around the funding for low-income heating and cooling systems that supports energy affordability, the need for reliable HVAC, and alignment with the climate law.
- Have more flexibility and funding within EmPower+ to reduce the number of additional programs and program rules homeowners and contractors need to navigate to make up gaps in project costs.
- Allow GJGNY low-interest loans for windows.
- Allow all to subscribe to community solar, even if they already have solar panels.
- Enable Energy Advisors to help customers switch contractors.
- Allow incentives for partial load systems, especially when heating systems are inadequate. When doing so, ensure high standards so that residents are not sold heat pumps that don't work in cold climates.

Department of Public Service should:

- Allow stacking of Empower+ with Clean Heat to enable LMI households to afford heat pumps

OTDA should:

- Align HEAP electric heating benefit rates with oil and propane rates.

NYSERDA and OTDA should:

- Allow homes with longstanding heating issues to get assistance through Empower+ and HERR.

Perspectives and Information Barriers

- There is a perception across income levels that programs/technologies are for other people. Renters and people above low income often believe they do not qualify for the programs. Low-income residents often worry or assume that clean energy opportunities are only for wealthy residents. A surprising find from the community conversations is that people with "no income" also do not believe they qualify for these programs.
- There is a lack of trust in programs claiming to reduce energy bills, especially door-to-door and tabling operations. Many people have been taken advantage of by energy service companies (ESCOs).
- There is a lot of fear that "the State is coming for my stove" which can be construed as cooking stove, wood stove, etc. Many people have expressed that they rely on their utility gas stove for heat when the power goes out (a dangerous way to heat a home).
- There is a lack of understanding about the DAC designation.
- Marketing obviously aimed at LMI and DAC communities from people not known in the community is distrusted. Earned media through conventional news sources is better trusted.
- Community Solar providers often want to see your utility account number before providing any details about what they offer, making it hard to distinguish them from predatory ESCOs.
- There is a lot of interest in solar, but a lack of confidence in community solar and the promised 10% bill savings.

Additional Barriers

- Renters face many challenges to accessing programs, including getting landlord permission, inability to get other tenants to provide income documentation, fears of helping improve a property only to be evicted so the landlord can raise the rents, and societal dismissal of renters' worthiness for healthy and comfortable homes.
- Many of the tax credits are not available to landlords, and while they can write off the cost of maintenance of rental properties on their taxes, they cannot get write offs for "improvements."
- Some tenants express they do not want to go through the effort to improve the property owner's building because of poor relationships with the landlord and the landlord's neglect to provide quality housing or other needed improvements on the building.
- Repeated and accurate communication is also important for building trust. A true CRM or other marketing system that can track status and facilitate timely and consistent communication with customers from energy advisors and contractors is key to any hub’s success. The current Salesforce system provided by NYSERDA is not adequate.

Opportunities & Recommendations

EnergySmart CNY should:

- Continue in-person outreach in DACs with trusted partners, bringing immediate value to build trust such as energy saving freebies like LED lightbulbs.
- Develop outreach materials that emphasize assistance to all income levels.
- Develop material packages and customer journeys specific to various customer types, inc. renters, retired homeowners, new homeowners, HEAP recipients, moderate income households etc.
- Visit the same places frequently and consistently, with trusted community partners, providing quality educational resources, and personalized outreach.
- Work with City of Syracuse Rental Registry to develop a landlord outreach program around the new EmPower+ IRA funding.
- Develop renter-specific offerings, based in empowerment and education, allowing them to choose the best option based on their situation.
- Emphasize programs with protections for renters, such as EmPower+.

NYSERDA should:

- Provide media advisory templates for easy use by Hubs to promote upcoming events.
- Facilitate development and consistent update of a master incentives database
- Create a process for the Hubs to vet local solar installers' offerings to help customers compare their options with transparency and confidence.
- Explore multi-platform communication manager systems to help facilitate better communication with customers.

Workforce Development Barriers

- There is a general lack of knowledge of clean energy careers across the region, and skepticism in Syracuse about "green jobs" as many programs a decade ago provided training but failed to connect people with jobs.
- Belief among workers that the clean energy transition will result in a loss of jobs, especially relating to gas utilities.
- Assumption that clean energy jobs need degrees or certifications.
- The clean energy industry is not on the in-demand occupations list, preventing other sources of funding, like Workforce Innovation and Opportunity Act (WIOA) funding, to grow the clean energy workforce.
- Employers accept GEDs and basic tool knowledge for entry level positions but prefer experience and completed training as well.
- Employers face a harsh and worsening workforce participation shortage throughout the region. According to 2023 Labor Statistics, labor force participation is at a historical low at 60.5% in the CNY Region and is lower than the state and national rates of 63.1% and 63.6% respectively. Furthermore, over 25% of the labor force is over age 55 so massive retirements are anticipated in the next 5 to 10 years.
- Key barriers to hiring/retention reported by the home performance and HVAC contractors included identifying good candidates; transportation, including lack of driver's licenses or vehicles; a lack of skills; childcare; and competition from other employers like Amazon and UPS that pay well for work that does not involve crawling into dirty spaces.
- There is a general lack of gender and racial diversity in HVAC and home performance, although it is changing. Company culture is strongly influential.
- Administrative support is strained or nonexistent for midsize-small contractors. Administrative burdens are not worth the incentives to many contractors, particularly for smaller projects. This applies for home performance, HVAC, and solar, as well as on-the-job training.
- The ever-changing nature of the programs and the large number of resources it takes contractors and hubs to track and incorporate those changes is costly.

For more details see the Contractor Survey results in Appendix I.

Opportunities & Recommendations

EnergySmart CNY should:

- Connect jobseekers with paid on the job training opportunities.
- Identify needs of jobseekers and connect them with wraparound services such as childcare, GED programs, regional on-demand transport where available, driver's license programs etc.
- Improve connections between contractors and educational and vocational institutions, training centers like NYSWDA, and workforce programs like SUNY EOC, Syracuse Build and Syracuse SURGE.
- Encourage more clean energy workforce outreach and investment in rural regions, especially in DACs.
- Engage with schools to promote clean energy careers.
- Highlight clean energy companies in CNY that are diversifying; feature them in outreach events and materials as well as developing trainings for other companies.
- Collaborate with community organizations like Urban Jobs Task Force to hold trauma-informed and implicit bias training for clean energy businesses to redevelop processes and policies.
- Connect with trusted education and workforce development networks to spread awareness about options for non-degree holders.

NYSERDA should:

- Create more materials for job-seekers about NYSERDA-approved on-the-job training programs and for existing career opportunities within various sectors.
- Keep program changes to a minimum.
- Simplify and streamline application and reporting requirements.
- Allow OJT funding for administrative staff.

Department of Public Service should:

- Support the co-development of more Utility Thermal Energy Networks, which use similar materials and skills as gas distribution pipelines and create a green industry transition pathway for gas workers.

VI. Next Steps: Recommendations & Timeline

The following high-priority, high-impact recommendations for EnergySmart CNY's next steps are built on existing and developing partnerships and the analysis featured in this report, representing significant program development initiatives.

Recommendation	Details	DAC Audience	Timeframe
Create scalable systems for increasing the quality and quantity of service provided.	Develop materials and communications for various personas, including renters, retired homeowners, new homeowners, HEAP recipients, people on delivered fuels, low- and moderate-income households etc. to facilitate ease of response and consistency of assistance provided. Consider hiring a marketing firm or experienced communications staff for added necessary capacity and skillset.	Yes	Summer 2024-2026
Reboot and update HeatSmart and Solarize campaigns, partnering with CEC Community Campaigns	Vet and onboard new installers and community solar providers, update educational materials, marketing, and expertise, and deepen partnerships. Take into account community survey results focusing on air sealing and promote home performance to all. As part of this reboot, assess HeatSmart marketing in the context of NYSERDA and IRA incentives for low-income households.	City of Syracuse for Solarize, rural DACs for heat pumps	Begin Autumn 2024 with contractor RFQ
Strengthen Educational Outreach	Public and partner-facing newsletter, energy literacy workshops (ELWs), and webinars to provide low-cost, energy saving advice, increase community energy literacy, and host local experts and partners on various programs and technologies. Include bi-annual EnergySmart CNY program update and stakeholder feedback sessions for community accountability	Especially for ELWs and feedback sessions	Begin Autumn 2024
Contractor Engagement	Engage contractors with regular communications and meetings to strengthen workforce pathways and opportunities, working to increase program participation for both NYSERDA workforce development programs (Internship, OJT, etc.) and energy efficiency programs (EmPower+, Clean Heat, etc.).	Indirectly	Begin Summer 2024
Landlord outreach	Partner with the City of Syracuse to educate landlords and tenants of 1-4 family units about the new funding available via EmPower+ and the IRA.	Yes	Autumn 2024 – Winter 2025
Community Advocate and Volunteer Program	Training, support, and materials for volunteers, trusted community leaders, educators, and influencers, support services staff, etc. to help educate their communities, including through multilingual outreach.	Yes	Spring 2025
Workforce Development	Outreach to local schools and businesses about the NYSERDA OJT and Internship programs. Develop administrative support resources for small businesses to be able to apply for and work with the programs.	Yes	Begin Autumn 2024

VII. Appendices

Appendix A: Key Definitions from NYSERDA

Clean Energy Businesses: *Energy efficiency and clean technology businesses, organizations, or municipalities that have dedicated energy efficiency or clean technology positions as an integrated part of their business or organizational practices, including start-up companies or businesses or labor management organizations working on behalf of energy efficiency or clean technology businesses. (Source: NYSERDA Clean Energy Business Webpage)*

Disadvantaged Communities: Those individuals who meet the criteria established to identify a disadvantaged community adopted by the Climate Justice Working Group under the Climate Leadership and Community Protection Act. The criteria identify individuals based on a geographic component or an income component.

Priority Populations for Workforce Development:

- Veterans;
- Individuals with disabilities;
- Low-income individuals, whose household's total income is below or at 60% of the State Median Income, or whose household has been determined eligible for or is receiving assistance through the Home Energy Assistance Program (HEAP), Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), or other human service benefit programs;
- Incumbent or unemployed fossil fuel workers;
- Previously incarcerated individuals;
- 16- to 24-year-olds who are enrolled in or have completed a comprehensive work preparedness training program such as those offered by Boards of Cooperative Education Services (BOCES), technical high schools, Conservation Corps, YouthBuild, and AmeriCorps. The training program must include a combination of rigorous clean energy education with hands-on technical training. Eligibility of work preparedness programs under this category will be considered on a case-by-case basis;
- Homeless individuals;
- Single parents.

Appendix B: References

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Appendix C: Baseline Sociodemographic Data

C.1: Languages Spoken

Data source: American Community Survey, ACS 5-Year Estimates Subject Tables, Table S1601

	ONONDAGA COUNTY, NEW YORK		CITY OF SYRACUSE, ONONDAGA COUNTY		OTHER CNY COUNTIES		ALL COUNTIES TOTAL	
	Total Language Speakers	Speak English less than "very well"	Total Language Speakers	Speak English less than "very well"	Total Language Speakers	Speak English less than "very well"	Total Language Speakers	Speak English less than "very well"
SPANISH	12999	3884	7938	2491	4154	736	17153	4620
OTHER INDO-EUROPEAN LANGUAGES	16287	5661	5069	1998	5368	1674	21655	7335
ASIAN AND PACIFIC ISLAND LANGUAGES	10975	5659	6516	3323	1854	774	12829	6433
OTHER LANGUAGES	8010	3886	5902	3048	862	261	8872	4147
TOTAL	48271	19090	25425	10860	12238	3445	60509	22535

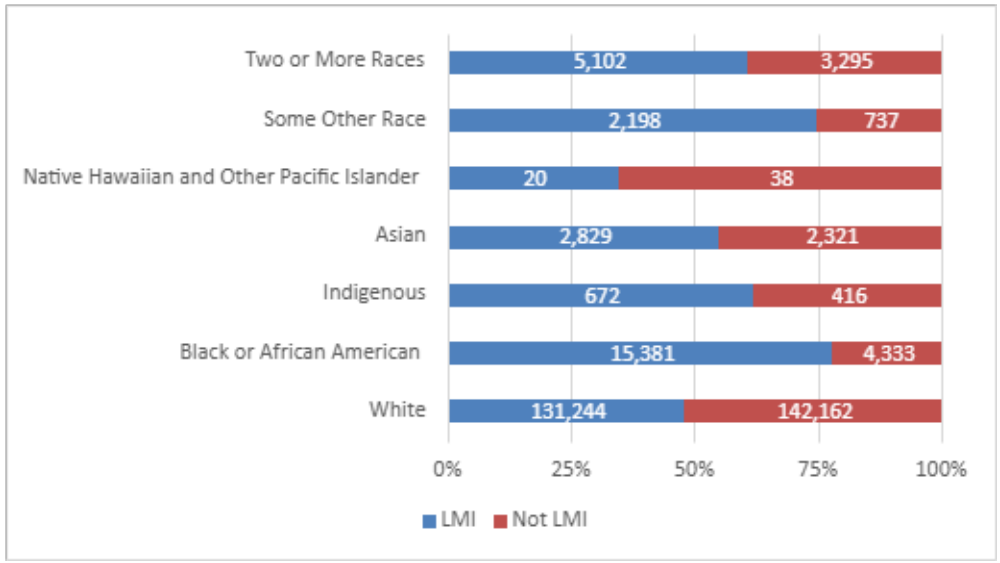
C. 2: Census Tracts with high LMI populations

Data Source: NYSERDA Tableau Data

Census Tract	Municipality / Neighborhood
36075020100	Redfield
36075020302	Richland
36075020500	Altmar
36075021501	Catfish Creek
36075020800	Palermo
36075021103	Fulton
36075021300	Hannibal
36011040100	Fairhaven
36075020702	Central Square
36075020901	Phoenix
36067011800	Seneca Knolls/ Village Green
36067012200	Camillus
36067012700	Amboy
36067013300	Liverpool
36067011102	Liverpool Morgan Rd/ MUD Area
36067010800	Mattydale/ Lyncourt/ N. Syr
36067010700	Mattydale/ Lyncourt/ N. Syr
36067010600	Mattydale/ Lyncourt/ N. Syr
36067013900	Mattydale/ Lyncourt/ N. Syr
36067014200	Lyncourt
3606700300	North Side
36067004400	Syracuse University Area
36067004500	Westcott
36067005602	Outer Comstock
36011041500	Auburn
36011041600	Auburn
36023970800	Cortland
36023970400	McGraw
36023970100	Deruyter
36023971100	Cincinnatus
36053030800	Georgetown
36053030700	Erieville
36053031100	Brookfield
36053030200	N. of Canastota
36053030501	Cazenovia

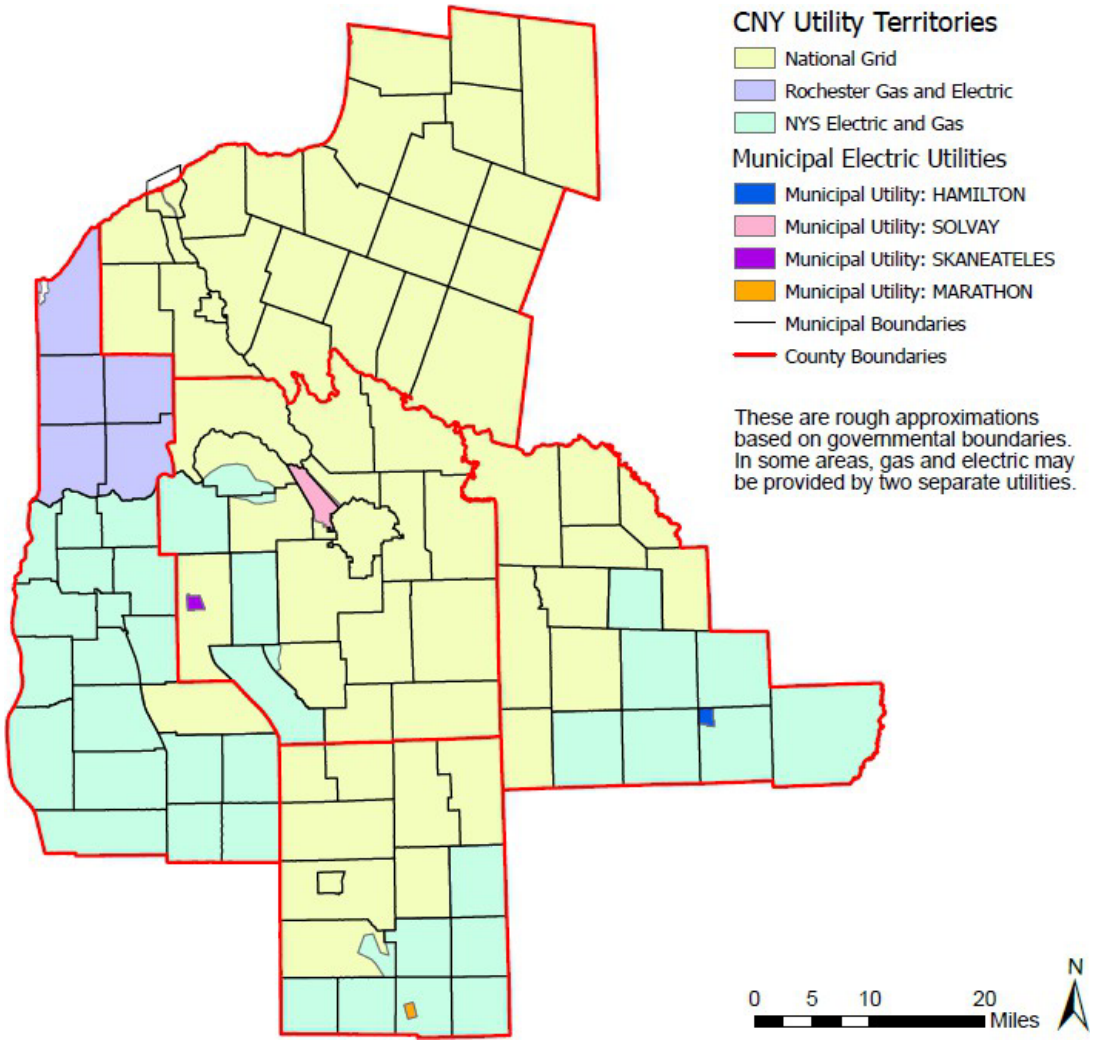
C. 3: LMI Households by Race in Central New York

Source: U.S. Census Bureau. (2021). American Community Survey (ACS) 5-year Public Use Microsample (PUMS) Estimates



Appendix D: Building and Sector Assessment

D. 1: CNY Utility Territories



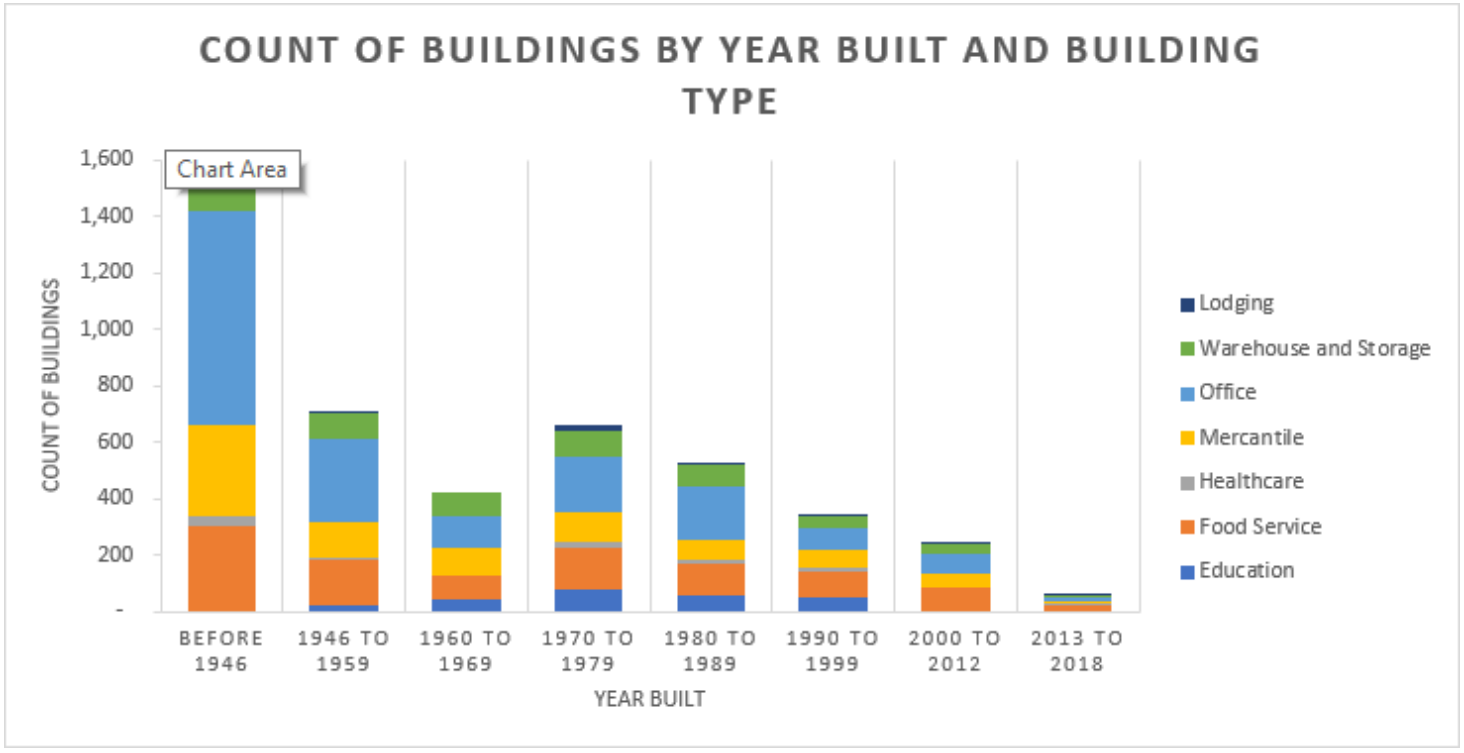
D.2: Commercial and Industrial Buildings in CNY

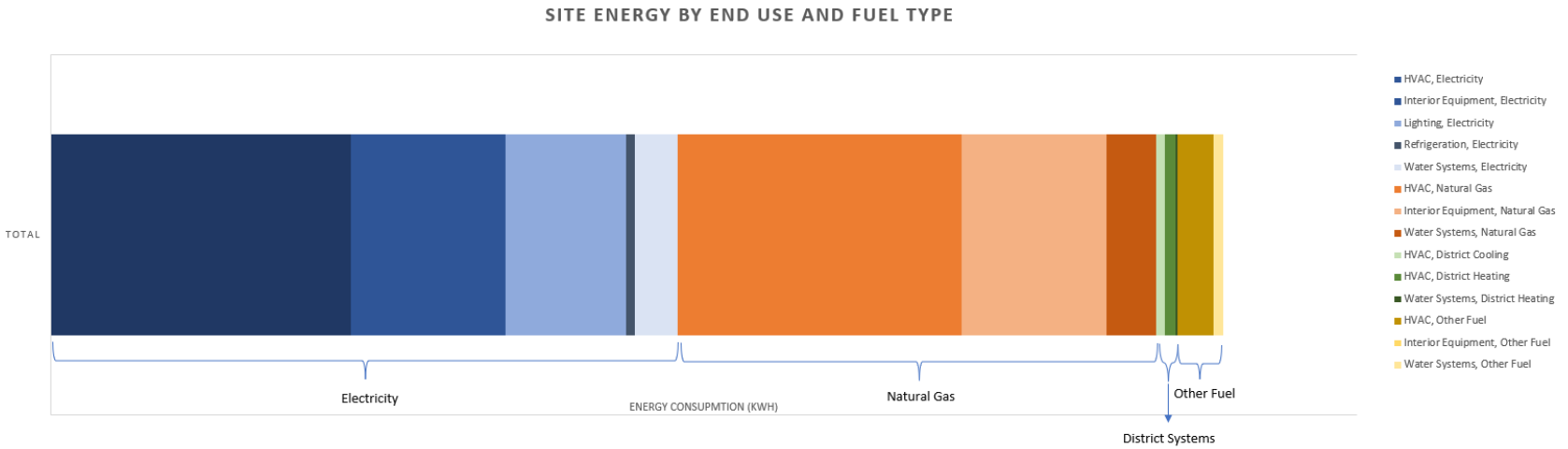
building_id samples included from the following geographies

in.state	in.county_name	in.nhgis_county_gisjoin	Sum of weight
NY	NY, Onondaga County	G3600670	3,075
	NY, Cayuga County	G3600110	420
	NY, Oswego County	G3600750	558
	NY, Madison County	G3600530	278
	NY, Cortland County	G3600230	153
NY Total			4,484
Grand Total			4,484

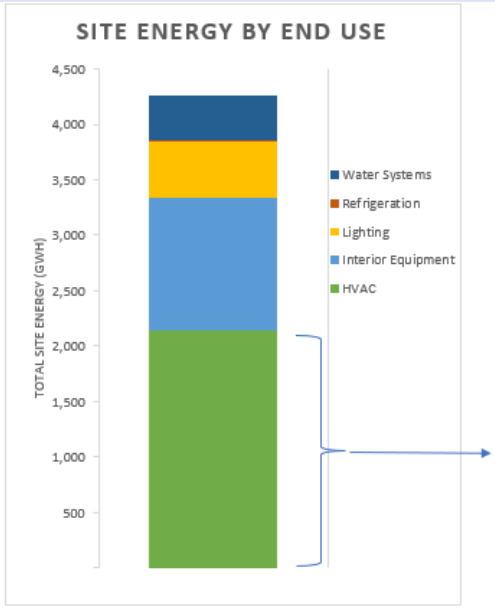
Onondaga County has a much higher percentage of C&I buildings in CNY

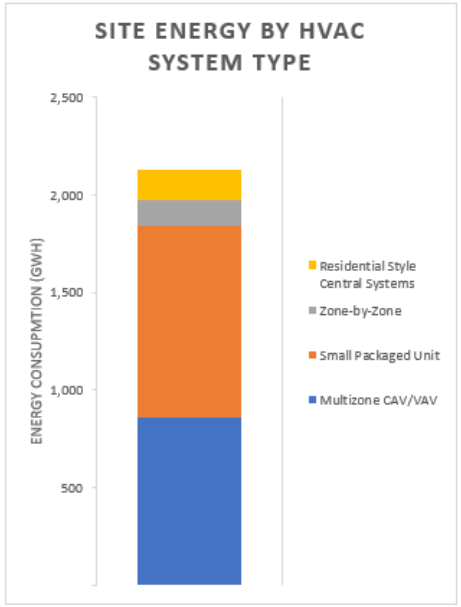
The following graphs are for all five counties combined.

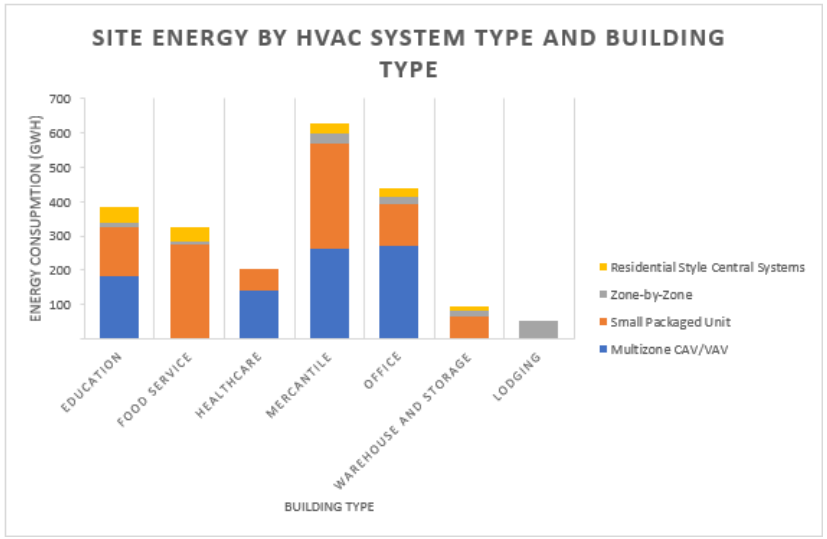




***These bars need to be manually adjusted for each new set of data. Blue is electricity, orange is natural gas, green is District Systems and yellow is other fuel type.**



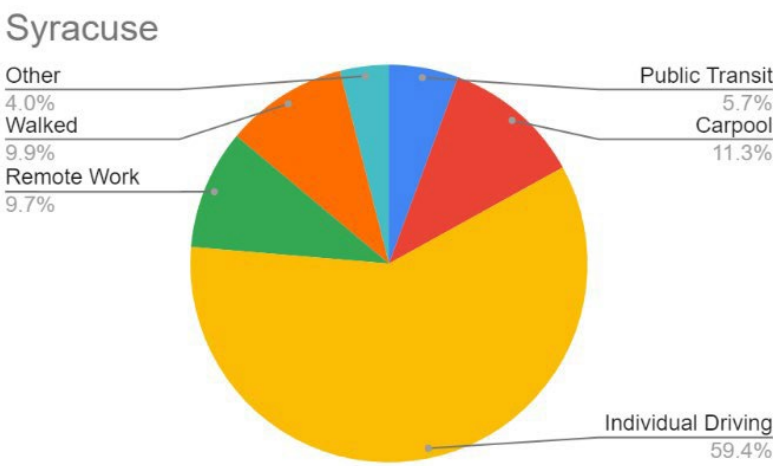


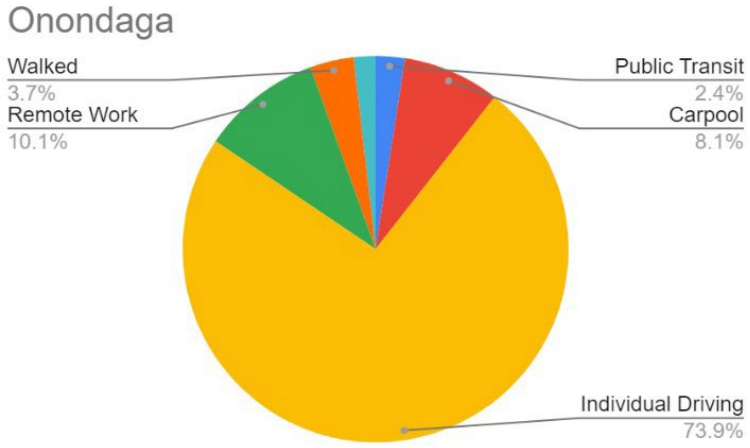


Appendix E: Workforce

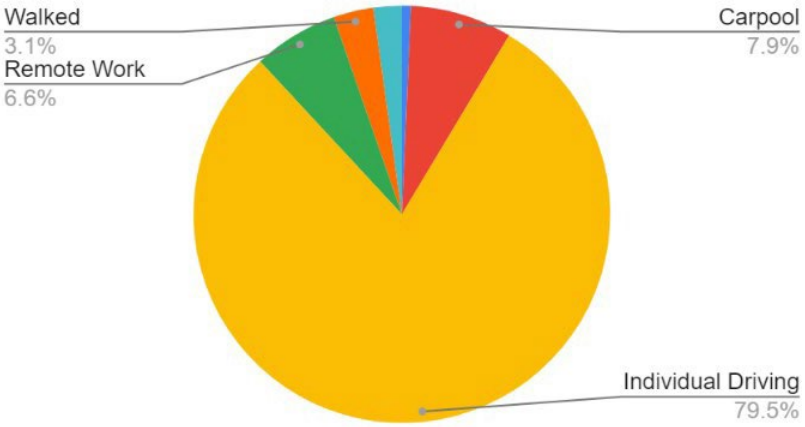
E. 1: Commuting Patterns By Region

	Public Transit	Carpool	Individual Driving	Worked From Home	Walked	Other
Syracuse	5.40%	10.80%	56.70%	9.30%	9.50%	3.80%
Onondaga	2.40%	8%	72.60%	9.90%	3.60%	1.80%
Oswego	0.70%	7.90%	79.40%	6.60%	3.10%	2.20%
Cayuga	0.60%	7.40%	80.30%	6.40%	3.70%	1.70%
Cortland	1%	11.30%	74.70%	6.30%	4.60%	2.10%
Madison	0.30%	6.20%	77.80%	8.70%	6.00%	0.90%

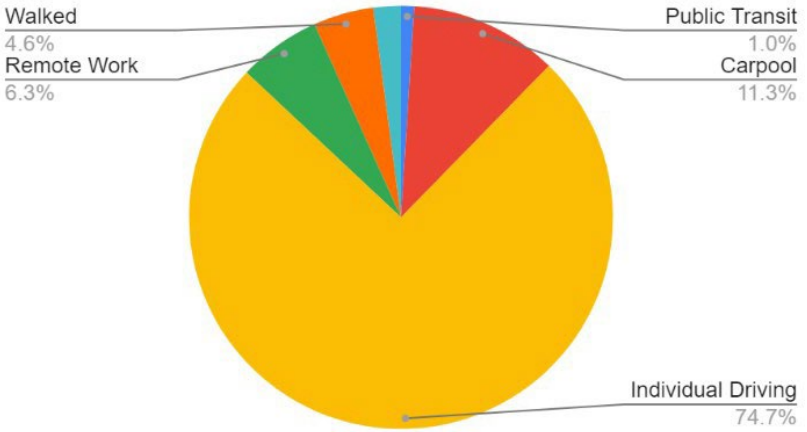




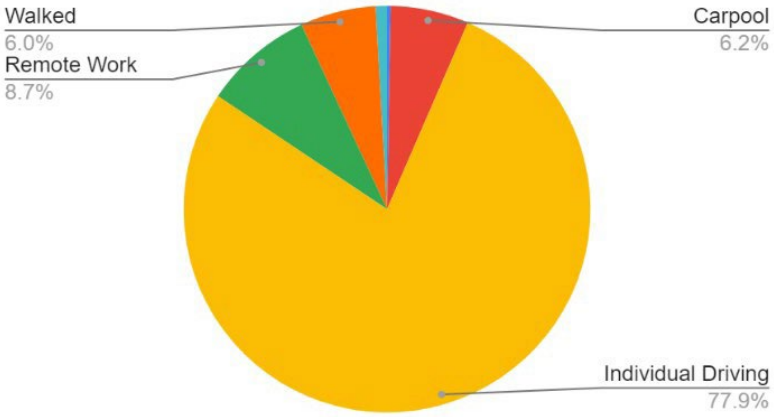
Oswego



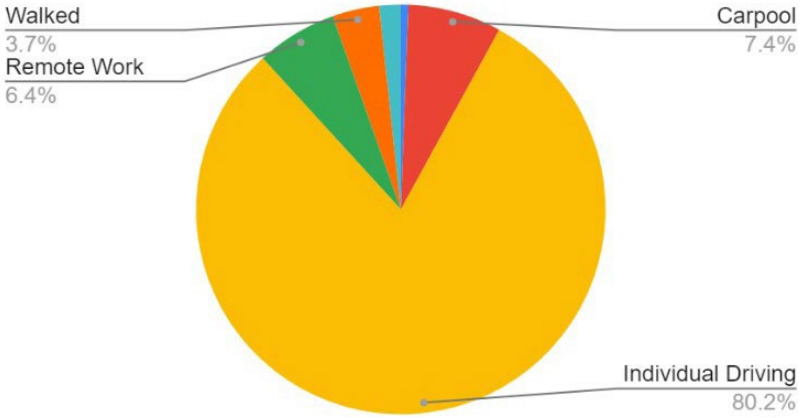
Cortland



Madison



Cayuga



E. 2: Clean Energy Jobs by County in CNY

Job Categories		*Cayuga*	*Cortland*	*Madison*	*Onondaga*	*Oswego*
Total Clean Energy Jobs	*2022 Jobs #*	496	187	226	3874	724
	NYS Rank	34	48	44	10	29
	2022 Growth %	1.80%	1.4%	0.7%	2.2%	1.4%
	NYS Growth Rank	37	43	53	31	45
Renewable Generation	*2022 Jobs #*	21	15	13	246	252
	2022 Growth %	0.10%	1.70%	0.50%	22.10%	N/A
Grid & Storage	*2022 Jobs #*	15	<10	<10	114	113
	2022 Growth %	2.3%	N/A	N/A	2.90%	2.20%
Energy Efficiency	*2022 Jobs #*	302	133	166	3003	272
	2022 Growth %	N/A	-0.60%	-0.10%	N/A	-0.10%
Clean Vehicles	*2022 Jobs #*	144	35	36	474	75
	2022 Growth %	7.60%	11.20%	8.20%	8.80%	13.80%
Biofuels	*2022 Jobs #*	15	<10	<10	38	12
	2022 Growth %	-10.70%	N/A	N/A	-10.70%	-10.70%

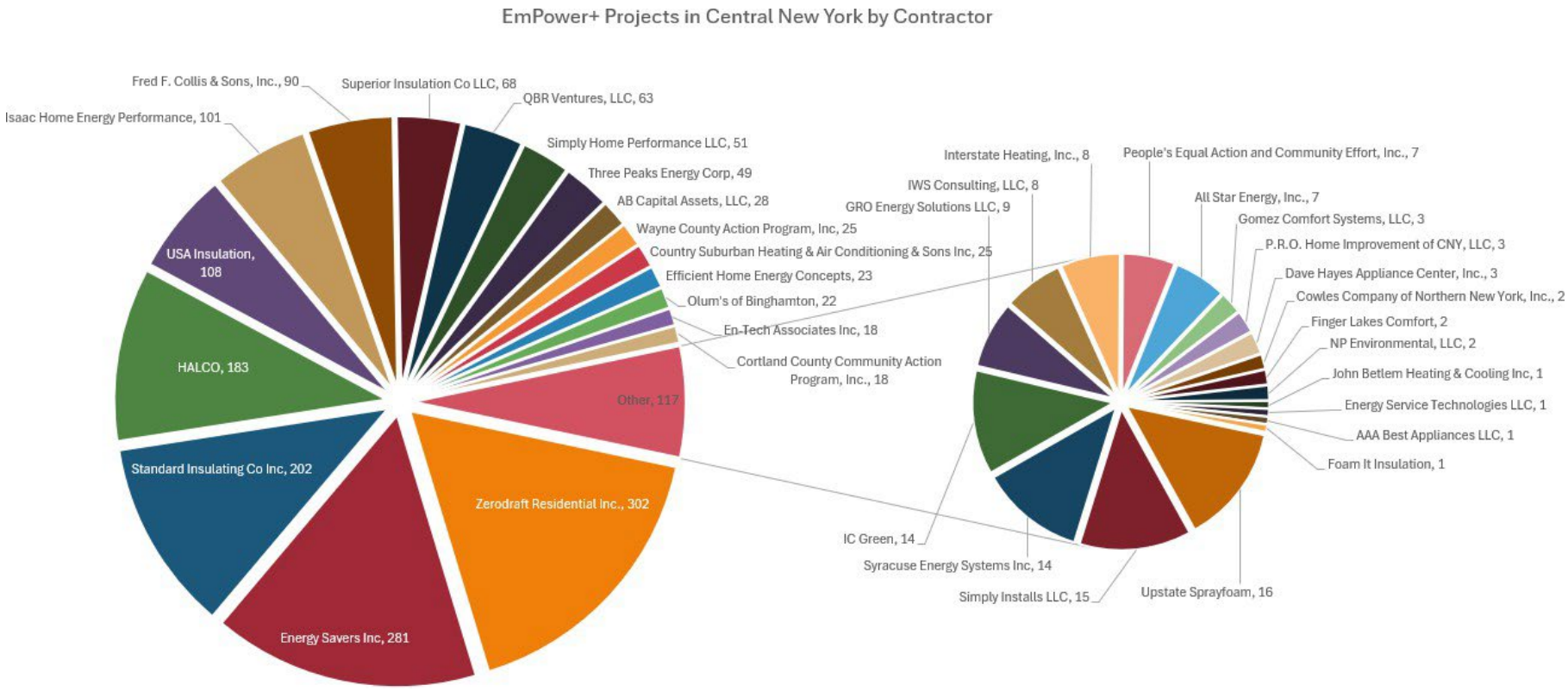
Clean Jobs America 2023

E. 3: NY Clean Energy Industry

Source: Clean Jobs America 2023

	NY Clean Energy Industry				
	Overall Clean Energy, 2021	**Overall Clean Energy, 2022**	**Renewable Electric Power Generation**	**Building Decarbonization and Energy Efficiency**	**New York State's Labor Force**
Female	25%	**26%**	28%	26%	48%
Male	75%	**74%**	72%	74%	53%
White	72%	**72%**	71%	72%	70%
Hispanic/Latin/a/x	15%	**15%**	16%	15%	17%
Black	8%	**9%**	10%	9%	17%
Asian	7%	**8%**	9%	8%	9%
Native American	2%	**1%**	1%	1%	1%
Pacific Islander	1%	**1%**	1%	1%	<1%

E. 4: EmPower+ Projects in Central New York by Contractor July 2023 - May 2024



E. 5: Workforce Development Program Participants

PROGRAM DATA PROVIDED BY NYSERDA WORKFORCE DEVELOPMENT AND TRAINING TEAM

WORKFORCE DEVELOPMENT AND TRAINING (PON 3982)

4 Green Power Systems, LLC

AB Capital Assets, LLC

All Temperature Systems Of Syracuse Inc

Alternative Carbon Energy Systems, Inc. (ACES-Energy)

Alternative Power Solutions of NY, LLC

Antares Group, Inc.

Aztech Geothermal, LLC

Barney Moravec, Inc

BlocPower

Breathe Easy of CNY Inc.

Buffalo Energy, Inc.

Buffalo Geothermal Heating, LLC

D&D Motor Systems

Dailey Electric, Inc

DEMCO New York Corp.

Edison Innovative Power

EMCOR Services Betlem

Finger Lakes Comfort Inc.

Fred F. Collis & Sons, Inc.

Fulton Thermal Corporation

Geotherm Inc

Halco Energy

Heat and Cool Solutions LLC

John Betlem Heating & Cooling

L&S Energy Services, Inc

Lake Country Geothermal, Inc.

USA Insulation of Syracuse

Leo J. Roth Corporation

Murray's Heating & Air Conditioning, LLC

Next Generation Solar, LLC

NP Environmental LLC

People's Equal Action and Community Effort, Inc.

Simply Home Performance LLC.

Simply Installs LLC.

Steven Winter Associates, Inc.

Sustainable Comfort, Inc.

Syracuse Energy Systems, Inc.

Syracuse Heating and Cooling, Inc.

Taitem Engineering, P.C.

Tioga Opportunities Inc.

Upstate Spray Foam Insulation

Van Hee Mechanical

Zerodraft Residential

WORKFORCE DEVELOPMENT AND TRAINING (PON 4000)

4 Green Power Systems, LLC

AB Capital Assets, LLC

Alliance for a Green Economy (AGREE)

Alternative Carbon Energy Systems, Inc. (ACES-Energy)

Alternative Power Solutions of NY, LLC

Antares Group, Inc.

Aztech Geothermal, LLC

BlocPower

Breathe Easy of CNY Inc.

Buffalo Energy, Inc.

Buffalo Geothermal Heating, LLC

CDH Energy Corporation

CenterState CEO

D&D Motor Systems

DEMCO New York Corp.

Edison Innovative Power

EMCOR Services Betlem

Finger Lakes Comfort Inc.

Fred F. Collis & Sons, Inc.

Fulton Thermal Corporation

Halco Energy

Heat and Cool Solutions LLC

L&S Energy Services, Inc

Lake Country Geothermal, Inc.

USA Insulation of Syracuse

Murray's Heating & Air Conditioning, LLC

Next Generation Solar, LLC

NP Environmental LLC

OnSite Solar, LLC

People's Equal Action and Community Effort, Inc.

Simply Home Performance LLC.

Simply Installs LLC.

Steven Winter Associates, Inc.

Sustainable Comfort, Inc.

Syracuse Energy Systems, Inc.

Syracuse Heating and Cooling, Inc.

Taitem Engineering, P.C.

Tioga Opportunities Inc.

TRC Companies, Inc.

Van Hee Mechanical

Workforce Development Board Herkimer, Madison & Oneida Counties, Inc.

NYSERDA CLIMATE JUSTICE FELLOWSHIP

Buffalo Geothermal Heating, LLC

Farm to Flame Energy

Fulton Thermal Corporation

USA Insulation of Syracuse

Murray's Heating & Air Conditioning, LLC

People's Equal Action and Community Effort, Inc.

Simply Installs LLC.

State University of New York-SUNY Cortland

Syracuse Energy Systems, Inc.

Syracuse Heating and Cooling, Inc.

Taitem Engineering, P.C.

Workforce Development Board Herkimer, Madison & Oneida Counties, I

E. 6: SUNY Morrisville Offshore Wind Training Institute

NEW YORK STATE | NYSERDA

SUNY MORRISVILLE RENEWABLE ENERGY TRAINING CENTER

New York State Offshore Wind

SUNY Morrisville Renewable Energy Training Center's Offshore Wind Technician Training

Dr. Ben Ballard, RETC Director
BallarBD@morrisville.edu
Ph: 315.684.6780
morrisville.edu/renewable-energy

SUNY Morrisville, Morrisville, NY
Renewable Energy Training Center

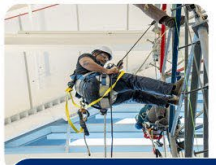
Program Description:

- ***Wind turbine technician micro-credentials → Wind turbine technician 1-yr certificate*** *(10-15 participants per semester)*
  - *Low-residency, online, hybrid, HyFlex offerings (classes beginning summer 2024)*
- ***Embedded wind tech. training in Renewable Energy A.A.S. and B.Tech.*** *(15-30 participants per year, began spring 2024)*
- ***Outreach: K-12 STEM workshops*** *(30-60 participants/yr),* ***RE career exploration*** *(>300 participants/yr),* ***Teacher Professional Development*** *(K-12, BOCES; 20-40 participants/summer)*
- ***Contacts:***
  - *Dr. Ben Ballard, RETC Director BallarBD@morrisville.edu 315.684.6780*
  - *Mr. Sam Doubleday, Outreach Coord., DoubleS@morrisville.edu 315.684.6299*
  - morrisville.edu/renewable-energy

SUNY MORRISVILLE EST. 1908

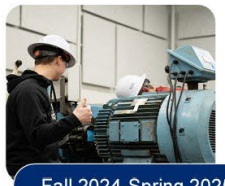
Timeline of Development

SUNY MORRISVILLE EST. 1908



Spring 2024
- Micro-credentials and Certificate developed
- Embedded Courses offered (RE A.A.S./B.Tech.)
- RENG Courses adapted for hybrid/HyFlex/low-resid.
- Career Exploration HS Events

Summer 2024
- Micro-cred. Courses offered:
  - RENG 101, 102, 225 (*hybrid/HyFlex/low-resid.*)
- Summer Institute:
  - Teacher Prof. Development
  - HS Career Exploration
- K-12 STEM workshops



Fall 2024-Spring 2025
- Micro-credentials and Certificate approval
- Wind Tech Micro-cred. Courses offered (*hybrid/HyFlex/low-resid.*)
- Embedded Courses offered (RE A.A.S./B.Tech.)
- Career Awareness/Outreach

Photos: Tower Climbing Lab and Wind Lab at SUNY Morrisville's ACET Center

Potential for Partnerships, Assistance, Job Pathways and Collaborations

SUNY MORRISVILLE RENEWABLE ENERGY TRAINING CENTER

- **Outreach, Recruiting, Collaboration – Join Us!**
  - Education Opportunity Program (EOP)
  - Science of Technology Entry Program (STEP)
  - Collegiate Science & Technology Entry Program (CSTEP)
  - Syracuse Education Opportunity Center (EOC)
  - Central New York Regional Planning & Development Board
  - Greater Syracuse Works
  - NY for Clean Power
  - SUNY Clean Energy Consortium
- **Wind Industry Partners** (technical review, internships, outreach)
  - Orsted, Avangrid, Storke LLC., others welcome!
- **Articulation Opportunities**
  - HS/BOCES, community college, SUNY-SUNY institution, GWO providers

morrisville.edu/renewable-energy

Tower Climbing Lab at SUNY Morrisville's ACET Center

E.7: New York State Joint Apprenticeship Training Centers by Union

Source: Cornell University Climate Jobs Institute, 2024

Name	Union	Location	County
BAC Local 2 NY - Syracuse Training Center	International Union of Bricklayers and Allied Craftworkers (BAC)	Liverpool	Onondaga
North Atlantic States Carpenters Training Center Syracuse	United Brotherhood of Carpenters and Joiners of America (Carpenters)	Syracuse	Onondaga
IBEW Central New York JATC- Local 43	International Brotherhood of Electrical Workers (IBEW)	Clay	Onondaga
Insulators Local 30	International Association of Heat and Frost Insulators and Allied Workers (Insulators)	Syracuse	Onondaga
Ironworkers Local 60	International Association of Bridge, Structural, Ornamental and Reinforcing Ironworkers (Ironworkers)	Syracuse	Onondaga
IUOE Upstate New York Engineers - Training Fund	International Union of Operating Engineers (IUOE)	Syracuse	Onondaga
LiUNA Local 633 - JATC	Laborer's International Union of North America (LiUNA)	East Syracuse	Onondaga
Millwrights Liverpool Training Center	UBC Millwrights	Liverpool	Onondaga
NEIEP Local 62	National Elevator Industry Educational Program (NEIEP)	Syracuse	Onondaga
Roofers Local 195	United Union of Roofers, Waterproofers and Allied Workers (Roofers)	Liverpool	Onondaga
SMART Local 58 - JATC	International Union of Sheet Metal, Air, Rail and Transportation Workers (SMART)	Syracuse	Onondaga
UA Local 81 - Syracuse Training Center	United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada (UA)	Syracuse	Onondaga
UA Local 81 - JATC	United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada (UA)	Syracuse	Onondaga
UA Local 81 - Syracuse JAC	United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada (UA)	Syracuse	Onondaga
IUOE Local 158 - District 545 Training Center	International Union of Operating Engineers (IUOE)	Constantia	Oswego
IUPAT FTI of Western & Central New York	International Union of Painters and Allied Trades (IUPAT)	Fulton	Oswego
LiUNA Upstate New York Laborers' Education and Training Fund	Laborer's International Union of North America (LiUNA)	Oswego	Oswego
IUPAT FTI of Western & Central New York	International Union of Painters and Allied Trades (IUPAT)	Cortland	Cortland

E. 8: Related Workforce Development Programs in CNY

1. **The Future-Ready Workforce Innovation Consortium**, made up of more than 40 members across seven CNY counties (i.e. Syracuse University, Onondaga Community College, Le Moyne College, Manufacturers Alliance of CNY), focuses specifically on workforce-ready training and degree pathways tied directly to in-demand industry sectors. This includes pathways to degree and non-degree programs, technical training, certificates, and specialized unions, secondary schools, community colleges and other four-year institutions. The training will prepare students for the advanced-manufacturing industry through lessons on semiconductor production, including topics such as information technology, cybersecurity, artificial intelligence and machine learning.

2. **One Network for Advanced Manufacturing Partnerships (ON-RAMP)**, through NYS Empire State Development, is a network of four new development centers across Upstate New York, including one in Syracuse overseen by CenterState CEO, an economic development organization. ON-RAMP Centers will offer credentials and training related to advanced manufacturing and focus on providing opportunities for disadvantaged populations. The core principles are creating commitment to access and equity, development of active industry partnerships, creation of effective workforce pipelines, wraparound supports for program participants, and data-driven performance management.

3. **NYSDOT WorkSmart NY** is a 7-week hybrid (classroom and workshop) training program through Syracuse Educational Opportunity Center (EOC) that prepares students for various construction jobs. Training includes construction math, blueprint reading, introduction to power tools and hand tools, introduction to concrete and forming systems, flagging and OSHA-10 for construction. Students also participate in soft skills training, resume writing workshops and mock interviews before completing the program. Syracuse EOC has other career programs as well like their Build Ready Construction Training Program, Surge Advanced Manufacturing, ATTAIN Lab, and more.

Appendix F: Grants, Loans, Rebates, Credits, and Other Sources of Financial Assistance

F.1: A Selection of Relevant Residential Programs for EnergySmart CNY Referrals

Program Name	Eligibility Category	Type	Funding	Helps LMI Homes?	What does it cover?
1% Home Improvement Loan & Grant - Onondaga County	Residential	Income-based (Loan/ Grant)	Onondaga County & US Dept. of HUD	Yes	a. Exterior Repairs: Includes roofs, siding, doors, and window replacements. b. Emergency Repairs: Covers furnace and hot water tank replacements or repairs, plumbing, electrical work, code violations, and other life/safety issues.
ACH Grant	Residential	Grant	New York State Affordable Housing Corporation	Yes	Home repairs necessary for the health and safety of homeowners. Examples of qualifying repairs would include roof, electrical, bathroom and furnace.
Comfort Home	Residential - No income restriction	Installation Rebates	Comfort Home Program	It can, after EmPower+	a. Seal and Insulate Packages: Improving home comfort by sealing air leaks and upgrading insulation in ceilings, floors, and walls. b. High-Performance Windows: Installation of energy-efficient windows. c. Consultation: No-fee consultation with trained contractors to select the right improvement package. d. Heat Pump Options: Information on clean heating and cooling options and additional rebates for heat pump installations within 24 months of completing seal and insulate work.

					e. Energy Savings: Helps offset future heating and cooling system costs, allowing for smaller, less expensive equipment and reducing energy bills.
Empower+ Low Income	Residential ≤ 60% SMI, Homeowner, Renter, Landlord	Income-based	NYSERDA	Yes	a. No-cost home energy assessment b. Insulation, air sealing, equipment efficiency, heat pump installation c. Monthly electric bill credit of between $5-$15 from community solar, if available.
Empower+ Moderate Income	Residential 60 to ≤ 80% S/AMI, Homeowner, Renter, Landlord	Income-based	NYSERDA	Yes	a. No-cost home energy assessment b. Insulation, air sealing, equipment efficiency, heat pump installation
Federal Tax Credit - Energy Efficient Home Improvements	Residential, Homeowner, some for Renters	Tax credit	Internal Revenue Service (IRS)	Yes, some moderate	Most items are 30% up to $1,200/yr. (a few are less); for heat pump equipment 30% up to $2,000; these incentives re-set each year, but you cannot roll over credits ex.) you get a HPWH and a GSHP and use your $2K up for the GSHP, you do not get a 2nd $2K for the HPWH, but could install it the next year; verify if 2nd property for some items or not
Federal Tax Credit – Ground Source Heat Pumps (GSHP)	Residential	Tax credit	Internal Revenue Service (IRS)	Yes, some moderate	Equipment, Installation costs, and certain electrical upgrades associated with geothermal heat pump system.
Federal Tax Credit - Residential Clean Energy Home Improvements	Residential, Homeowner, some for Renters	Tax credit	Internal Revenue Service (IRS)	Yes, some moderate	GSHP; Solar/battery storage; Small wind - some listed in this chart individually; 30% of cost
Federal Tax Credit - Solar	Residential	Tax credit	Internal Revenue Service (IRS)	Yes, some moderate	purchase community solar, onsite solar, battery storage
Finger Lakes Climate Fund	Residential	Income-based	Funded initially by the Park Foundation, mainly carbon offset donations made by individuals and businesses to the Finger Lakes Climate Fund	Yes	a. Air sealing b. Insulation c. Heat pumps d. Heat pump water heaters
GJGNY Financing - Smart Energy Loan	Residential, <120% AMI, Homeowner, Geo-Eligible Financing	Financing (Loan)	NYSERDA facilitated by Slipstream / EFS	Yes	a. Solar photovoltaic systems b. Ground source heat pumps c. Air source heat pumps d. Energy efficiency improvements (insulation, windows, and doors, HVAC systems, lighting, etc.)

GJGNY Financing - Bridge Loan	Residential, Have tax liability	Financing (Loan)	NYSERDA facilitated by Slipstream / EFS	Yes, some moderate	
GJGNY Financing - On-Bill Recovery	Residential, Market Rate, <60% SMI,60-80% AMI, Geo-Eligible Financing	Financing (Loan)	NYSERDA facilitated by Slipstream / EFS	Yes	a. Purchase and installation of solar photovoltaic systems. b. Ground source heat pumps. c. Air source heat pumps. d. Energy efficiency improvements.
HEAP - Clean and Tune (C&T)	Residential	Income-based	Federal funding, administered by NYS Office of Temporary and Disability Assistance (OTDA)	Yes	Heating system maintenance
HEAP - Cooling Benefit	Residential	Income-based	Federal funding, administered by NYS Office of Temporary and Disability Assistance (OTDA)	Yes	Cooling Assistance: Financial aid to purchase and install an air conditioner or a fan to help the home stay cool, subject to eligibility criteria.
HEAP - Emergency Benefit	Residential	Income-based		Yes	a. Restoring or preventing the shut-off of natural gas or electric heat. b. Providing emergency fuel for oil, kerosene, propane, wood, wood pellets, coal, or other deliverable heat sources. c. Necessary repairs or replacements for heating equipment.
HEAP - Heating Equipment Repair or Replacement Benefit (HERR)	Residential	Income-based		Yes	Repair or replacement of heating system
HEAP - Regular Benefit	Residential	Income-based		Yes	Utility Bill Reduction
Homes and Community Renewal (HCR) - Resilient Retrofits	Residential, <60% SMI,60-80% AMI, Homeowner, ccASHP, <80% AMI,<120% AMI,<100% AMI	Loan/ Grant	NYS Homes & Community Renewal	Yes	a. Flood Mitigation: Measures to prevent water-related damage, including sealing spaces below flood elevation and raising mechanicals above flood levels. b. Energy Efficiency and Electrification: Upgrades to improve home energy use and transition to electric heating/cooling systems, such as installing insulation, high-efficiency appliances, and electric cold climate heat pumps. c. Onsite Generation: Addition of renewable energy solutions like solar panels or battery backup systems to complement resilience and efficiency upgrades.

Independent Energy Efficiency Program (IEEP) Rebates	Residential and Commercial	Installation Rebate	Participating municipal electric utilities in collaboration with IEEP	Yes	a. Energy-efficient light bulbs, attic insulation, cold climate heat pumps, weatherization of homes b. Commercial refrigeration upgrades, purchase of EV, and facilitation of installation of charging station and many more..
Lead Hazard Reduction Program	Residential, <80% AMI	Income-based (grant)	Several different Federal and State agencies	Yes	a. Window and door replacement b. Exterior siding installation c. Porch repairs d. Other health and safety related repairs as needed, including addressing lead paint hazards
NYS Clean Heat - Air- to-Water ccASHPs	Residential, Commercial, Nonprofit etc.	Installation Rebates	NYS Public Service Commission regulated	Yes	Air to water cold climate air source heat pumps
NYS Clean Heat - ccASHP Full Load Heating (90-120%)	Residential, Commercial, Nonprofit etc.	Installation Rebates	NYS Public Service Commission regulated	Yes	Cold Climate Air Source Heat Pump (ccASHP)
NYS Clean Heat - GSHP Full Load Heating	Residential, Commercial, Nonprofit etc.	Installation Rebates	NYS Public Service Commission regulated	Yes	Ground Source Heat Pump (GSHP)
NYS Clean Heat - HPWH	Residential, Commercial, Nonprofit etc.	Installation Rebates	NYS Public Service Commission regulated	Yes	Air-to-Water Heat Pump Water Heaters (HPWHs)
NYS Dept. of Health - Healthy Neighborhoods Program	Residential, by referral.	Education and on-site visit	NYS Department of Health	Yes	During a visit, the home is assessed for environmental, health and safety issues. For problems or potential hazards identified during the visit, an outreach worker provides education (written and verbal), referrals and products to help residents correct or reduce housing hazards.
NYS Property Tax Exemption	Residential	Tax Exemption	NYS	N/A	Solar or wind energy systems, farm waste energy, micro-hydroelectric system, fuel cell electric generating, micro-combined heat and power generating equipment, electric energy storage, and fuel-flexible linear generator systems.
NYS Tax Credit - GSHP	Residential	Tax credit	NYS	Yes, some moderate	Installation costs, and qualified expenditures for lease payments made under a written agreement for geothermal energy system equipment.
Oswego Housing Rehab Program	Residential <80% AMI	Income-based (grant)	NYS Affordable Housing Corporation to the City of Oswego/ Administered by HHQ	Yes	Insulation, heating, plumbing, Roof, Carpentry, Masonry, replacement of windows and doors and exterior paintings

Shape-Up for Veterans	Residential, Veteran, Homeowner, <80% AMI, municipalities	Grant	Onondaga County Community Development Office	Yes	a. Mechanical system repairs (water supply, plumbing, heating, electrical). b. Structural repairs (roofs, foundations, porches, stairs). c. Installation of safety and energy-related items (deadbolt locks, smoke detectors, grab bars, storm windows, insulation). d. Lead Hazard reduction (additional funds may be available if a child under six lives in or visits the home often and lead hazards are found).
Shape-Up Program - Safe Housing Assistance Program for the Elderly	Residential, Homeowners, Seniors, Located in Onondaga county outside Syracuse, <80%AMI	Age-based (deferred loan)	Onondaga County Community Development Office	Yes	a. Repairs: water supply, plumbing, heating, electrical.b. Structural repairs: roofs, foundations, porches, stairs.c. Safety/energy items: deadbolts, smoke detectors, grab bars, storm windows, insulation.d. Lead hazard reduction per HUD regulations.e. Extra $10,000 for homes with children under six if lead hazards exist.
Solar for All	Residential, Homeowner, Renter, <60% SMI, power bill in their name	Utility Bill Assistance	NY State	Yes	Monthly electricity bill credits from community solar projects, reducing energy costs for eligible New Yorkers.
Syracuse Homeowner Assistance & Repair Program (SHARP)	Residential, Located in the City of Syracuse, Homeowner, <80% AMI, Building Owner	Income-based (grant)	US Dept of HUD's Community Development Block Grant Program (CDBG)	Yes	a. Structural Repairs: Including window and exterior door repair/replacement, step/railing repair. b. System Repairs: Addressing hot water heater issues, furnace repair, and electrical or plumbing emergencies.
USDA 504 - Single Family Housing Repair Loans & Grants	Residential	Financing (Loan)	USDA	Yes	a. Loans to use for repairs, improvements, or modernization of homes, and removal of health and safety hazards b. Grant exclusively for health and safety hazard removal for elderly homeowners.
Weatherization Assistance Program (WAP)	Residential ≤ 60% SMI, OR ≤ 200% of FPL, whichever is higher	Income-based	Federal funding, administered by NYS Homes and Community Renewal (HCR) to local service providers	Yes	a. Air sealing, insulation upgrades in walls, floors, and attics, duct improvement, heating system upgrades or repairs b. Energy-efficient lighting and appliance upgrades c. Window and door improvements
Zonolite Attic Insulation Trust	Residential, Homeowner, Renter, Landlord, commercial buildings	Financing	ZAI Trust Fund. Non-governmental, comes from a legal settlement	Yes	a. Reimbursement Contribution: Up to 55% of abatement costs for eligible claimants, subject to the "Allowed Value" ceiling.b. Vermiculite Abatement: Costs associated with the removal of Zonolite brand vermiculite insulation.c. Re-insulation Costs: Reasonable costs to replace the vermiculite insulation with new insulation, excluding upgrades or additional insulation beyond what's necessary for replacement.d. Fair Market Rental Cost: Potential reimbursement for fair market rental of certain equipment (e.g., HEPA vacuum) used in the abatement process, excluding purchase costs of such equipment.

F. 2: A Selection of Relevant Non-Residential Programs and Incentives for EnergySmart CNY Referrals

GJGNY Energy Study	Non-profit, Small business	Technical Assistance	NYSERDA	N/A	a. Facility Evaluation: Includes a comprehensive walkthrough of the facility and interviews with site staff to identify energy-saving opportunities. b. Financial Analysis: Examination of past utility bills to assess current energy usage and costs, and fuel-neutral, unbiased assessment of both low-cost/no-cost and capital improvement opportunities for energy efficiency. c. Report Generation: Produces an energy study report detailing identified energy and cost-saving opportunities for the facility.
Renew America's Nonprofits	Non-profit	Installation Rebates (grant)	Office of State and Community Energy Programs	N/A	Energy efficient materials may include materials (including a product, equipment, or system) the installation of which results in a reduction in use by a nonprofit organization of energy or fuel. Examples include lighting upgrades, roof replacement with insulation, HVAC upgrades, and door or window replacements. Fuel-switching upgrades that will reduce both energy costs and projected carbon emissions will also be eligible. Prime recipients are encouraged to look for projects that package multiple improvements to deepen energy and cost savings and increase carbon reductions.
NYS Clean Heat - Custom	Non-profit (Large), Commercial, full load	Installation Rebates	NYS Public Service Commission regulated	N/A	GSHP, HPWH, ASHP, VRF
Charge Ready 2.0	Commercial, Non-profit, Agricultural Producers	Installation Rebates	NYSERDA	Yes	Provides incentives for EV charging infrastructure with these specifics: a. Incentives apply to Level 2 charging ports at public, private, and not-for-profit locations. b. Public facilities eligible must be in Disadvantaged Communities. c. Workplaces and multi-unit dwellings are eligible regardless of location. d. Additional rewards are available for promoting EV adoption at workplaces and MUDs. e. Eligible charging stations must be networked for data and payment processing. f. The program requires a five-year operational commitment for installed stations.
Climate Friendly Homes - HCR	Multifamily housing that serves economically disadvantaged communities	Incentive	Administered by the Community Preservation Corporation (CPC) on behalf of the New York State Homes and Community Renewal (HCR).	Yes	a. Electrification of heating systems (ccASHP, geothermal, VRF)b. Electrification of domestic hot water systems (HPWH). Upgrades to building envelope and ventilation systems

Affordable Multifamily Efficiency Program (AMEEP)	Multifamily <80% AMI, Landlord, Affordable Housing,5+ Units	Financing (Incentives)	NYSERDA	Yes	Eligible Energy Efficiency Measures include windows, doors, appliance efficiency, insulation, light emitting diode (LED) lightbulbs, and water supply, among others. a. Comprehensive Pathway: Aimed at large-scale or whole-building retrofits; Offers higher incentives with a mid-project payment; Requires a minimum of 100 points for incentives, calculated per dwelling unit; Mandates an energy audit with available incentives to offset audit costs; Incentive cap at 85% of total project cost for eligible measures or $1 million, whichever is lower. b. Non-Comprehensive Pathway: Suitable for smaller upgrades or projects below the 100-point minimum; Incentives based on installed equipment and/or energy savings.
IRA Section 48: Accelerated Depreciation	Commercial	Tax Incentives	IRS	No	a. Geothermal heat pump systems b. Installation costs including equipment and labor c. Heat pumps using the earth or groundwater for heating and cooling d. Energy-efficient upgrades to existing HVAC systems
Agriculture Energy Audit Program	Agricultural Producers, SBC Contributor	Technical Assistance	NYSERDA	N/A	a. Energy Audits: Offers free audits for farms to identify energy efficiency measures, conducted by assigned FlexTech Program Consultants.b. Greenhouse Benchmarking: Provides free benchmarking reports for greenhouse facilities, detailing energy-use intensity and comparisons with peers.c. Recommendations: Following audits, farms receive recommendations for energy efficiency upgrades and clean energy investments.

Appendix G: Community Conversations Report

From February to August in 2023, Greater Syracuse Works (GSW) Counselor created three bi-monthly reports with findings and data from conducting outreach in communities gathering information about the current state of clean energy workforce in our region.

Overview

The goal of these community conversations was to provide a complete assessment of the region's clean energy landscape and develop recommendations for inclusion of Disadvantaged Communities (DACs) into the clean energy transition. The GSW Counselor connected with low income and disadvantaged community populations located in the City of Syracuse. We wanted to know the:

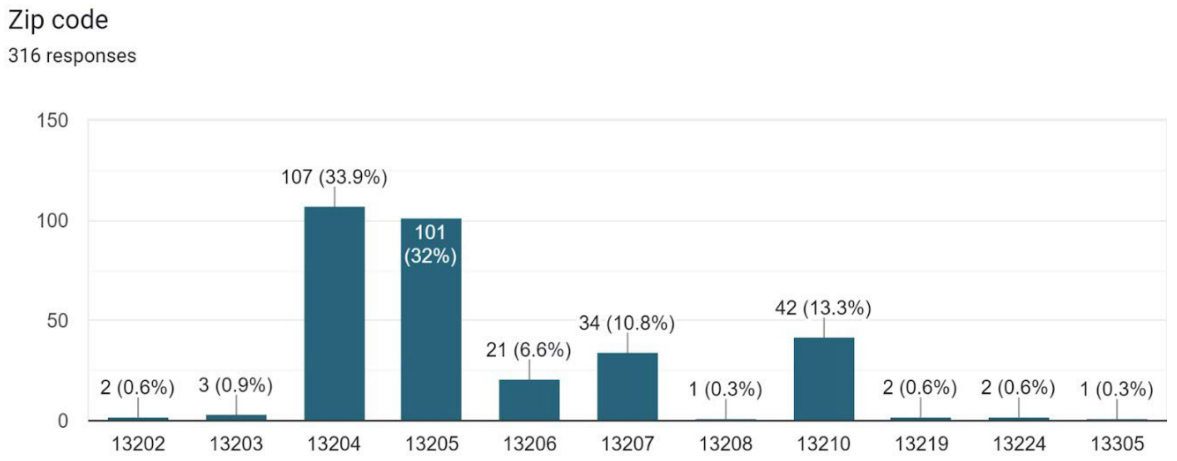
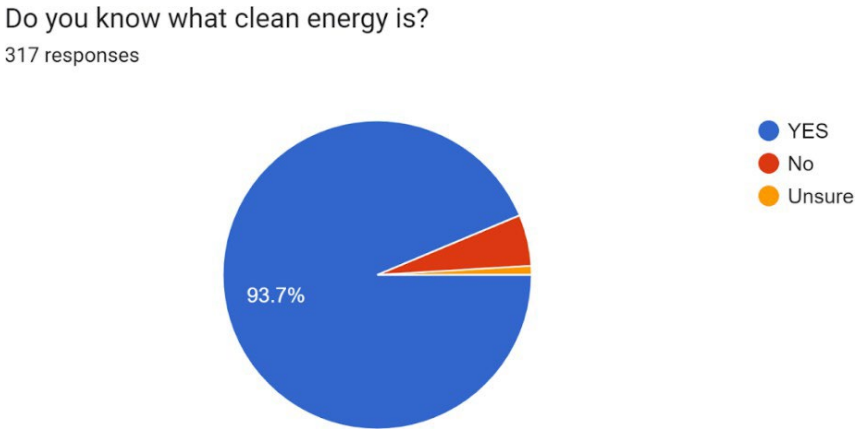
- Understanding and awareness of clean energy,
- Awareness of available funding programs,
- Interests in clean energy careers and workforce opportunities.

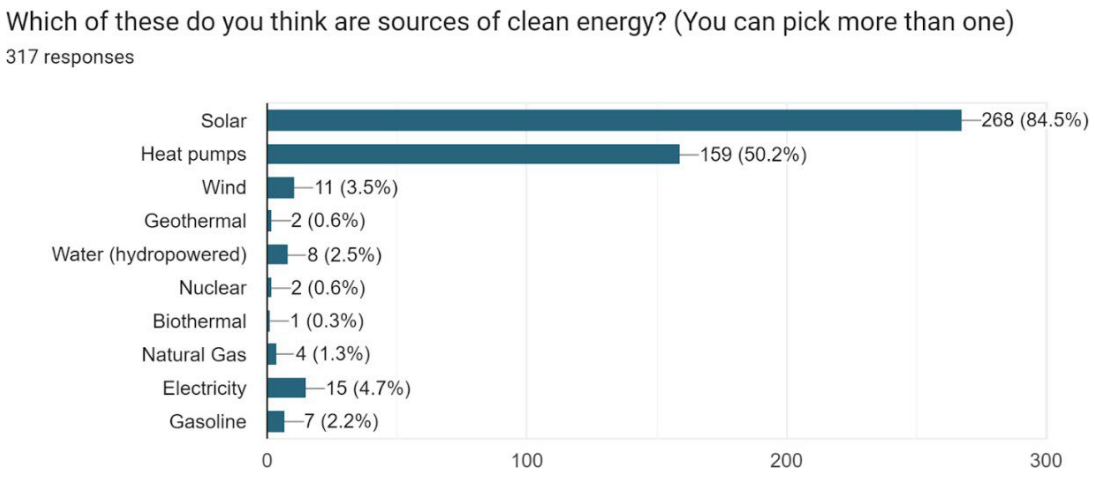
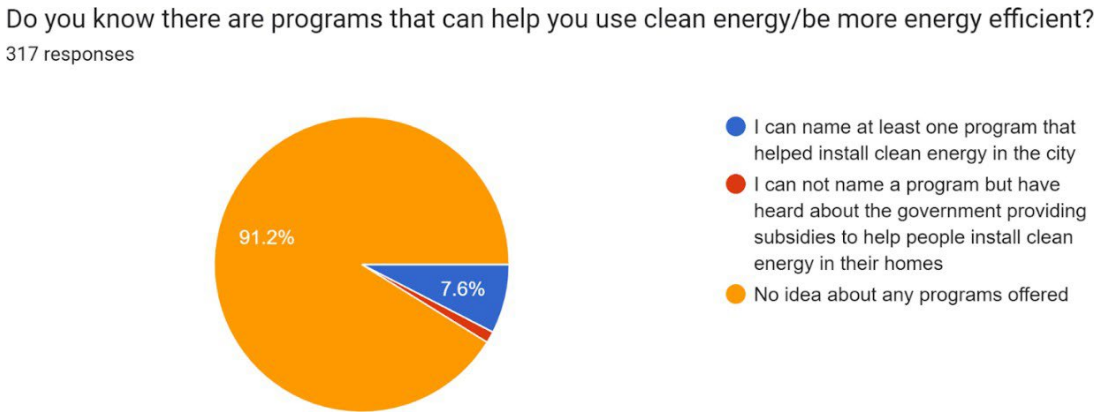
Methodologies

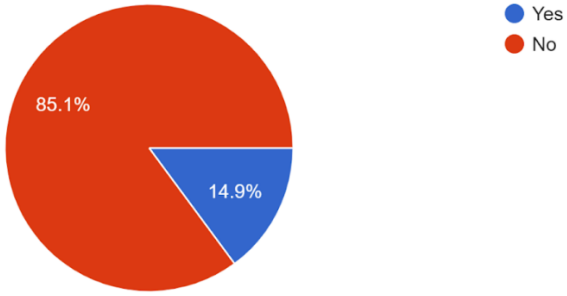
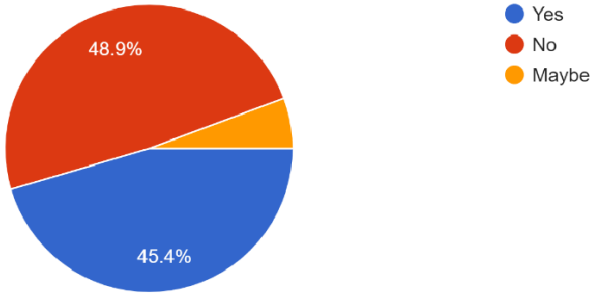
The GSW Counselor interacted with the community by tabling at events, speaking at churches, and being present at places where there could be one-on-one conversations with disadvantaged community members like laundromats and libraries. During these conversations, the goal was to have the individual fill out a survey to gain insight of our objectives. For this in-person outreach, we provided options of filling out the survey together right then-and-there, or individuals could scan a QR code to respond to the survey on their own. By using these different methods of data collecting, we found that providing the QR code was ineffective, as it was often that most people did not follow-through and submit the survey after the conversation.

From survey collection to conversing with folks directly at events or at gathering places like churches and laundromats, in total, there are an estimated 700 individuals who were engaged in conversations about energy efficiency and clean energy workforce opportunities. It was found that priority populations living in the city were receptive to holding conversations in places like the local libraries, gas stations, laundromats, community centers, churches, and events compared to reaching out digitally like through an email.

Survey Analysis

A total of 317 responses were collected from March 27 to April 26, throughout nine different zip codes. The zip codes surveyed were 13202, 13203, 13204, 13205, 13206, 13207, 13208, 13210 and 13224. The highest number of responses were collected from residents living in 13204, 13205 and 13210 zip codes. - 13204: about 75% of the zip code area is DAC, - 13205: about 75% of the zip code area is DAC, - 13210: < 50% of the zip code area is DAC.	
When asked is the respondent knows what clean energy is, 93.7% of respondents selected that they do know what clean energy is, but not all are able to identify clean energy sources and technologies.	

We found that the most well-known sources of clean energy are solar and heat pumps. There were a few people who selected incorrect answers like natural gas and gasoline.	
When asked if the respondent knows of any programs that can help them use clean energy/be more energy efficient, 91.2% selected that they have no idea about any programs offered. When asked if the respondent would like more information about clean energy and available government programs, 65% of the respondents selected yes.	

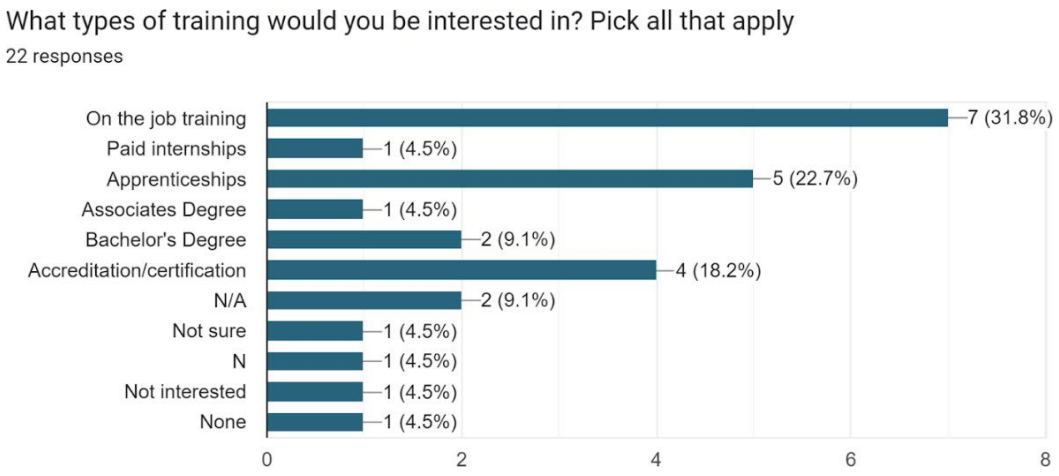
When asked if homeowners would be interested in installing solar panels or heat pumps, 85% of the respondents selected No.	HOMEOWNERS ONLY: If you own your home, are you interested in installing solar panels or heat pumps? 309 responses 
The survey then asked if the respondents have considered working in the clean energy industry. There was almost a 50/50 split, with nearly half of respondents selecting No, 45% of respondents selected Yes, about 5% selected maybe. Many respondents had never considered working in the clean energy industry. 41.5% of respondents would like more information about clean energy jobs.	Have you considered working in this industry? 317 responses 

As a follow-up question, we received 22 responses on the types of training/education they would be interested in. The options that were given to select:

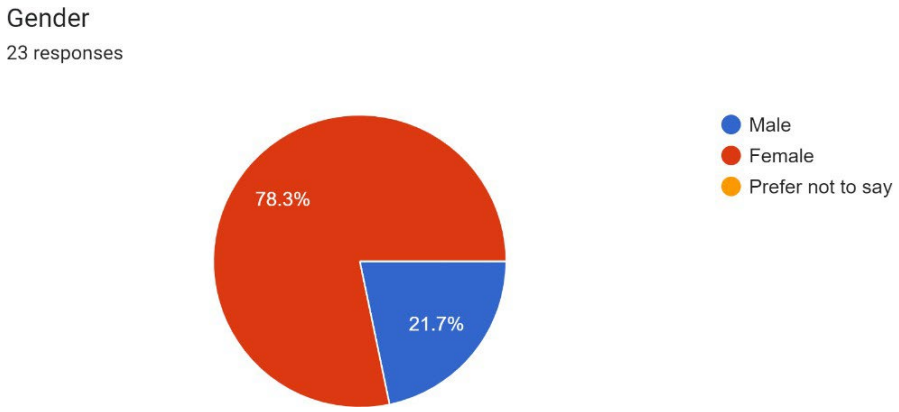
- on-the-job training
- paid internships
- apprenticeships
- associate's degree
- bachelor's degree
- accreditation/certification

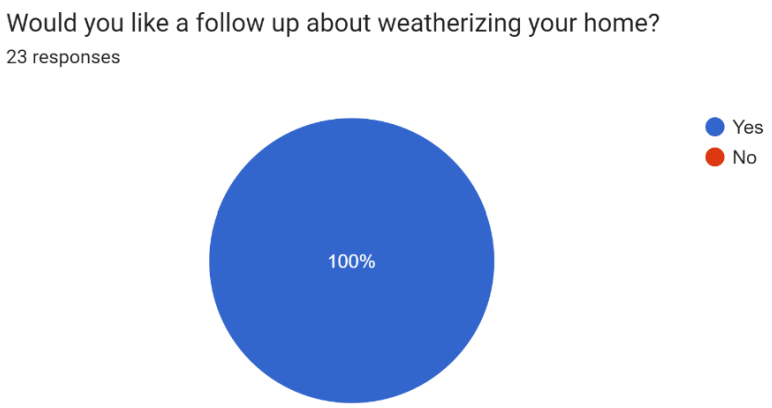
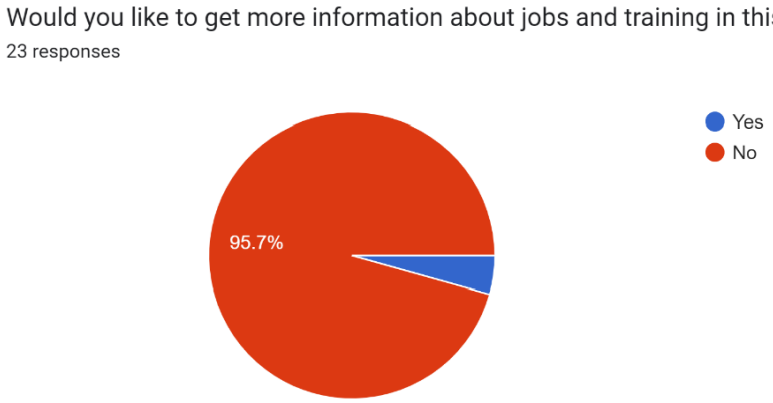
The top three answers that were selected were on-the-job training, apprenticeships, and accreditation/certifications.

A total of 23 respondents provided contact information to receive more information about jobs and/or clean energy programs. The following summarization of the data shows different patterns and data found through the surveys.



Of the responses, a majority (78%) were females, with a smaller percentage (22%) of males.



It was found that 100% of respondents wanted follow-up information about weatherizing their homes.	
Out of 23 responses, only 4.3% of respondents selected that they would like more information about clean energy jobs and training.	

Summary

Consistently, we find that folks ask similar questions. These questions are often generated from lack of trust and limited awareness which becomes a barrier for members of disadvantaged communities and/or priority populations to take advantage of the available resources that are currently available for energy efficiency improvements to their home or interest in joining the clean energy workforce. It was found that visiting the same places regularly helps build the trust needed to make these connections.

Gathering information through conversations revealed that post-pandemic, some low-to-median individuals as well as individuals living in disadvantaged communities have been displaced and are living with family members until they find a place of their own. When presenting information on the opportunities they may very well qualify for, they express it is not their priority. They feel they need stable housing before trying to seek housing improvement opportunities. For rental properties, tenants have expressed that they do not want to go through the effort to improve the property owner's building because of the poor relationship with their landlord and the landlord's neglect to provide quality housing or improvements to the building.

It was also found that respondents have concerns regarding their lack of education and knowledge for clean energy and energy efficiency. This lack of knowledge could directly result in them not receiving the available opportunities to improve the energy efficiency of their home. Respondents spoke about the opportunities that were presented as if they would only be for people in higher-income areas. Additionally, respondents expressed concerns about not understanding the eligibility and an assumption that these energy efficiency improvement opportunities would be for higher-income folks.

Common Questions Asked

Questions regarding EmPower+ Grant:	**Questions regarding solar panels:**
• Does it cost? • Is this a loan? • Will this mess with my HEAP grant next year? • What are the requirements to receive this? • Is this for homeowners only? • Does it cost my landlord? • Will I need to provide tax information?	• Do they cost? • What are the requirements to receive them? • Who pays for it? • Are they only for homeowners? • Can they move with me if I move to a different rental property? • How do they work?

Questions regarding heat pumps:	**Questions regarding employment?**
• What are heat pumps? • Will it save me money? • Can they get installed at rental properties? • Do the landlords have to say yes? • Does this go through National Grid?	• Where are the jobs? • Do you need a license or degree? • What if I don't have any experience? • Will they train me? Will I get paid for the training? Hiring? • When will they be? • Does training guarantee a job?

Appendix H: AGREE Community Survey

EnergySmart CNY

CENTRAL NEW YORK REGIONAL CLEAN ENERGY HUB

Making Energy Improvements to Your Home

EnergySmart CNY is a NYSERDA-supported project of the CNY Regional Planning and Development Board, Alliance for a Green Economy, and Greater Syracuse Works, serving as your Regional Clean Energy Hub.

We are working to connect our community with the growing clean energy opportunities, including jobs, funding for energy efficiency improvements to homes or buildings, solar and heat pumps where appropriate.

This 10-minute survey will enable us to more effectively help you and other Central New Yorkers. In appreciation for your time, we are offering **a chance for CNY residents to win one of 6 gift cards, each worth $50!**

This survey may be completed anonymously, or you have the option to leave your contact information if you wish to be entered in the drawing or have further assistance from our energy advisors. Your contact information and associated responses will be kept confidential and not shared with anyone outside of the EnergySmart CNY team. Published findings of the survey will be aggregated and anonymous.

Thank you! Let's get started.

You can also take the survey online→

Page 1 of 8

What kinds of energy and home improvements interest you the most?

This helps us understand your priorities and concerns with energy and home improvements.

Assuming that you could make all the improvements you wanted, regardless of costs, what would you do?
(check all that apply)

- ☐ Have my home's energy-use assessed and get improvement ideas
- ☐ Get new energy-saving appliances (stove, lights, washer, dryer, etc.)
- ☐ Weatherize my windows
- ☐ Replace my windows
- ☐ Upgrade my insulation and seal air leaks in my home
- ☐ Replace my furnace with a cold climate heat pump
- ☐ Replace my furnace with a geothermal heat pump
- ☐ Get energy-saving air conditioner(s)
- ☐ Install a heat pump water heater
- ☐ Install solar panels
- ☐ Enroll in a community solar program
- ☐ Install an Electrical Vehicle (EV) charger
- ☐ None of the above
- ☐ Other

Page 2 of 8

Do you know or suspect your home has any of the following issues?
(check all that apply)

- ☐ Structural concerns
- ☐ Knob and tube wiring
- ☐ Mold or moisture issues
- ☐ Asbestos around ductwork or in attic insulation
- ☐ Broken windows
- ☐ Lead paint
- ☐ Holes in walls
- ☐ Broken heating systems
- ☐ Other

How Renters & Homeowners Can Reduce Energy Bills & Usage

There are New York State programs that can help both renters and homeowners reduce their energy use and utility bills, improve their heating systems, and get power from the sun. These programs are free or low-cost for income-eligible households. But there are also programs for all income levels.

Which of the following programs have you heard about?
(Select all that apply)

- ☐ EmPower+
- ☐ Comfort Home
- ☐ Weatherization Assistance Program
- ☐ Community Solar
- ☐ Home Energy Assistance Program (HEAP)
- ☐ NYS Clean Heat
- ☐ Inflation Reduction Act Tax Credits and Rebates
- ☐ None of the Above
- ☐ Other

Page 3 of 8

Have you applied for any of these programs?

- ☐ Yes
- ☐ No

Do you know anyone who has applied for these programs?

- ☐ Yes
- ☐ No

Where Do You Learn About Energy and Programs?

Providing this information, will help us spread knowledge and news to more people if we have a good idea of where those people are turning to for info.

Where do you get your information about making improvements?
(Select all that apply)

- ☐ Television, TV
- ☐ Radio
- ☐ Friends
- ☐ Family
- ☐ Church, Synagogue, Mosque, Temple
- ☐ Work
- ☐ Public Events
- ☐ Newspapers
- ☐ Newsletters
- ☐ Social Media
- ☐ Flyers/Mailers
- ☐ Websites (NYSERDA, your utility's, etc.)
- ☐ Utility Companies
- ☐ HVAC or building contractors
- ☐ Non-profit or community-based organizations
- ☐ None of the above
- ☐ Other

From the list above, which is your main source of information?

Page 4 of 8

Tell us about your situation

These final questions let us know about your energy situation and your background. Optionally, this section will collect your name, phone number, and email address, in case you want to learn more about energy programs. It's also so we can send you the gift card!

Are you a renter or do you own your home?

- ☐ Renter
- ☐ Homeowner

How many units are in your building?

- ☐ Single family home
- ☐ 2 - 4 units
- ☐ 5 - 50 units
- ☐ More than 50 units

How do you heat and cool your home?
(Select all that apply)

- ☐ Gas Furnace
- ☐ Oil Furnace
- ☐ Propane Furnace
- ☐ In window/through wall AC units
- ☐ Electric Fans
- ☐ Electric Baseboard
- ☐ Space Heaters
- ☐ Central AC
- ☐ Cross Ventilation
- ☐ I don't know
- ☐ Other

If you chose "Other," let us know why

Page 5 of 8

What is the main language spoken in your home?

- ☐ English
- ☐ Spanish
- ☐ Mandarin
- ☐ Other

If you chose "Other," let us know which language

_____

How many people reside in your home?

- ☐ 1 (just me)
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6 or more

What is your annual household adjusted gross income?

- ☐ Less than $20,000
- ☐ $20,000 to $39,999
- ☐ $40,000 to $49,999
- ☐ $50,000 to $79,999
- ☐ $80,000 to $100,000
- ☐ More than $100,000
- ☐ Decline to state

Page 6 of 8

What is your age?

- ☐ Under 18 - 24 years
- ☐ 24 - 44 years
- ☐ 45 - 64 years
- ☐ 65 years and older
- ☐ Prefer not to say

How would you describe your race or ethnicity?
(Select all that apply)

- ☐ Native American, American Indian, or Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic, or Latina, Latino, Latinx, or Spanish Origin
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Middle Eastern
- ☐ White
- ☐ A mix of two or more races
- ☐ Prefer not to say

If you don't see yourself in the list provided, please self-describe:

What is your highest level of formal education?

- ☐ Less than high school
- ☐ High school diploma or equivalent
- ☐ Some college
- ☐ Associate degree
- ☐ Bachelor's degree
- ☐ Graduate or Professional degree
- ☐ Decline to state

Page 7 of 8

I want more information about energy programs

Yes____ No____

Zip Code

_____

Please share your contact info to receive more information and/or to enter to win a $50 Gift Card.

Name:_____

Telephone:_____

Email:_____

Thank you for sharing your experience!

If you have any questions or concerns, please reach out to us - advisor@energysmartcny.org or visit EnergySmartCNY.org

Use the QR Code to visit our website:

Page 8 of 8

The following tables represent survey responses by question. Unless otherwise noted, the actual number of responses are indicated (out of a total of 349 respondents).

Section One: Improvements

Assuming that you could make all the improvements you wanted, regardless of costs, what would you do? (select all that apply)	
Envelope Improvements	185
Replace Windows	163
Energy Efficient Appliances	162
Energy Assessment/Audit	135
Weatherize Windows	123
Solar Panels	129
Energy efficient AC	112
Upgrade furnace to heat pump	99
Heat Pump Water Heater	91
Community Solar	85
Geothermal heat pump	68
EV charging station	61
None of the above	24
Other	15

Do you know or suspect your home has any of the following issues? (select all that apply)	
Structural concerns	59
Knob and tube wiring	30
Mold or moisture issues	94
Asbestos around ductwork or in attic insulation	38
Broken windows	50
Lead paint	43
Holes in walls	38
Broken heating systems	28
Other	52
None of the above	42

Section Two: Programs

Which of the following programs have you heard about?	
Home Energy Assistance Program (HEAP)	252
Weatherization Assistance Program	135
Community Solar	128
Inflation Reduction Act	89
EmPower+	66
NYS Clean Heat	52
Comfort Home	47
None of the Above	42

Have you applied for any of these programs?	
Yes	128
No	219

If yes, how far did you go?	
Applied, but did not qualify	3
Applied, but did not hear back	5
Applied and approved, but challenges prevented the work from being done	4
Applied and am currently in the program	25
Applied and benefitted from the program	33

Let us know why you did not apply	
Unsure if I am eligible	75
Unsure if it is within my budget	37
I did not know about the programs	30
I did not know how to apply	21
My home is already energy efficient	17
I am afraid of being scammed	8
I don't want people coming to my house	5
Rent covers my utilities	5
Other	26

Do you know anyone who has applied for these programs	
Yes	128
No	219

If yes, were they generally satisfied with their experience	
Yes	37
I don't know	29
No	3

In what way can these programs be improved? (Open ended question)	
Responses	32
Common themes*	
Need for authoritative and transparent information sources	6
Single clearing house	4
Simplified applications	5
Lower costs, partial programs, more upfront savings	6

* As grouped after the fact by the survey administrators

Section Three: Information Sources

Where do you get your information about making improvements? (select all that apply)	
Television, TV	105
Radio	55
Friends	152
Family	95
Church, Synagogue, Mosque, Temple	20
Work	50
Public Events	87
Newspapers	71
Newsletters	54
Social Media	126
Flyers/Mailers	93
Websites (NYSERDA, your utility's, etc.)	128
Utility Companies	84
HVAC or building contractors	28
Non-profit or community-based organizations	115
None of the above	15
Other	19

Section Four: Demographics

Bldg Type	*Renter*	*Homeowner*
Single-family home	36	251
2 - 4 units	34	9
5 - 50 units	5	1
> 50 units	9	0
Total	85	263

How do you heat and cool your home? (Select all that apply)	
Gas Furnace	189
Oil Furnace	36
Propane Furnace	33
In window/through wall AC units	94
Electric Fans	93
Electric Baseboard	31
Space Heaters	40
Central AC	67
Cross Ventilation	32
I don't know	7
Other *	92

* Heat pumps (and mini splits) and wood (pellet) stoves were frequently cited in the "Other" category.

*What is the main language spoken in your home?**	
English	341
Spanish	5
Other	2

* Note: this survey was administered in English

How many people reside in your home	
1	77
2	140
3	79
4	41
5	23
6 or more	17

What is your annual gross adjusted income?	
< $20,000	60
$20,000 to $39,999	76
$40,000 to $49,999	34
$50,000 to $79,999	61
$80,000 to $100,000	36
>$100,000	51
Decline to state	27

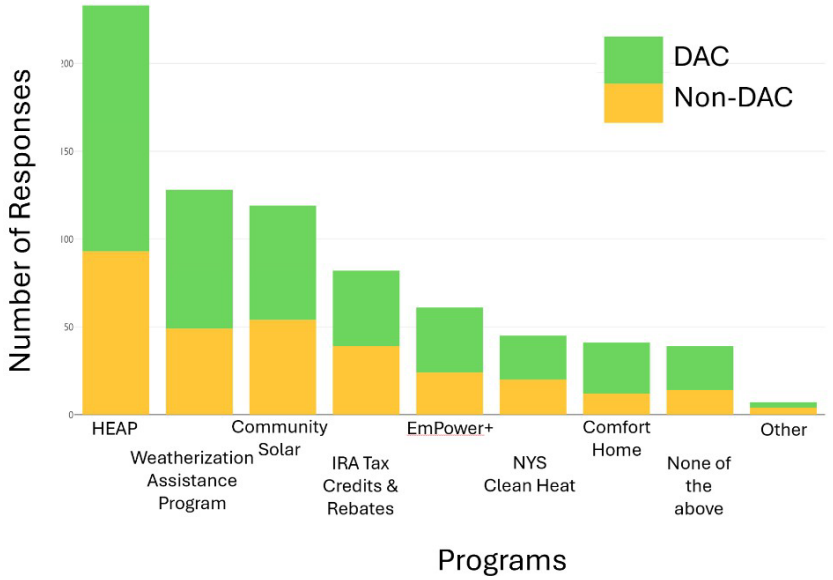
What is your age?	
18 – 24	13
25 - 44	86
45 - 64	118
65 or older	121
Prefer not to say	9

How would you describe your race or ethnicity?	
Native American, American Indian, Alaska Native	8
Asian or Asian America	13
Black or African American	29
Native Hawaiian or Other Pacific Islander	2
Hispanic, or Latina, Latino, Latinx, or Spanish Origin	13
Middle Eastern	3
White	260
A mix of two or more	16
Self-describe*	5
Prefer not to say	19

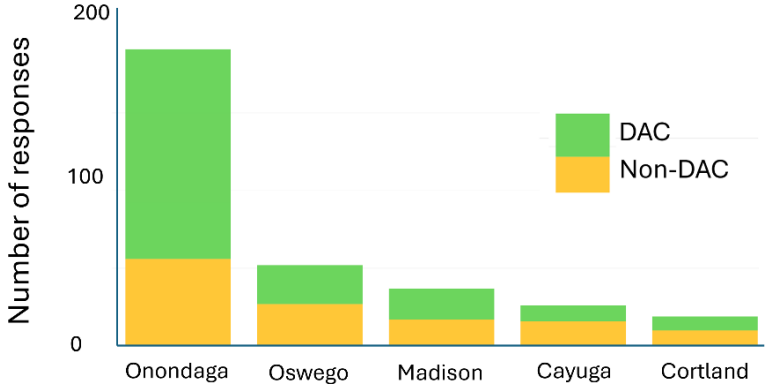
* Two wrote “European American” and 3 wrote “Mediterranean”

What is your highest level of formal education?	
Less than high school	11
High school diploma or equivalent	75
Some college	57
Associate’s degree	31
Bachelor's degree	69
Graduate or professional degree	96
Decline to state	9

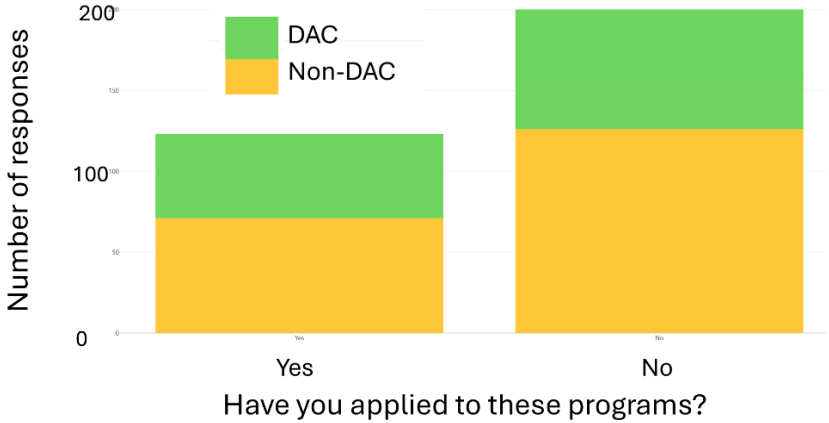
Program Awareness, by DAC v. Non-DAC Status



DAC v. Non-DAC Status, by County



Application to Programs, by DAC v. Non-DAC Status



Appendix I: Contractor Survey 2024

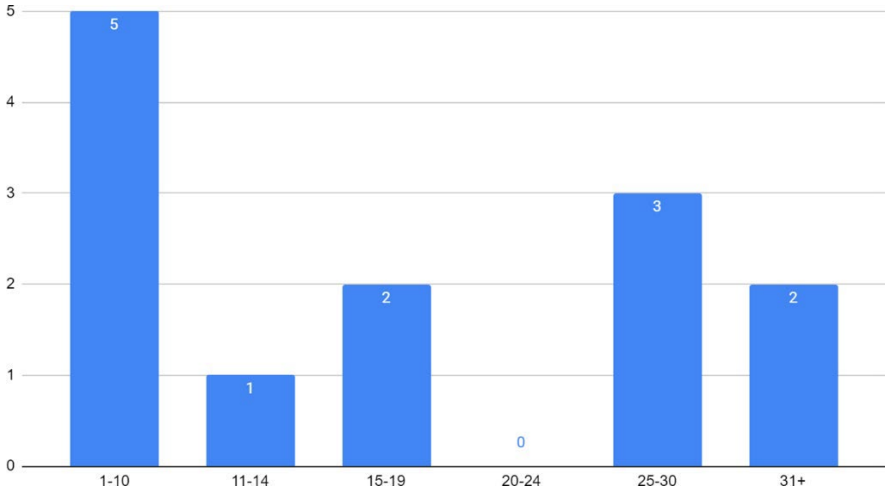
Methodology

NYSERDA's Regional Clean Energy Hub for Central New York, EnergySmart CNY, emailed surveys to local clean energy companies to gather information on the clean energy workforce in our region. The information gathered assists in referring customers as well as potential employees and supports the strategy of development to grow the clean energy economy in the Central New York region.

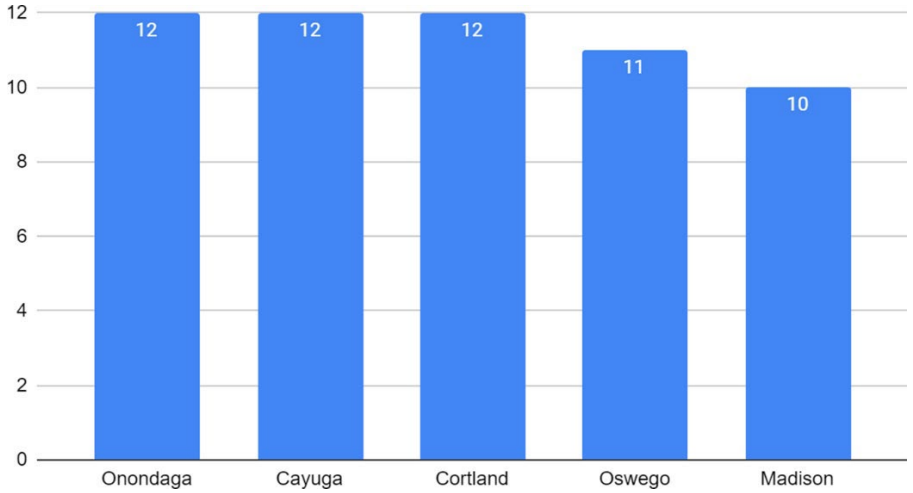
There were 13 surveys received from both smaller size and larger size companies with employee count ranges from 1-10 employees to 31+ employees. The companies who submitted the survey are: Kozy Heating & Air Conditioning, Halco Energy, Dailey Electric, Renaissance HVAC, NP Environmental, American Plumbing, Heating & Cooling, Syracuse Energy Systems, Lake Country Geothermal, Nickels Energy Solutions, Gomez Comfort Systems, Zerodraft, Energy Savers and Simply Installs Heating & Air Conditioning.

Survey Results

WHAT IS YOUR CURRENT STAFF COUNT?



WHICH COUNTIES DOES YOUR COMPANY SERVE?



NYSERDA'S WORKFORCE PROGRAM PARTICIPATING EMPLOYERS LIST
(OF THE 13 BUSINESSES WHO SUBMITTED THE SURVEY)

On-the-Job Training (PON 3982):

- Halco Energy
- Dailey Electric
- NP Environmental
- Lake Country Geothermal
- Zerodraft
- Energy Savers
- Simply Installs

Clean Energy Internship Program (PON 4000):

- Lake Country Geothermal

Not on list:

- Kozy Heating & Air Conditioning
- Renaissance HVAC
- American Plumbing, Heating & Cooling
- Syracuse Energy Systems
- Nickels Energy Solutions
- Gomez Comfort Systems

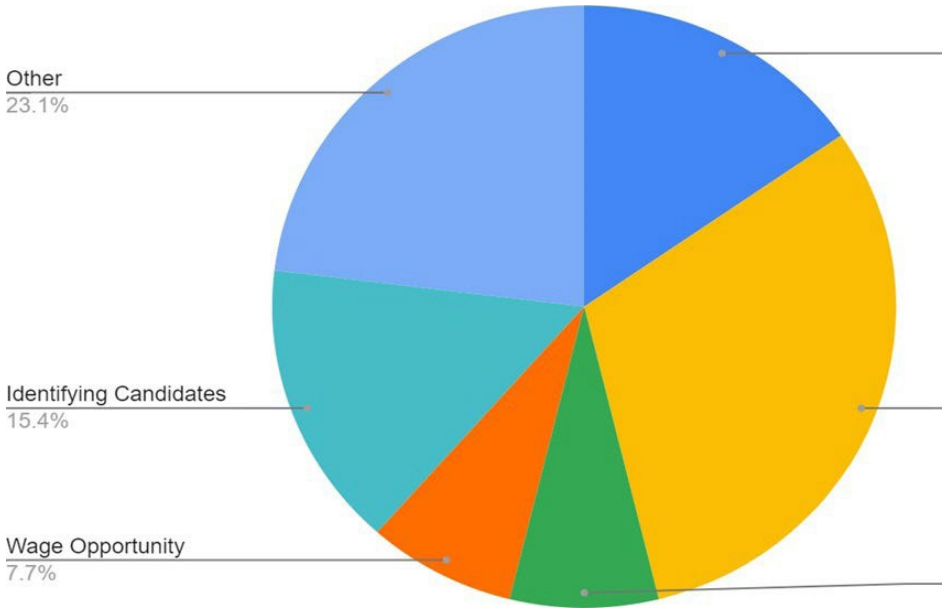
Not on currently on the Participating Employers List but answered Yes to providing NYSERDA funded on-the-job training: Kozy Heating & Air Conditioning, American Plumbing, Heating & Cooling, Syracuse Energy Systems, and Nickels Energy Solutions

Data Discrepancies

When answering 'What programs have you worked with?':

- Halco Energy, NP Environmental and Nickels Energy Solutions all selected that they *have* worked with the NYSERDA Internships (PON 4000), but they are *no*t currently listed on the NYSERDA Workforce Program Participating Employers List as approved for PON 4000.
- Lake Country Geothermal did *not* select having worked with the NYSERDA Internships, but they *are* listed on the Participating Employers List for PON 4000.
- Syracuse Energy Systems selected having worked with the NYSERDA On-the-Job Training (PON 3982), but they were *not yet an approved employer* until after this survey response was submitted.

Barriers for hiring and retention?



Other commonly experienced barriers for hiring/retention?

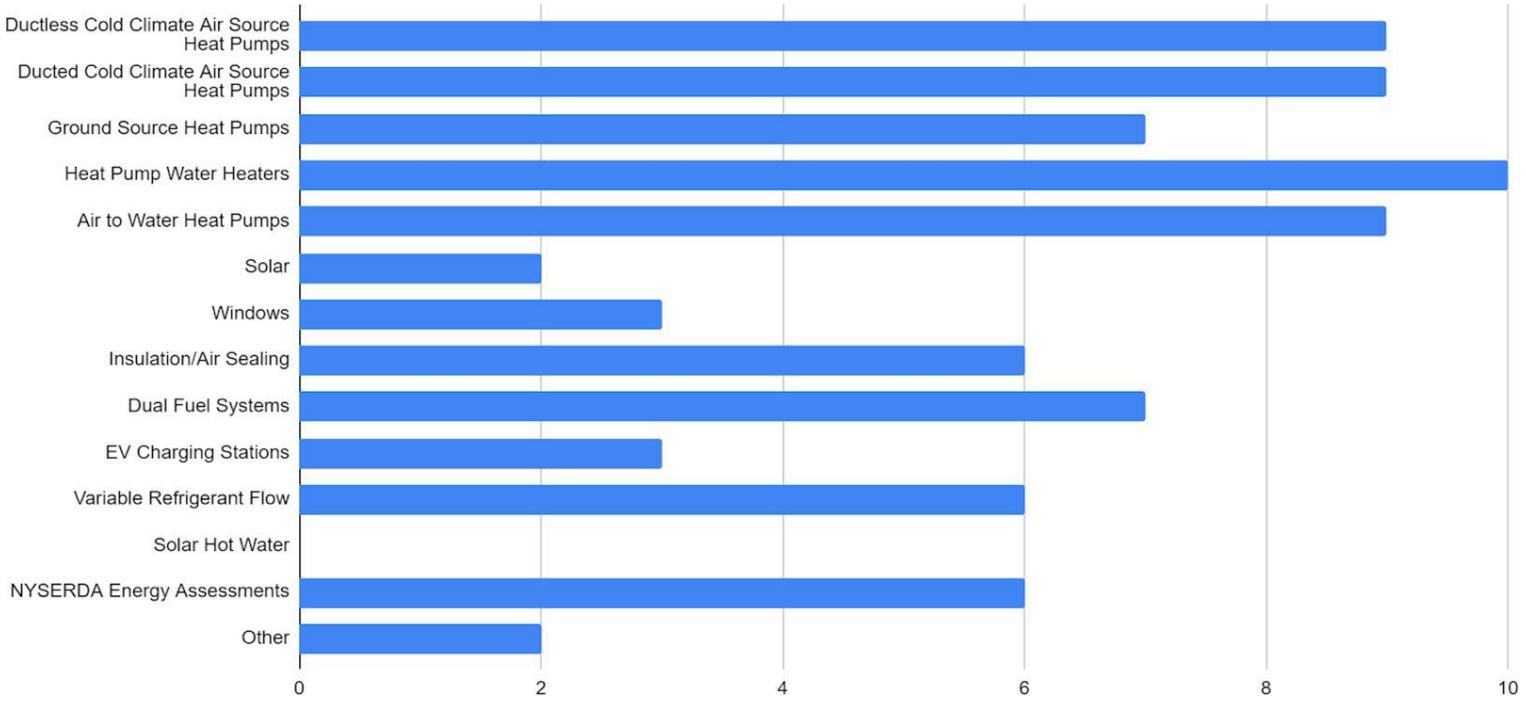
- Commitment to 8-hour shifts, 5 days/week.
- Finding candidates interested in the HVAC field.
- Lack of candidates with HVAC technical experience.
- Complicated and time-consuming processes and paperwork regarding hiring and training funding programs that pushes the business to hire an administrative position just to handle and navigate the requirements of the programs.
- Difficult to compete with
- large companies (Amazon/UPS) that pay higher wages with cleaner and easier work than construction work entails.
- Finding candidates who want to learn and have the motivation to be trained.
- Want to work in this field as a career, not a hobby.

Selected Other:
1: Answered other as they are the sole proprietor 1: Dependability
1: Finding personnel that want to work

What are your requirements for an entry-level position?

- Clean and valid driver's license
- Clean background check
- Reliable transportation
- High school diploma/GED
- Ability to follow direction.
- Welcoming personality and ability to have a good relationship with other team members
- Desire to learn
- Dependability and commitment
- Mechanical, construction and/or electrical experience
- HVAC experience
- Ability to develop understanding of insulation materials and equipment, and sidewall and attic installation techniques with provided training
- Ability to read and comprehend technical documents
- Physically able to bend, lift 50 lbs., crawl in confined spaces, climb ladders, and use power and hand tools

WHAT TYPES OF WORK DO YOU PERFORM?



Other: 2
1: plumbing, electric, battery storage, basement waterproofing, healthy home
1: commercial geothermal

Issues/conditions you face when dealing with older homes?

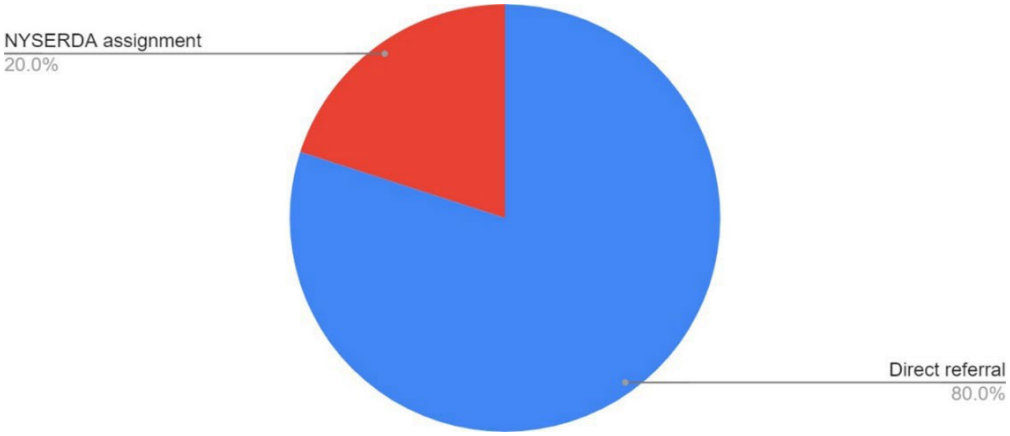
The housing stock in CNY has many very old homes that offer all kinds of challenges, but we are prepared to tackle them.
None that can't be dealt with. We retrofit them all the time.
Nothing that we don't overcome.
Winterization upgrades- Homes with boilers are not candidates for geothermal. Can do air source heat pumps but folks do not like the line sets on the sides of their homes.
Many logistical challenges.
Access for distribution, and cost barriers.
Electrical work.
NYSERDA funding doesn’t support fuel changes. Also, the cost to meet the NYSERDA guidelines for air source heat pumps.
Electric panels need to be upgraded, rafters need to be structurally reinforced, etc.
Asbestos
Vermiculite, Knob and Tube, if the house is full of it then we have to walk away.
Knob and Tube wiring, wet basements, asbestos and lead. Getting extra funding for corrections so the home can be insulated.
Typically leaky, older single-pane windows, larger sizes require multiple ODUs, older home construction was not nearly as regulated with standards as they are now, they were not designed to be easily cooled with ductwork. We still encounter asbestos in older houses.

What are the challenges you have experienced in working with NYSERDA programs?

Navigating the paperwork is a challenge.
A lot of paperwork.
Paperwork and getting different approvals depend on the reviewer being new or experienced.
Jumping through the hoops to comply for the rebate.
Getting through the rebate program.
Too much bureaucracy without reality check whether it's adding value for the time spent.
New portal and system were not developed to support the demands to meet new states or the federal goals for IRA goals.
The application process takes too much time. The NYSERDA solar incentive gets weaker over time. Now, for small projects I don't even use NYSERDA rebate because the incentive is not worth the effort.
Changes are never smooth, and the expected timeline is always longer than expected. Exceptions are not made so LMI homes are rejected for inappropriate reasons. Not providing low interest loans for windows. Taking too much authority away from our account managers, so they cannot make real time decisions without having to ask someone else.
The ever-changing nature of the programs and the large number of resources that are required by us contractors to make the changes causes pain. We strive to become as efficient and effective as possible with the NYSERDA programs, but when they change, we need to restart our processes all over again. We understand the need to evolve and change programs, but they should be kept to a minimum and be as streamlined as possible.
Consistency and communication.

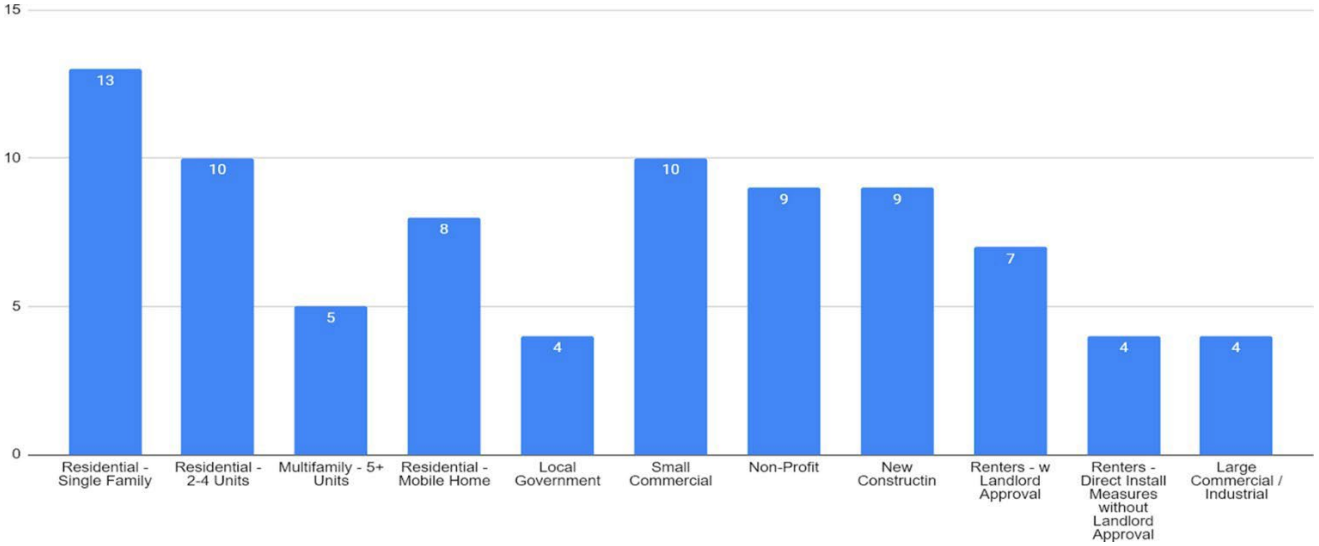
The size of the system needed to meet minimum requirements.
We have had good luck with NYSERDA programs- We underutilize them and should be more familiar with them and how to offer to the customers.

How do you prefer to receive leads for programs like EmPower+?

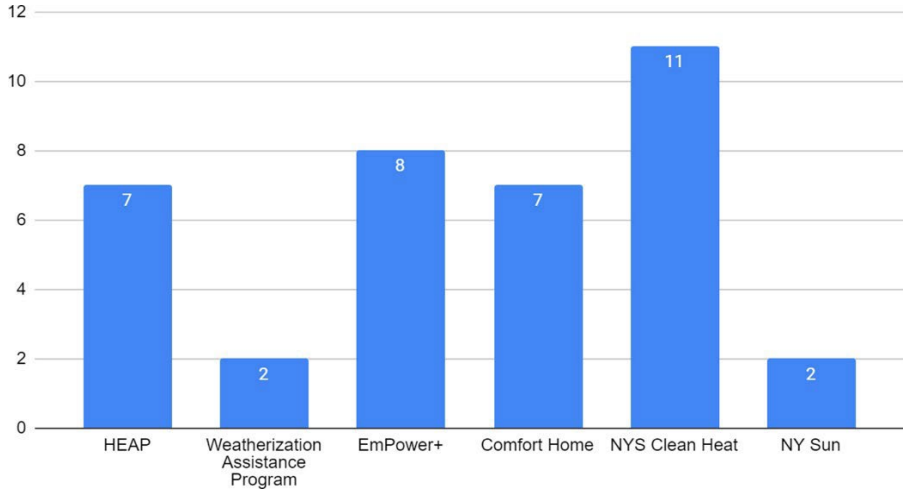


Direct referral is much more preferred than receiving leads through NYSERDA assignment.

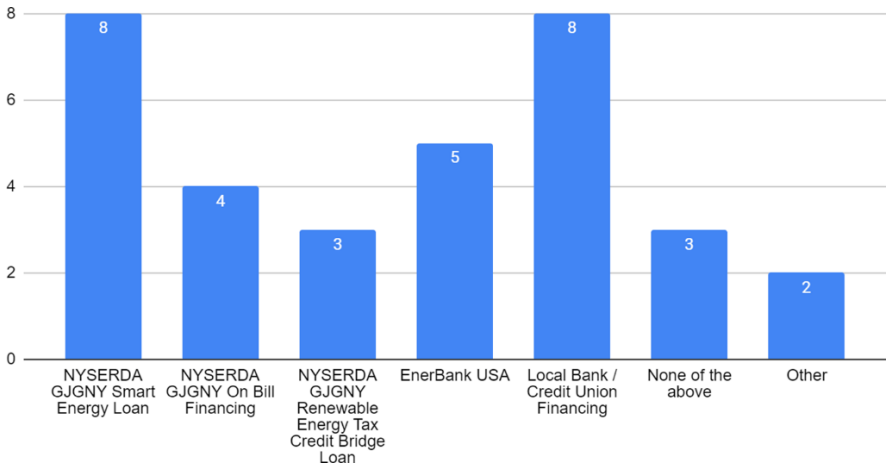
What types of projects do you successfully serve?



WHICH PROGRAMS DO YOU PARTICIPATE IN?



WHICH FINANCING OPTIONS DO YOU OFFER TO YOUR CUSTOMERS?



An AMPED Report

Regional Assessment and Barriers Analysis (RABA)

To Advance an Inclusive Clean Energy Economy in New York State's Finger Lakes Region

Published December, 2024

Finger Lakes Clean Energy Hub

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Executive Summary

The Finger Lakes Clean Energy Hub is proud to serve our region's unique mix of around 1.2 million people. Since its inception, our Hub has served over 400 clients and connected with many more at over 100 engagement events. Our region has a lot of foundational assets and interest in transitioning to clean energy technologies. Our aging housing stock creates an intersectional need for upgrades that include clean energy and health and safety remediation to ensure the financial and physical wellbeing of the populations we serve, 47% of whom have been classified as living in Disadvantaged Communities (DACs) by New York State's Climate Justice Working Group (CJWG). While there is considerable energy around this goal, our work is stymied by structural barriers and needs meaningful investment in relationship building and mutual trust to ensure that we enjoy a clean energy future.

The rate of transition to clean energy in residential and commercial properties is not on track to comply with the Community Leadership and Climate Protection Act (CLCPA) as it stands. We need to completely electrify 16,134 households a year to keep up with 2030 and 2050 goals. Every time a resident replaces their heating system with another fossil fuel option, we lose the potential to reduce the equipment's lifetime pollution and to give that family mid- and long-term financial and health benefits. Our staff is ready to act with urgency by creating wide-reaching engagement strategies and developing self-service methods of connecting residents to the incentives and resources they need to improve their home's safety and energy efficiency and prepare to benefit from clean energy technology.

In order to meet this charge, our Hub needs to nurture and develop a relationship of mutual trust and commitment to the co-design principles of continuous improvement on which the Hub initiative was founded. We need to work together to broaden program eligibility and access for residents and make it as easy as possible for people to opt in and participate in programs that have the potential to provide life changing improvements to their living spaces, community centers, and local businesses.

To ensure we are prepared to transition our communities at the scale required to do our part to combat the worst impacts of climate change, we need to grow our clean energy workforce on the level of both individuals and contractors. We also need to ensure that the quality of our services is equitably experienced among priority populations. This means ensuring that language access and cultural humility are practiced at every level of program rollout from NYSERDA applications to energy advisement calls to contractor appointments.

The investment of our state and federal governments and our utility companies needs to scale up dramatically in order for us to truly achieve our charge to build a path toward a clean energy future for the Finger Lakes region. This report reflects on the actions required by NYSERDA and our Hub which, taken together, will provide the systemic and regional strategies needed to fulfill our mission and make clean energy affordable and accessible to all.

Introduction

In many ways, the Finger Lakes Regional Clean Energy Hub is the culmination of years of collaboration between the New York State Energy Research and Development Authority (NYSERDA) and regional community stakeholders ranging from clean energy installers to climate justice advocates and frontline community-based organizations. As the lead contractor for our region's Hub, the Climate Solutions Accelerator of the Genesee-Finger Lakes Region (the Accelerator) has seen huge improvements in the avenues by which our community learns about and implements clean energy opportunities in just the last few years. Early wins from the Community Energy Engagement Program (CEEP) and three HeatSmart campaigns showed that community organizations could serve as impactful on-the-ground educators and client advocates in the ever-developing landscape of clean energy and energy efficient technologies and incentives.

Still, the ad hoc approach of these pop up campaigns made it difficult for anyone organization to integrate into the larger landscape of nonprofits, installers, funders, workforce educators, and community resource navigators. As the largest city in the region, Rochester's trusted community messengers prioritized action and energy around racial equity, housing rights, eviction prevention, and poverty reduction, among other initiatives. The shadow of redlining and segregation still looms over much of the Finger Lakes region. Coalition building is an on-going process between climate-focused community groups and organizations to connect energy equity and climate justice with the larger movement to materially improve the lives of systemically disinvested-in communities.

Monroe County is the most populous county in our region by far with a population of approximately 760 thousand (2020 US Census), accounting for well over half of the approximately 1.2 million people (2020 US Census) who call our region home. Because of funding restrictions and capacity, many social service nonprofits and funders focus solely on Monroe County, leaving the less populous counties without some of their most successful resources. This creates a deficit of resources for the surrounding eight

counties that don't have the populations necessary to sustain public and private infrastructure and connect suburban and rural communities to vital housing, workforce, and educational opportunities.

The formation of our Regional Clean Energy Hub positions the Finger Lakes to leverage the budding connection between the social service landscape and climate justice to scale our ability to serve our region's residents and small businesses. Our goal is to ensure that all residents, but especially our Disadvantaged Communities (DACs), have access to the education, advocacy, and case management support they need to navigate and benefit from the intricate web of clean energy, energy efficiency, and home improvement incentives available through state, federal, utility, and local sources.

The road to longevity and systemic success is not easy. Significant barriers exist in the form of exclusionary eligibility criteria, aging housing stock, exploitation of renters by negligent landlords, and more, making it difficult for our DACs to see themselves as the target audience of current educational campaigns and incentive programs. Our Energy Advisors have seen transformative clean energy projects fall through because of a deficit of gap funding, in some cases as low as a few hundred dollars. Our wrap-around resources are critical but not infallible as staffing shortages, lack of funding, and strict income, geographic, and other guidelines block families from receiving intervention where it is most needed. Real distrust has festered in rural and urban communities alike, with histories of being manipulated, deceived, or ignored by their government

that will take time and good faith efforts and relationship building to heal. Our Hub has a responsibility to demonstrate consistency, accuracy, and community care in the delivery of our services in order to create a lasting relationship across 188 municipalities, nine counties, two Indigenous reservations, and the thousands of neighborhoods, cultural identities, and networks in our region. Quite simply, we are not there yet and we don't currently have the resources we need to accomplish our goals.

This report aims to explore our region's complex characteristics, partners, barriers, and opportunities as they relate to how people engage (and don't engage) in learning about and adopting clean energy and energy efficient technologies in their homes, businesses, and communities. We hope to draw a roadmap to quantify what it would take for the Finger Lakes Region to meet the goals of the Climate Leadership and Community Protection Act. We are already seeing climate refugees relocating to our region to escape extreme heat, droughts, wildfires, poor air quality, and hurricanes. Our opportunity to adapt and develop the infrastructure needed to transition to a clean energy economy is here. We need the support and resources of our state government to rise to the occasion.

The Regional Clean Energy Hub program began between NYSERDA and climate-focused organizations around the state, who saw an opportunity to co-design lasting community resources and engagement processes to achieve continuous improvement in the equitable delivery of clean energy services. In order for our Hub and other Hubs to realize these ideals, this co-design must deepen and broaden in scope through mutual collaboration. Communicating must result in trust building and actions taken by both the Finger Lakes Hub and NYSERDA staff and leadership to prioritize Disadvantaged Communities and ensure they benefit from our efforts. With 12 Hubs statewide, individual efforts to create processes for Energy Advisor training, language access, and invoicing can and should be threaded together to create a robust repository of useful systems that can be adapted to each region's talents, capacity, and needs.

The following report demonstrates our current understanding and identified opportunities and needs of the Finger Lakes Region. It should be treated as a living document to be updated annually. Feedback and suggestions from members of the Finger Lakes community are always welcome.

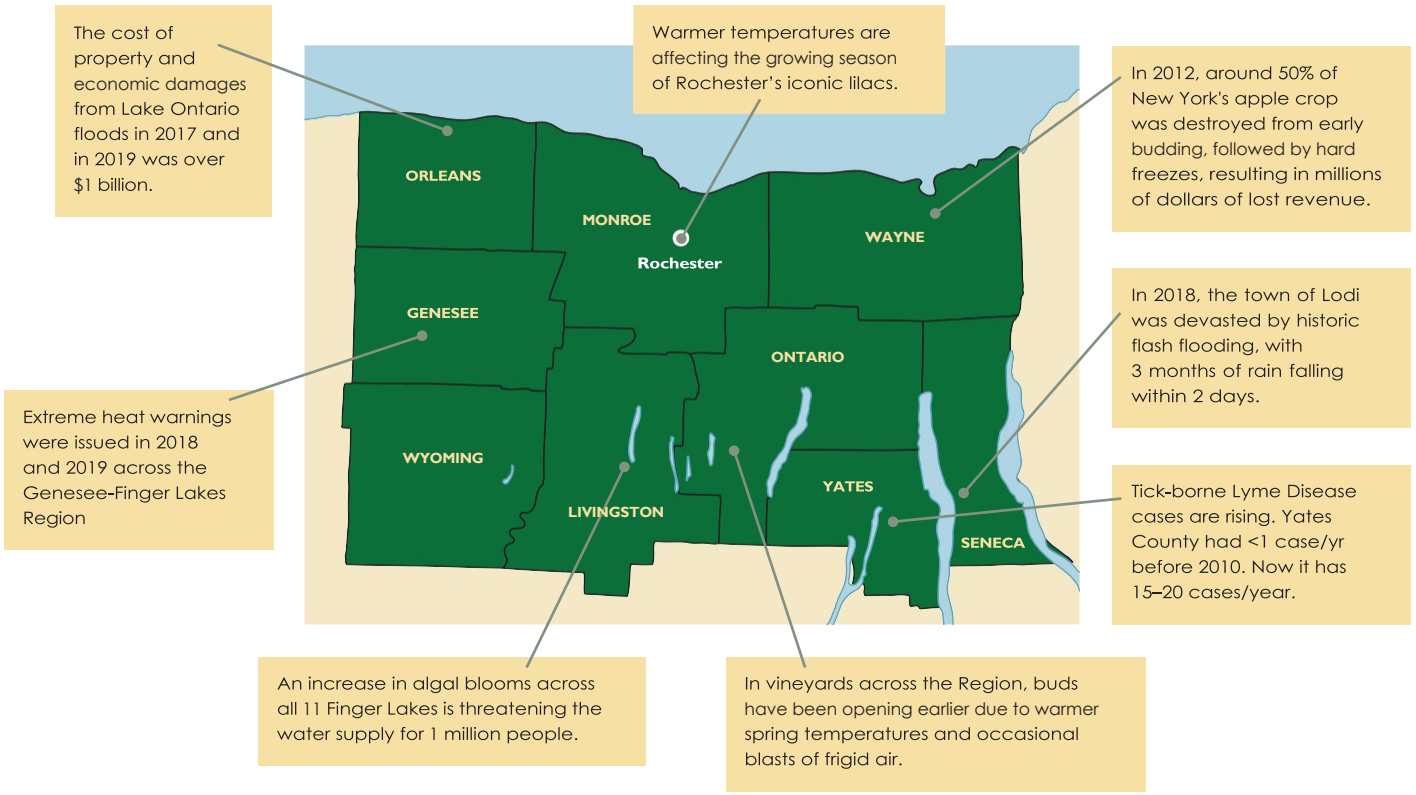
Baseline Regional Characteristics

Baseline Regional Socio Demographics

Overview

Located on the land of the Seneca Nation, a member of the Haudenosaunee Six Nations Confederacy, the Genesee-Finger Lakes (GFL) region of Upstate New York is nestled between the City of Buffalo to the west, Lake Ontario to the north, and the bucolic Finger Lakes to the southeast. The nine-county region boasts bountiful natural resources, particularly fresh water, relatively clean air, and the most farmland in all of New York State.Unfortunately, climate change poses multiple threats to the people and places of the region, through temperature increases, extreme flooding, fluctuations in precipitation patterns, and increases in heat-related and vector-borne illnesses (See Figure 1).

Figure 1 – The Genesee-Finger Lakes region and some of its current environmental burdens



A diverse population of approximately 1.2 million people lives in the region's many rural villages, suburban towns, and the cities of Rochester (the third largest in NY), Geneva, Canandaigua, and Batavia (See Table 1). Results from the American Community Survey show that the region's total population has remained relatively flat since 2000, similar to state trends but counter to the nation. In 2021, residents

numbered more than 1.2 million, up 1.4% from 2000, compared to growth of 18% in the nation and 4.5% in the state. The City of Rochester and five counties, Genesee, Livingston, Orleans, Wayne, and Wyoming, lost population: 4.0% in the city and between 3.0% and 9% in each of the counties. The fastest growing counties were Ontario (12.5%) and Monroe (2.7%). The 60 to 84 age group has been the fastest growing population in the region since 2000, increasing 55%, while the 85 and older age group increased 35% as well by 2017-21. Meanwhile, the under 20 and 20-39 age groups decreased by 16% and 4%, respectively.

Table 1: Population, Gender, and Age

	POPULATION	GENDER		AGE								
Geography		Male	Female	0-19 Years	20-24 Years	25-34 Years	35-49 Years	50-61 Years	62 Years and Over	Median Age	Male Median Age	Female Median Age
Genesee County	58,204	29,171	29,033	13,049	3,358	7,183	10,195	10,164	14,255	44	42	45
Livingston County	61,980	31,139	30,841	14,440	5,650	6,438	10,153	10,602	14,697	42	41	43
Monroe County	756,406	367,653	388,753	179,281	51,485	105,461	132,593	123,118	164,468	40	38	41
Ontario County	112,288	55,283	57,005	25,145	7,135	12,340	19,248	19,747	28,673	44	43	46
Orleans County	40,148	20,464	19,684	8,586	2,229	5,200	7,256	7,704	9,173	43	41	45
Seneca County	33,651	17,613	16,038	7,379	1,872	4,397	5,873	5,732	8,398	42	41	45
Wayne County	91,324	45,865	45,459	21,129	4,961	10,424	15,851	16,289	22,670	44	43	46
Wyoming County	40,338	21,526	18,812	8,710	2,117	5,178	7,645	7,148	9,540	43	41	46
Yates County	24,713	12,105	12,608	6,229	1,738	2,680	3,576	4,193	6,297	41	40	42
GFL Region wo Monroe	462,646	233,166	229,480	104,667	29,060	53,840	79,797	81,579	113,703			
GFL Region Total	**1,219,052**	**600,819**	**618,233**	**283,948**	**80,545**	**159,301**	**212,390**	**204,697**	**278,171**			
GFL Region Percentages		***49%***	***51%***	***23%***	***7%***	***13%***	***17%***	***17%***	***23%***			
										43	***41***	***44***
											Regional Averages	

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org) *Percentages might not add to exactly 100% because of rounding.*

Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (DP05, S0101)

Table 1: Race and Hispanic or Latino in the GFL Region by County

	ONE RACE							HISPANIC OR LATINO				
Geography	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Other Race	TWO OR MORE RACES	Mexican	Puerto Rican	Cuban	Other	TOTAL HISPANIC OR LATINO
Genesee County	52,954	1,188	269	476	0	632	2,685	655	700	67	628	**2,050**
Livingston County	56,557	1,380	50	606	0	914	2,473	296	1,347	50	724	**2,417**
Monroe County	546,529	112,897	1,511	28,883	488	21,973	44,125	4,406	48,143	3,702	16,015	**72,266**
Ontario County	101,505	2,457	85	1,588	0	1,836	4,817	1,378	3,217	108	1,149	**5,852**
Orleans County	35,018	2,167	122	270	0	961	1,610	663	667	86	706	**2,122**
Seneca County	30,133	1,498	78	236	5	413	1,288	250	644	34	357	**1,285**
Wayne County	81,988	2,214	156	801	3	1,734	4,428	1,064	2,129	56	1,113	**4,362**
Wyoming County	36,228	1,473	56	248	0	1,008	1,325	470	497	27	358	**1,352**
Yates County	23,683	133	18	253	5	167	454	167	105	14	258	**544**
GFL Region wo Monroe	418,066	12,510	834	4,478	13	7,665	19,080	4,943	9,306	442	5,293	**19,984**
GFL Region Total	**964,595**	**125,407**	**2,345**	**33,361**	**501**	**29,638**	**63,205**	**9,349**	**57,449**	**4,144**	**21,308**	**92,250**
GFL Region Percentages	***79%***	***10%***	***0%***	***3%***	***0%***	***2%***	***5%***	***10%***	***62%***	***4%***	***23%***	***8%***

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)

Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (B08141)

Percentages might not add to exactly 100% because of rounding.

The region is home to a diverse population in terms of race, ethnicity, and language (See Tables 2 and 3). The region continues to grow more diverse as year after year, the American Community Survey results show that the representation of groups such as Black or African Americans, Hispanics, and Asians is increasing. Within the City of Rochester, approximately 70% of individuals identify as people of color, with a sizable Puerto Rican, Dominican, Chinese, and Nepalese population. Wayne County has one of the largest migrant populations in NY State, largely due to on-farm employment, as is the case in Ontario County, resulting in a burgeoning Hispanic population. Members of the

Haudenosaunee can be found across the region, with a small concentration on the portion of the Tonawanda Reservation that extends into Genesee County. Wayne and Yates counties have a growing Amish and Mennonite population, but the exact numbers are difficult to determine. Around 90% of the population in the region speaks only English at home and around 4% reported speaking English at a less than “very well” level. The predominant languages other than English in the region are Spanish (5%) and Other Indo-European languages (4%). Along with these diverse groups, the region hosts several cultural institutions that are assets to developing an equitable and inclusive community response to climate change.

Table 3: Languages Spoken at Home in the GFL Region by County

	LANGUAGE SPOKEN AT HOME FOR POPULATION 5 YEARS AND OVER									
	English Only	Less than "Very Well" English	English + Spanish		English + Other Indo-European Language		English + Other Asian or Pacific Island Language		English + Other Language	
Geography				*Less than "Very Well" English*		*Less than "Very Well" English*		*Less than "Very Well" English*		*Less than "Very Well" English*
Genesee County	53,310	631	1,195	387	446	123	238	111	15	10
Livingston County	55,619	1,264	1,325	495	1,205	126	454	227	747	416
Monroe County	622,051	36,250	43,329	15,572	28,726	10,175	14,927	7,306	7,431	3,197
Ontario County	100,268	2,236	3,017	1,036	2,894	711	455	261	420	228
Orleans County	35,694	872	1,342	460	760	251	276	143	119	18
Seneca County	29,499	815	692	184	1,505	575	99	48	37	8
Wayne County	81,820	1,826	2,055	698	1,912	848	500	261	132	19
Wyoming County	37,195	324	787	284	207	8	201	32	14	0
Yates County	19,331	1,037	407	175	3,309	858	186	4	0	0
GFL Region wo Monroe	412,736	9,005	10,820	3,719	12,238	3,500	2,409	1,087	1,484	699
GFL Region Total	**1,034,787**	**45,255**	**54,149**	*19,291*	**40,964**	*13,675*	**17,336**	*8,393*	**8,915**	*3,896*
GFL Region Percentages	***90%***	***4%***	***5%***	*36%*	***4%***	*33%*	***1%***	*48%*	***1%***	*44%*

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (S1601)
Percentages might not add to exactly 100% because of rounding.

Table 4: Area Median Income, Household Income, and Poverty Status

	HOUSEHOLD MEDIAN INCOME	HOUSEHOLD INCOME							POPULATION'S POVERTY STATUS	
Geography		Less than $10,000	$10,000 to $29,999	$30,000 to $49,999	$50,000 to $74,999	$75,000 to $99,999	$100,000 to $149,999	$150,000 or more	Status is Determined	Below Poverty Level
Genesee County	$68,178	1,250	3,561	4,093	4,318	3,692	4,151	3,351	57,184	5,974
Livingston County	$70,443	1,210	3,198	3,740	4,536	3,361	4,676	3,350	56,947	6,667
Monroe County	$71,450	16,090	50,528	46,334	51,020	41,122	54,000	55,633	732,201	98,468
Ontario County	$76,603	1,692	6,035	6,531	8,771	6,539	8,853	8,659	108,869	9,803
Orleans County	$61,069	904	2,827	2,815	2,962	2,348	2,327	2,018	38,163	4,801
Seneca County	$64,050	651	2,386	2,478	2,551	1,991	2,031	1,534	31,526	4,144
Wayne County	$71,007	1,849	5,392	5,637	7,158	5,190	7,570	4,960	90,405	9,958
Wyoming County	$65,066	620	2,534	2,649	3,275	2,530	2,896	1,648	37,732	4,037
Yates County	$63,974	408	1,459	1,587	1,821	1,097	1,412	1,098	23,537	3,347
GFL Region wo Monroe		8,584	27,392	29,530	35,392	26,748	33,916	26,618	444,363	48,731
GFL Region Total		**24,674**	**77,920**	**75,864**	**86,412**	**67,870**	**87,916**	**82,251**	**1,176,564**	**147,199**
GFL Region Percentages		***5%***	***15%***	***15%***	***17%***	***13%***	***17%***	***16%***		***13%***
	$67,982 Regional Average									

Percentages might not add to exactly 100% because of rounding.

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (B19001, S1701, S1901)

Below the Geography's Household Median Income
Some Households Below the Geography's Household Median Income

Many in the region share the struggle for an improved quality of life, and improved economic, health, and housing outcomes. The average of Median Income for the 9 counties that make up the region was reported as $67,982 by the ACS (See Table 4). Across all counties in the region, more than 35% of the households are living under their counties’ Median Income. Poverty rates prior to the COVID-19 pandemic hovered around 13%

in the nine-county region, just shy of the state average of 14%, but with considerably higher rates concentrated in the City of Rochester at 31%, and near 20% in Batavia and Geneva. There are also pockets of poverty in rural areas outside of regional cities, in Sodus, Lyons, Geneseo, Mt. Morris, parts of Penn Yan and Naples, among others.

Poverty has a significant racial dimension across the region (See Table 5). Inequities in wealth accumulation and the disproportionate number of Black, Indigenous, and People of Color (BIPOC) in poverty can be attributed, in part, to the history of residential segregation and redlining that scars the region's landscape, particularly in the City of Rochester. Discrimination in the housing sector continues, despite the end to formal segregation policies, impacting housing quality and access to resources and opportunities - such as employment and neighborhood safety - all of which negatively impact the social determinants of health. Racial disparities are not limited to the housing sector. The Commission on Racial And Structural Equity (RASE) found that structural racism persists across every sector and system, and issued several recommendations to address racial inequality in Business Development, Criminal Justice, Education, Healthcare, Human Services, Housing, Job Creation, Mental Health and Addiction Services, and Policing. Beyond the RASE Commission's recommendations, several measures to ameliorate racial inequities have been put into place, including Interrupt Racism, the Police Accountability Board, and the Person in Crisis Team. Widespread disparities in racial outcomes mean that communities of color are more likely to experience the most significant impacts of climate change. Ensuring equitable access to climate solutions will require an anti-racist and inclusive local climate movement to counteract these various longstanding inequities. A systems-level approach to

Table 5: Percentage of the population at Poverty Status by Race and Ethnicity by County

Race and Ethnicity	NY State	GFL Region	GFL Region wo Monroe	Genesee County	Livingston County	Monroe County	Ontario County	Orleans County	Seneca County	Wayne County	Wyoming County	Yates County
American Indian and Alaska Native	22%	30%	22%	21%	35%	34%	17%	0%	43%	26%	57%	33%
Asian	14%	16%	10%	20%	10%	17%	5%	1%	11%	12%	4%	34%
Black or African American	21%	29%	28%	25%	24%	29%	23%	19%	52%	31%	48%	73%
Native Hawaiian and Other Pacific Islander	27%	29%	0%	*No Individuals*	*No Individuals*	30%	*No Individuals*	*No Individuals*	0%	0%	*No Individuals*	0%
White	10%	9%	10%	9%	11%	9%	8%	12%	12%	10%	10%	13%
Other race	22%	25%	28%	33%	27%	25%	21%	39%	40%	21%	27%	61%
Two or more races	16%	19%	17%	16%	12%	20%	19%	13%	27%	17%	6%	31%
Hispanic or Latino origin (Any race)	20%	26%	21%	20%	23%	27%	21%	21%	28%	16%	32%	24%

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)

Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (S1701)

addressing climate change and racial inequity increases our likelihood of success in addressing both.

Approximately 91% of the population 18 years and over in the region has either completed high school or achieved an even higher level of education (See Table 6). The population with a bachelor's degree or higher accounts for approximately 33% of those 18 years and over. The primary method of transportation to work in the region is riding alone in a car, truck or van. Approximately 77% of the population of workers use this as their primary method of transportation to work. Alternate methods of transportation such as Public Transportation and Walking only account for 1% and 2% respectively.

While climate change will impact all 1.2 million residents of the region, it will not impact everyone equally. According to the City of Rochester's Climate Vulnerability Assessment, climate change will disproportionately impact seniors/ elderly, children, people of color, indigenous communities, low-income residents, renters, people without access to vehicles, disabled individuals, individuals without the ability to access resources in a crisis, individuals dealing with substance abuse, non-native English speakers, undocumented immigrants, refugees, visually/hearing impaired individuals, individuals with mental illness and farmworkers. Climate change impacts, therefore, threaten to undermine the ecological, economic, and social vitality of the region, as well as overall public health.

Table 6: Educational Attainment for Population 18 Years and Over by County

	EDUCATIONAL ATTAINMENT FOR POPULATION 18 YEARS AND OVER											
Geography	**High school graduate or higher ***	**Bachelor's degree or higher ***	**Less than 9th grade**	**9th to 12th grade no diploma**	**Less than high school graduate**	**High school graduate (includes equivalency)**	**Some college, no degree**	**Some college or associate's degree**	**Associate degree**	**Bachelor's degree**	**Bachelor's degree or higher**	**Graduate or professional degree**
Genesee County	42,863	10,195	1,144	1,996	379	17,216	7,261	1,965	6,226	5,638	512	4,045
Livingston County	47,321	12,933	1,049	2,193	369	15,850	7,470	5,357	5,711	6,471	591	5,871
Monroe County	549,300	224,291	16,840	28,555	6,742	142,887	84,165	34,945	63,012	116,878	11,477	95,936
Ontario County	84,270	31,096	2,105	3,224	788	23,972	13,645	4,706	10,851	15,907	1,302	13,887
Orleans County	27,875	5,462	1,205	2,859	519	12,610	5,320	1,137	3,346	3,434	241	1,787
Seneca County	22,420	5,660	1,301	2,556	631	8,749	3,846	814	3,351	3,301	256	2,103
Wayne County	64,691	16,898	2,389	3,764	1,189	23,575	13,319	2,079	8,820	10,056	590	6,252
Wyoming County	28,393	5,678	971	2,728	269	12,214	5,137	1,245	4,119	3,251	300	2,127
Yates County	15,994	4,124	1,928	698	656	6,526	2,482	1,205	1,657	2,386	99	1,639
GFL Region wo Monroe	333,827	92,046	12,092	20,018	4,800	120,712	58,480	18,508	44,081	50,444	3,891	37,711
GFL Region Total	**883,127**	**316,337**	**28,932**	**48,573**	**11,542**	**263,599**	**142,645**	**53,453**	**107,093**	**167,322**	**15,368**	**133,647**
GFL Region Percentages	***91% ****	***33% ****	***3%***	***5%***	***1%***	***27%***	***15%***	***5%***	***11%***	***17%***	***2%***	***14%***

** These groups are not mutually exclusive.* *Percentages might not add to exactly 100% because of rounding.*

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)

Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (S1501)

Significant health inequities already plague the Genesee-Finger Lakes region, and these inequities will worsen with further climate change. Yet, if we move swiftly, the world's scientists say, there is still time to avoid the most devastating impacts to human health and to our natural and economic systems. Working collectively, we can maximize the abundant natural resources and considerable human capital of the Genesee-Finger Lakes region to embed environmental and economic sustainability, resilience, and climate justice into all aspects of our lives.

One unique point of interest in the Finger Lakes Region comes when we consider the overlap between geographic Disadvantaged Communities and households that qualify as Disadvantaged Communities because they fall below 60% of the State Median Income. The combination of geo-eligible DAC households, income-eligible DAC households, and households that would count as both add up to a total of 47% of the region's total population (See Figure 2). Even though NYSERDA has a mandate to ensure that 35-40% of its programs benefit

Table 7: Means of Transportation to Work by County

Geography	POPULATION OF WORKERS COMMUTING TO WORK	MEANS OF TRANSPORTATION TO WORK					
		Car, truck, or van -Riding Alone-	Car, truck, or van -Carpool-	Public transportation (excluding taxicab)	Walk	Taxicab, motorcycle, bicycle, or other means	Worked from home
Genesee County	28,090	23,066	1,982	30	976	575	1,461
Livingston County	27,162	21,372	2,276	126	1,103	397	1,888
Monroe County	359,578	271,679	27,899	6,912	5,512	5,324	42,252
Ontario County	53,606	42,286	3,927	202	1,314	460	5,417
Orleans County	17,233	13,206	1,674	53	624	399	1,277
Seneca County	14,430	11,065	1,547	47	414	312	1,045
Wayne County	42,449	34,223	3,757	106	797	367	3,199
Wyoming County	17,784	14,168	1,389	113	937	178	999
Yates County	10,302	7,469	929	2	272	383	1,247
GFL Region wo Monroe	211,056	166,855	17,481	679	6,437	3,071	16,533
GFL Region Total	**570,634**	**438,534**	**45,380**	**7,591**	**11,949**	**8,395**	**58,785**
GFL Region Percentages		***77%***	***8%***	***1%***	***2%***	***1%***	***10%***

Table by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Percentages might not add to exactly 100% because of rounding.
Data source: US Census Bureau - American Community Survey (ACS) 5Yr Estimates 2022 (B08141)

Figure 2: 2020 Total Households per Geography and Eligibility
(No Boat/RV/Van/Mobile/Trailer)

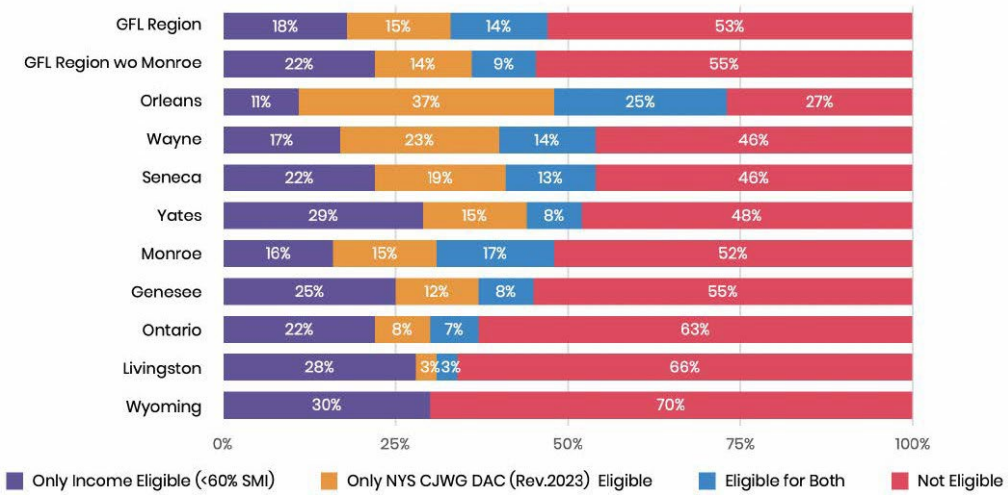


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US DOE Low-income Energy Affordability Data (LEAD) Tool ACS 2020 PUMS Download 20240404

Disadvantaged Communities at a State level, the Finger Lakes hub has set the goal to achieve parity for our DACs and ensure that at least 47% of our clients are DAC members to achieve true equity in our region.

Buildings and Sector Assessment

Housing Units

The Finger Lakes Region has a wide variety of housing, varying greatly throughout each county. Monroe County's industrial history with former giants such as Kodak and Xerox led to ornate housing developments around the City of Rochester. Counties closer to the Finger Lakes, such as Seneca and Yates, see more seasonal and secondary homes, while rural counties such as Livingston and Orleans, have higher percentages of mobile and manufactured housing. This section discusses the challenges and opportunities of the Finger Lakes' current housing stock, including housing stock age, vacant housing, and heating fuel, in addition to analyzing the region's unique nonprofit building landscape.

Housing unit data was determined using the US Department of Energy's Low-income Energy Affordability Data (LEAD) Tool in April of 2024. The data indicates 540,819 housing units in the nine Finger Lakes counties. Of that number, 357,660 (66%) are single family detached homes and 97,627 (18%) are classified as multifamily units. Overlapping with the multifamily designation, 71,083 (13%) are classified as 'multisector'. An average of 72% housing units are 'owner-occupied', while 27% are 'renter-occupied'.

Of the overall housing units in the Finger Lakes region, a total of 157,871 (29%) are in census tracts that contain a Disadvantaged Community (DAC) classification, with a regional average of 25% of housing units in DAC areas. Comparing all census tracts in the region, 232 (33%) had a DAC classification. Comparing owner occupancy rates in DAC and non-DAC areas, there are more DAC renter occupied units in the region (69,881 or 15%) compared to DAC owner occupied units (66,657 or 14%). This is a stark contrast with non-DAC buildings (53% owner occupied and 18% renter occupied).

Comparing all nine counties, Monroe County's large population weighed the data averages by a significant amount. Monroe County's population of 755,160 is nearly double that of the other eight counties combined (461,845).

Figure 3: Total Households per Geography and Percentage of State Median Income (SMI)
(No Boat/RV/Van/Mobile/Trailer)

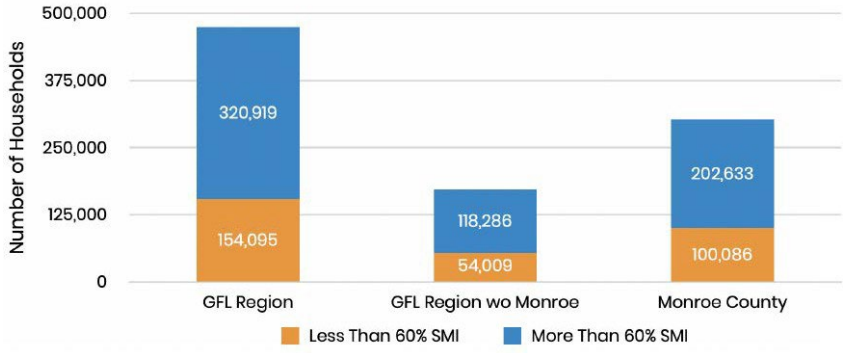


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US DOE Low-income Energy Affordability Data (LEAD) Tool ACS 2020 PUMS Download 20240404

Monroe County has 327,880 housing units, of which 68,574 (20%) are multifamily, while the total number of housing units among the remaining counties ranged from 13,870 (Yates) to 50,857 (Ontario). Wayne County had the second highest number of both multifamily units (6,751) and multi sector units (12,047) followed closely by Ontario County (5,948 multifamily units and 11,730 multi sector units). Yates County had the highest owner occupancy rate with 79.47% of housing units, whereas Monroe County had the lowest (58%). Genesee County was the only other county with under 70% owner occupancy (67%).

Looking at DAC census tracts, Orleans County had both the highest percentage of housing units in DAC areas (11,304 units or 60%) and the highest percentage of DAC census tracts (60%). The county with the highest overall number of DAC census tracts, Monroe County (81 or 42%) only had 111,636 (34%) of housing units within DAC areas. Multisector units resulted in multiple outliers, with Genesee, Livingston, and Seneca counties having zero multi sector units. Mobile homes make up 10% of the housing stock in four counties: Livingston, Orleans, Seneca, and Yates. Due to its high population and density, Monroe County had the lowest percentage of mobile homes.

When interpreting these findings and planning future outreach, the Finger Lakes Hub should target areas that contain a high percentage of DAC census tracts and a high number of households in DAC areas. With these parameters, Orleans, Monroe, and Wayne counties appear to be key outreach areas. When planning outreach targeted at renters and landlords, counties with a high percentage of multifamily units such as Orleans, Monroe, and Livingston are prime areas. Within these counties, reaching out to local landlord and tenant rights organizations may yield better results than trying to canvass renters individually. On the other end, as the Hub works with counties with a high proportion of single-family detached housing (Yates, Wyoming, and Wayne), these strategies are less effective. Instead, well-advertised community presentations that reduce isolation and bring community members together in a common gathering place (e.g. libraries, community centers) may be more impactful. The exception to this is counties with a high percentage of mobile homes. Hubs should utilize a mix of community presentations (due to the single-family nature of manufactured housing) and canvassing (due to the high density of homes) in mobile home parks to best reach residents. Although Monroe County possesses a large resource directory, this is not shared in the surrounding eight counties. The Finger Lakes Hub has experienced a continual inflow of referrals within Monroe County given strong partnerships with other agencies (such as Pathstone and RENEW), but special attention is needed for the surrounding counties.

Age of Housing Stock

The presence of older housing stock in the Finger Lakes region represents an obstacle for clean energy adoption. The late 19th century saw a manufacturing boom within Monroe County, leading to a current housing stock that is much older than surrounding counties. Installation of clean heating and cooling, especially air-source and geothermal systems, is made more difficult with factors such as a lack of modern-sized vents, or no vents at all in the case of radiator or baseboard heat. Additionally, harmful building

materials such as asbestos tiles, lead-based paint, and asbestos-containing vermiculite insulation are more common in older housing stock. Outdated electrical work, such as knob-and-tube or cloth-insulated wiring, is more common, meaning additional funding is required to replace wiring or an electrical panel before installing a heat pump system.

Based on 2022 American Community Survey (ACS) data, a total of 56% of housing units in the Finger Lakes region were constructed before 1970, whereas most modern building codes were enacted between 1971-1979. The United States Government banned lead-based paint in 1979 and new asbestos products in 1989. Region-wide, Genesee County had the highest percentage of housing units built before 1970, with 67%, while Ontario County had the lowest at 44%. Every area aside from Ontario County had at least 50% of housing units built before modern building codes. When comparing houses built before 1990 (when both asbestos and lead paint had been banned in new construction), the regional percentage jumps to 80% . Genesee County again has the highest percentage of pre-1990 stock with 86%, with Orleans and Monroe following closely behind. Ontario County contains the lowest percentage of older housing stock again at 69%.

28% of total housing stock in the Finger Lakes region was built before 1939. Orleans has the highest percentage of housing being built in this period, with 43%, followed by

Figure 4: 2022 Housing Stock by Age
(No Boat/RV/Van/Mobile/Trailer)

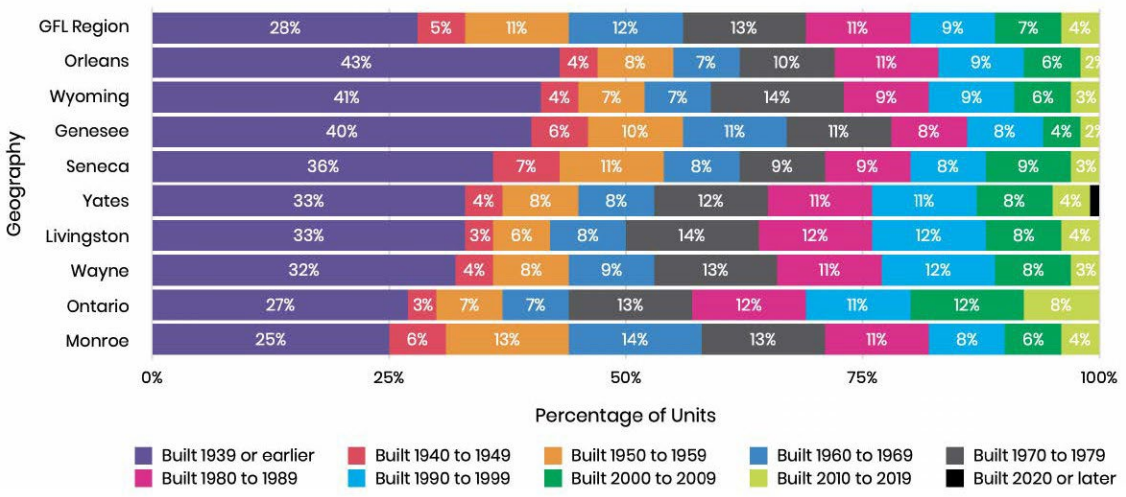


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US DOE Low-income Energy Affordability Data (LEAD) Tool ACS 2020 PUMS Download 20240404

Wyoming and Genesee. Based on this data, buildings in Orleans, Wyoming, and Genesee counties may be more likely to require pre-electrification work such as wiring replacement and/or electrical panel upgrades compared to other counties.

These data findings indicate that special attention should be given to counties with the highest overall percentage of older housing stock. Pre-electrification measures are usually out of the scope of NYSERDA's low-to-moderate income programs due to limitations to both funding and approved measures. Per the recommendations section found at the end of this report, raising the EmPower+ grant funds above $10,000 could help address gap funding needs. Scaling the program funds based on historic inflation is one consideration, but another option could be scaling the

funding based on age of existing homes. Prioritizing extra funding to older homes that require additional pre-electrification work (for example, maximum of $17,000 for homes built before 1939, baseline of $10,000 for homes built after 1990) could help low-income homeowners who lack the funds for critical repairs. Additionally, Hubs should be aware that counties with newer housing stock may have less pre-electrification measures needed, but may be entering the time to consider system replacements. According to Carrier, the average furnace lifespan is 17.5 years. Ontario County has the highest percentage of new construction (after 1990), meaning that the heating systems of homes in that area have likely been replaced once already in the late 2000s and are nearing a second replacement in 2025. Hub staff should also be aware of local wrap-around programs to refer occupants to when dealing with hazards such as vermiculite insulation (Zonolite Attic Insulation Trust) and lead-based paint (Monroe County offers free paint testing for renters and expectant mothers). Hub staff should also educate homeowners on the federal Home Electrification Appliance Rebate (HEAR) rebates, which offer necessary funding for electrical wiring and panel replacement. However, the pilot program for the HEAR rebates has exposed difficulties for EmPower+ contractors needing to subcontract electrical panel replacements, as this can cause project delays.

Vacant Housing Units

Vacant housing has been both problematic and opportunistic for the Finger Lakes Energy Hub. Investment in secondary and vacation homes is dissuaded by federal and state incentives, which has caused programmatic confusion for clients looking to invest in these dwellings. Meanwhile, improving the energy efficiency of vacant rental units in DACs is important for future low-to-moderate income renters. Based on 2022 American Community Survey (ACS) data, 9% of total housing units in the Finger Lakes region are vacant. Yates County has the highest proportion of vacant units, with 32% of housing stock being vacant. This is due in part to seasonal vacation homes, as the county is bordered by three of the Finger Lakes (Canandaigua, Keuka, and Seneca). Seneca County, which has the second highest proportion of vacant housing units at 15%, is bordered by two lakes, Seneca and Cayuga. The prevalence of secondary homes in these counties is difficult to address, as NYSERDA programs and federal clean energy credits are designed for primary homes. It should be noted that the total number of vacant units in Yates and Seneca counties (6,725) still pales in comparison to Monroe County, which is listed at 21,597 vacant units (only making up 6% of the housing stock). As discussed in previous sections, Monroe County has both the highest number of multifamily units and the lowest percentage of owner-occupied units. Hub staff may be able to create more electrification opportunities by reaching property owners in Monroe County and taking advantage of EmPower+ funding towards vacant units, compared to trying to convince homeowners in Yates and Seneca counties to invest in vacant secondary homes.

Vacant rental units represent an opportunity for landlords to improve their properties before a tenant moves in, but the experience of Finger Lakes Hub staff has varied wildly with vacancies. Some landlords have approached the Hub looking for energy efficiency funding when their vacant units

were in the midst of renovation, which meant workspaces were inaccessible to contractors or not ready for work. EmPower+ also requires a tenant to move into a vacant unit within 90 days of work completion, which some landlords were not prepared for.

One major advantage of completing projects on vacant rental units is that the landlord is the only point of contact for the unit–there is no need to track down tenants for signatures. EmPower+ projects are likely to fall through if either the tenant or landlord are unresponsive, meaning that removing one party from the equation usually makes the process easier. One major disadvantage of working on vacant units is the skewed energy saving calculations–no tenant means no energy usage history. Additionally, since EmPower+ installations can take up to 90 days, time spent waiting for project approval can keep viable housing off the market for longer.

Vacant single-family homes are another story and are usually reliant on intervention from local governments, but can also present an opportunity for clean energy investment. One example is the Rochester Land Bank Corp., established by the City of Rochester in 2013. The Corp. began acquiring vacant and abandoned properties in the city to demolish or re-sell to developers, but in 2023 launched the "Buy the Block" program. The program offers low cost single family homes (intended so that occupants spend no more than 30% of their income on housing), with the overall goal of 100 homes built in disadvantaged city

Figure 5: 2022 Housing Stock by Occupied/Vacant
(No Boat/RV/Van/Mobile/Trailer)

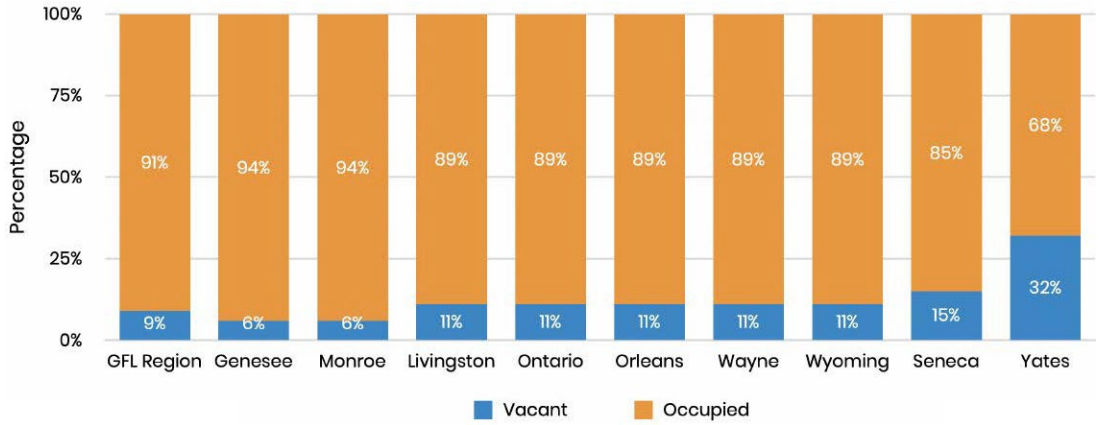


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: US DOE Low-income Energy Affordability Data (LEAD) Tool ACS 2020 PUMS Download 20240404

neighborhoods. These homes are Energy Star 3.0 certified and include air source heat pumps as the primary heating and cooling source. The Hub should support these types of projects however possible, and market them as positive examples of electrification within DACs.

One major success story for vacant units during the first year of the Hub program was utilizing EmPower+ funds on a temporary housing shelter operated by a local church. The program offers wraparound support to individuals re-entering the community from jail, prison, and treatment centers and is the only program of its kind in Monroe County. The three-story shelter is a converted former single-family that houses around a dozen individuals at a time, and due to its size was considered a multifamily building within the EmPower+ program. By utilizing income

documentation from temporarily housed tenants (with their consent), an EmPower+ Low-Income grant meant that insulation, air sealing, and energy efficiency improvements could be made with reduced cost to the housing shelter.

Nonprofit Buildings

The Finger Lakes Hub collaborates with nonprofit organizations in a variety of ways, such as client referrals, joint outreach efforts, and public speaking engagements. According to data from the National Center for Charitable Statistics, the greater Rochester area has a higher per capita number of nonprofits (number per 10k population) than Buffalo and even the New York-Newark-Jersey City metropolitan area. Many organizations are interested in educating their base about the benefits of electrification and climate action, so it is no surprise that these nonprofits also plan to electrify their own buildings. Nonprofit buildings can take standard forms, such as an office or converted single-family house for a community organization, but many houses of worship such as churches and synagogues have more complex heating needs due to their historic nature. The experience of the Hub with nonprofit electrification has been challenging, mainly due to programmatic oversight and high cost-share expectations.

Based on internal tracking from 2023, the Hub engaged with at least 25 nonprofit organizations over the year, with 15 of them being houses of worship. Energy studies through NYSERDA's Green Jobs Green New York program were recommended as a starting point, due to the program's low cost-share for houses of worship (usually $100). However, energy studies through the program have caused issues for nonprofit partners. The first issue is waiting time, with several partners waiting two to three months for an energy study report, which is especially problematic if heating needs are involved during the winter. The second and predominant issue is with the recommendations proposed by the subcontractors who carry out the energy studies–L&S Energy Services and C.J. Brown Energy. There are two other subcontractors that provide these reports, but the Hub team did not see any reports prepared by them in our region and we cannot comment on their quality of reporting. The report recommendations are broken up into "Energy Efficiency Measures" and "Building Electrification Measures", with estimated cost and payback period. The former recommends measures such as improved building controls, interior lighting retrofits, and window glazing, while the latter recommends 'big ticket' items such as air source and/or ground source heat pumps. In the 'Building Electrification Measures' section, it is not unusual to see estimated costs over six figures, but also a 'Simple Payback' number that is often disparagingly over 100 years. More recent reports have started including 'n/a' instead of a lengthy estimated payback period. While this is an improvement, the Simple Payback section has caused nonprofit building owners to gravitate towards the lower-cost options such as window glazing and lighting replacement, even if their heating systems are a larger priority.

Budget is the primary roadblock for nonprofit buildings to reach their electrification goals. One example showcasing the complexity of nonprofit electrification is the First Unitarian Church of Rochester, which has a volunteer base that is well-connected with the Hub team. When First

Unitarian Church leadership approached the Hub team for a geothermal price quote to replace their boiler system, the project was quickly delayed for multiple reasons. First, the Hub team's recommendation of Property Assessed Clean Energy Programs (PACE) financing was not a good fit for the church due to its historic designation. First Unitarian is registered in the U.S. National Register of Historic Places due to its connection with the 19th century women's suffrage movement, putting restrictions on changing the exterior of the building. The financing type requires putting a lien agreement on the property, which was not ideal for a culturally significant building. Secondly, locating a geothermal installer in the Finger Lakes Region who wanted to undertake such an expensive project was difficult for the First Unitarian Church team. Despite having eight acres of usable land, church leadership were unable to find a qualified large-facility installer willing to provide a quote due to the scale and funding complexity of the project. At the current moment, First Unitarian Church is waiting on incentives to make the project more attractive, creating a push-pull effect between raising funding through a capital campaign and hoping the building's current boiler system holds on until geothermal is feasible.

An inverse of the First Unitarian Church project can be seen at a building we are referring to as "Case Study B" (we were not able to get ahold of our contact at the organization to approve name usage in the RABA). The building is a small Methodist church in Rochester, NY and located in a formerly EmPower+ Geo-Eligible neighborhood. While First Unitarian Church can afford its energy bills due to its large attendance, Case Study B has seen a drop in attendance since the COVID-19 pandemic and struggles with high energy costs during the winter. Church leadership did not want to wait on the longer timeline of the Green Jobs Green New York study, so Hub staff arranged a private energy study done by a partnered installer. The study revealed that the building had a complete lack of attic insulation, numerous gas leaks, and three gas furnaces which were all oversized and close to failure. When church leadership approached Hub staff about next steps, the only logical referral was to the Rochester Gas & Electric Direct Install Program (which does not assist with insulation, only appliance and lighting rebates). With NYSERDA's Green Jobs Green New York financing being locked behind completion of the energy audit, Case Study B would have to look at private financing instead of waiting three months for access to a NYSERDA audit and financing. This is also assuming church leadership would be willing to explore financing as an option. The lack of incentives for critical energy efficiency work such as insulation and HVAC replacement is a major problem for small-to-medium houses of worship and requires divesting their already limited funding from community programs. Additionally, this issue is not specific to houses of worship. Hub staff were also approached by a neighborhood organization and community Scout House in similar situations, both with major energy efficiency needs and limited income.

With the arrival of the federal Inflation Reduction Act, strides have been made towards increasing electrification incentives for nonprofit buildings. New programs are available to promote solar and geothermal through direct payment and scalable tax credits based on location (DAC and former energy communities). However, solar and geothermal are substantial investments, and out of reach

for smaller churches that are reliant on crowdfunding. Due to the prevalence of boiler systems in older houses of worship, geothermal conversion is also more difficult compared to air source heat pumps, which offer a lower price point and increased flexibility in design. The added benefit of air conditioning is also appealing to nonprofit leadership. There is a serious lack of funding for air source heat pumps, as nonprofits lack access to the residential energy efficiency tax credit and HEEHRA rebate programs. Renew America's Nonprofits looked to be another promising direct funding source for nonprofit energy efficiency work, but the competitive applicant pool meant the Finger Lakes region has been shut out of this round of grants.

One recommendation from the Hub team to promote electrification to nonprofits would be removing the energy study requirement to access Green Jobs Green New York financing. PACE financing is unattainable for many nonprofits, as private lenders mainly seek out large multifamily projects. Access to PACE is also heavily dependent on whether a municipality has passed legislation in their area to allow the financing in the first place. Green Jobs Green New York financing needs to be more accessible for nonprofits who cannot afford to wait multiple months for access. Additionally, the Green Jobs Green New York energy studies should stop recommending window glazing for two reasons. First, window replacements are not covered in any of the NYSERDA residential programs (aside from the residential Comfort Homes program), so our team is concerned when it is recommended for nonprofits instead of insulation and/or weatherization. Second, energy study recipients who the Hub has worked with have struggled to find an installer to provide window glazing for nonprofits in our area. The Hub team's final recommendation is increasing funding for nonprofit-specific electrification. One example could be matching the federal residential energy efficiency tax to New York State, so churches could also take advantage of the air-source heat pump tax credit. Another option would be administering a discretionary pool of funding for Clean Energy Hubs to provide emergency grant funding for small-to-medium nonprofits struggling with energy costs. Some restrictions on this grant could include only funding necessary work such as insulation, air sealing, and heat pump installation, and requiring NYSERDA approval on projects.

Fuel Usage by County

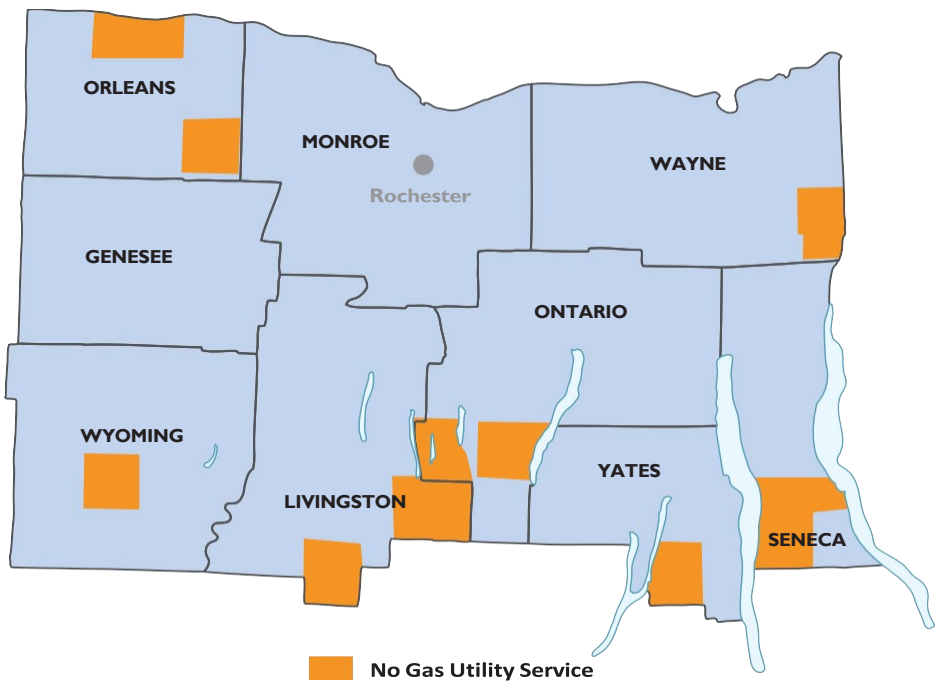
Residential fuel usage is a key metric for understanding which communities are prime outreach areas to promote electrification. Hub staff have worked with homeowners reliant on heating sources such as fuel oil and propane that have seen wild delivery cost fluctuation. For these households facing a sudden energy burden, electrification may be a more cost-effective option. Based on 2022 American Community Survey (ACS) data, the most common fuel type among the Finger Lakes was utility gas, serving 66% of total households. This is not surprising, given natural gas' subsidized heating cost and pre-existing infrastructure in the region. Monroe County had the highest percentage of households that used utility gas at 75%, while Yates County had the lowest at 28%. However, the NYS Gas Utility Service Territories Map available in data.ny.gov and last updated on June 15th 2023, shows that 7 out of the 9 counties that make up the Finger Lakes region had at least

one census tract not served by natural gas infrastructure (See Figure 6). Seneca, Livingston, Ontario, and Orleans counties had the highest number of census tracts that fit this criteria. When conducting outreach in these counties, Hub staff should be aware of areas not served by gas and adjust their discussions towards the cost saving benefits of switching from fuel oil to heat pump technology.

When including other fossil fuel types such as liquified petroleum and coal, 78% of total heating sources in the region were attributed to fossil fuel. Genesee County had the highest overall percentage of fossil fuel usage at 81%, closely followed by Monroe County at 80%. The only counties below 70% overall fossil fuel usage were Wyoming and Yates. Comparing the percentage of households using electricity as their primary heating source (likely including heat pumps and electric baseboards), Yates had the highest at 22% of total households. Every other county in the region was under 20% for electricity as primary heating source, with Genesee being the lowest at 12%.

This data showcases the need for education on the benefits of heat pump technology, but also the need for increased incentives to help heat pumps find footing against subsidized fossil fuel pricing. Counties with high fuel oil usage, such as Orleans County (38% fuel oil usage), Yates (31%), and Seneca (30%) are prime outreach opportunities as the cost savings of switching from fuel oil to electricity are more easily demonstrated compared to natural gas. Outreach materials should be tailored towards discussing the estimated annual heating costs of heat pumps compared to fuel oil. A key outreach method utilized by the

Figure 6: Areas Without Gas Utility Service



Data Source: NYS Gas Utility Service Territories Map (data.ny.gov)

Finger Lakes Hub has been training HEAP examiners in local OTDA offices on the benefits of braided EmPower+ and OTDA funding. Energy burdened households are reliant on HEAP funding through OTDA, and the temporary OTDA Heat Pump Waiver funding can outright cover an air-source heat pump installation. During 2023, these trainings were conducted in Livingston, Monroe, and Wayne counties. Based on the data findings, the next round of training should prioritize counties with the highest rates of fuel usage.

The Finger Lakes Hub recommends extending funding from the OTDA Heat Pump Waiver to year-round for EmPower+

households (instead of 3-6 months) to increase rates of electrification. The reasoning behind this is the current EmPower+ limit does not provide enough funding for low-income households to switch to heat pumps. Based on the Climate Leadership and Community Protection Act (CLCPA)'s Climate Action Council, the estimated cost of an air-source heat pump system was "$14,678, plus another $1,140 for the electric resistance backup" in 2022. If funding could be extended to HEAP recipients year-round, specifically in the three highest fuel oil usage counties (Orleans, Yates, and Seneca), heat pump adoption would likely increase. When focused in these key areas, the extra funding would help lessen energy burden and improve home comfort. For counties with high percentages of electricity as primary heating source (Yates, Monroe, and Wyoming), outreach efforts should expect to run into both pre-existing heat pump owners and electric baseboard/ resistance heater users. Therefore, outreach should include both education on annual heat pump maintenance (seasonal settings, cleaning) as well as the benefits of switching from electric baseboards to heat pumps.

As of September 2024, EmPower+ households with natural gas heating are not currently allowed to access the air-source heat pump HEAR rebate, only households with delivered fuels (propane, oil) and electric resistance. This has led to a backlog of clients that have interacted with the Hub, been interested in switching to a heat pump, but have had to be placed on a waiting list. Currently, the heat pump waiting list is over 80 households in our region, not counting clients that wanted to wait for a heat pump but had to replace their natural gas furnaces due to emergency or system failure. The exclusion of natural gas households is hurting the Hub's relationship and trust with clients, especially those in LMI and DAC communities in Monroe County that overwhelmingly use natural gas. The Finger Lakes Hub continues to urge NYSERDA to find a solution with the Department of Public Service to allow low-income customers to access this important funding.

Regional Clean Energy Workforce

The Finger Lakes Clean Energy Workforce Assessment includes seven economic sectors: Buildings, Transportation and Land Use, Clean Energy Generation and Distribution, Waste Management, Agriculture/Food/Forestry, and Multi-sector, but for the purposes of this Regional Assessment and Barriers Analysis, we will focus on the sectors most aligned with those outlined in NYSERDA's Clean Energy Industry Reports: Buildings, Transportation and Land Use and Clean Energy Generation and Distribution. In addition to analyzing current and past participation in the clean energy workforce, the study also assesses projected growth in these sectors. See Appendix A for a full discussion of the methodology.

Regional clean energy job growth outpaced the state's rate from 2019-2022 by 3.5%. Two counties, Wayne and Ontario, have added the most clean energy jobs in the region. Wayne County and Orleans County are state leaders with the highest number of DAC residents in clean energy jobs (1st and 3rd). The proportion of clean energy jobs based in DACs in the Region (36%) is higher than the state's proportion of 31% (NYSERDA 2023).

Finger Lakes Regional Clean Energy Industry and Occupational Analysis:

For the Industry and Occupational Analysis, the Finger Lakes Clean Energy Assessment uses the standard classifications of official government economic statistics (NAICS codes and Standard Occupational Codes), with no duplication of industry or occupational codes across sectors. See Appendix A for a full list of the industries and occupations.

The Buildings sector currently employs almost 28,000 individuals in its various industries. Of the top 15 industries by job count in the region, six of them are in the Buildings sector. There has been rapid growth in this sector over the past two decades, and the sector is projected to add over 4,000 jobs in the next ten years, an increase of over 14%.

Regional employment in the Clean Energy Generation and Distribution sector is currently over 2,300, largely in the distribution and power line construction industry. This sector is expected to add approximately 700 jobs in the next decade, led by the need for power line installers and solar installers.

Currently, the Transportation and Land Use sectors employ about 6,500, primarily in service-based industries, and with fossil-fuel based fleets that will need to be electrified in the future.

Historically, the largest industries by job count within the buildings sector have been plumbing and HVAC, with 4,814 jobs in 2023, electrical contracting and other wiring installations with 3,775 jobs, and commercial and industrial building construction with 2,855 jobs. These industry sectors have experienced some of the highest job growth numbers in the region over the past 20 years. This is closely followed by residential remodelers with 2,661 jobs and home centers, with 2,659 jobs. Within the top 15 industries in the region (in terms of job count), plumbing and HVAC are expected to see a 20% increase, with residential remodelers seeing a 27% increase, and electrical contractors seeing an 18% increase.

Current occupations within the Buildings sector include, laborers & freight, stock, material movers, 1st line supervisors of mechanics, installers, and repairers, and construction laborers. The top three occupations with projected growth over the next ten years in this sector include, laborers and freight, stock, material movers, 1st line supervisors of mechanics, installers, and repairers, and electricians.

School and employer bus transportation and general automotive repair comprise the top two industries In the transportation and land use sectors, with 2,059 jobs in school and employer bus transport (3.2 times higher than the national average), and 1,992 jobs in general automotive repair. School and bus transportation is expected to see a 37% increase in job growth over the next ten years, with general automotive repair experiencing an 18% increase. Although current job counts are low in the bus and motor vehicle transportation industry, this sector is projected to see a 53% increase over the next ten years, and will be important for reducing overall regional vehicle miles traveled.

Top occupations within the Transportation and Land Use sector include tractor/trailer drivers, drivers, and bus drivers (transit and city). The top three occupations with projected growth over the next ten years include, tractor/trailer drivers, light truck drivers, and school bus drivers.

Historically, the Clean Energy Generation and Distribution sector has not been one of the largest 15 industries within the region, in terms of job count. However, several industries within this sector are expected to see substantial growth in the next ten years, including electric power distribution, with a 26% increase, doubled growth in wind electric power generation, despite current low job counts, and an 80% increase in hydroelectric generation, despite current low job counts. The top occupations in the Clean Energy Generation and Distribution sector include electric power line installers and repairers, nuclear power reactor operators, and nuclear technicians. Over the next 10 years, the occupations with the highest projected increase in this sector include electric power installers and repairers, nuclear power reactor operators, and solar photovoltaic installers.

In line with national analyses of clean energy employment trends, entry-level occupations in the clean energy sector are less likely to require a bachelor's degree than the average regional occupation (Muro et al. 2019). Forty-eight percent of occupations in the Buildings sector require a high school diploma with only 11% requiring a bachelor's degree. Similarly, 62.5% of occupations in the Clean Energy Generation and Distribution sector require a high school diploma, with only 12.5% requiring a bachelor's degree, and 40% of entry-level Transportation and Land Use occupations require a high school diploma and 10% a bachelor's degree.

Although we do not currently have racial demographics of those participating in the region's clean energy workforce, anecdotal evidence from a series of interviews with local employers indicate that the region's workforce mirrors larger national trends comprised largely of older Caucasian males (Muro et al. 2019). The Finger Lakes Assessment indicates that the overwhelming number of clean energy job participants are between the ages of 35-55 (42% of all employees), and that there are more individuals over the age of 55 participating in clean energy jobs than individuals

between the ages of 25-34, posing a "retirement risk" for the clean energy economy. The "retirement risk" does, however, provide the opportunity for those living in state-designated disadvantaged communities to enter the clean energy workforce in the somewhat near future, but this will require a concerted effort to make individuals aware of clean energy workforce training and job opportunities.

Across all seven sectors included in the Finger Lakes Clean Energy Workforce Assessment, wages were considerably higher than the regional average, at 33% more than the average job. Wages vary significantly, however, by industry and occupation, with the Clean Energy Generation and Distribution sector having significantly higher average industry wages ($126,391) than the regional average ($60,494). The average annual earnings for the various industries included in the Buildings sector are $64,235, just above the regional average. However, the average wages of the various occupations in the Buildings sector is just below the regional average at $58,599. The average wage for occupations in the Clean Energy Generation and Distribution sector is $97,057, much higher than occupational averages in the Transportation and Land Use sector at $47,295, which are below the regional average.

New York State's Climate Action Council convened a Just Transition Working Group to ensure that all New Yorkers can benefit from the transition from fossil fuels to a clean energy economy, including those who have historically worked in fossil-fuel dominated industries. Currently, 8,664 employees in the region are considered "just transition workers." Similar to the findings of the state's Just Transition Working Group, gas stations with convenience stores are the largest industry to be impacted by the transition away from fossil (currently employing 2,695), followed by oil and gas pipeline construction (472) and fuel dealers (374).

Across clean energy sectors in the region, overwhelmingly, employers found it very to somewhat difficult to hire employees, with an increase of those reporting it very difficult to hire clean energy talent rising from 31% in 2019 to 45% in 2022. However, across the region, there were 1,497 more clean energy workers than jobs. Only Monroe and Orleans counties had more clean energy jobs than workers (NYSERDA 2023). As part of the Finger Lakes Clean Energy Assessment, interviews with regional employers, workforce developers, educational entities, and service providers indicate that overall there is a lack of understanding about what constitutes a clean energy job, what skills are needed, and what career pathways exist in the clean energy economy. They also indicated the need to decrease the stigma associated with employment in the trades and careers that do not require a college degree. In addition to these challenges, interviews indicate that transportation barriers, the cost of training, and work supplies also constitute barriers to increasing the diversity and inclusion of the clean energy workforce.

Case Study: Barriers to EmPower+ Project Completion for Small Installers

Since August 2021, 91 installers have completed at least one EmPower+ project. A total of 28,189 EmPower+ projects were completed during that same time frame. One installer, Isaac Heating & Cooling, completed 7,200 installations, accounting for 25.5% of all installations in the region. Smaller installer companies often try out EmPower+ projects and are unable to continue administering them at scale, in large part because of the onerous paperwork burden and frequent program updates and requirement changes. Meanwhile the top 17.5% (16) installers account for about 85% of all regional EmPower+ projects in our region.

While we can speculate, further conversations with installers that only completed one EmPower+ are needed to understand their decision-making processes and the barriers they encountered when participating in the EmPower+ program. Initial interviews with local contractors indicate that completing the necessary paperwork is often a barrier to pursuing these projects. There is also an opportunity to engage with the 30 contractors who completed between 11 and 200 EmPower+ projects to understand what they might need to scale up to help put the region on pace to meet our CLCPA emissions reduction target in the housing sector for the Finger Lakes Region. Finally, this analysis makes it clear that between their enormous capacity for EmPower+ projects and the presence of their I-TECH educational facilities, structural adoption of clean energy technology must include Isaac Heating & Cooling in the conversation intentionally.

Figure 7: Percentage of Contractors by Number of EmPower+ Projects (2021 - 2023)

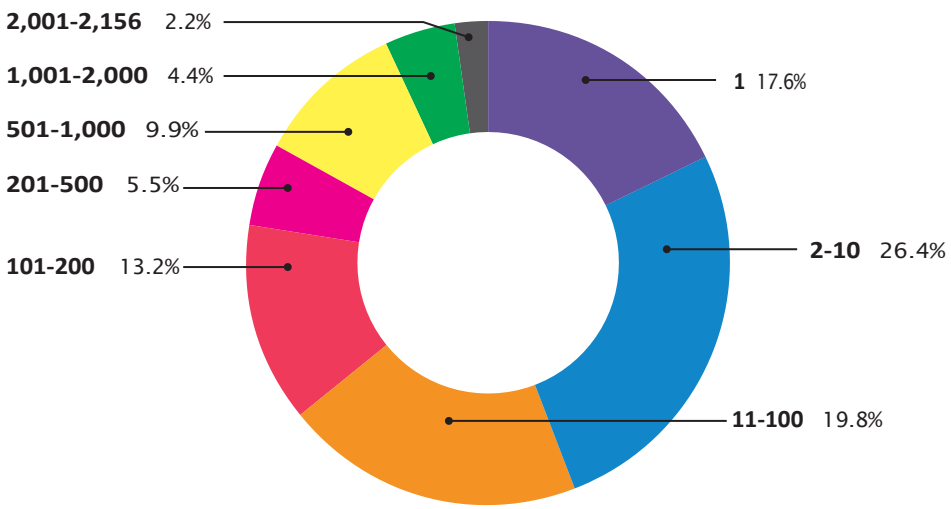


Figure 7 shows the significant drop offs in number of EmPower+ projects completed, with 16 installers completing only one job.

Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)

Data source: NYSERDA

Regional Workforce Development Partners:
One of the Genesee-Finger Lakes' many regional assets is its robust workforce development infrastructure, network of educational institutions, and myriad social service providers that can be leveraged to increase participation in the clean energy economy. To activate the full potential of these assets will require an organization or group of organizations to take a leadership role in coordinating these resources and developing new partnerships. A regional collaboration coordinating efforts across employers, educators and workforce developers could help ensure employers are better able to get the workforce they need. While there are many opportunities and information available, the lack of coordination leads to gaps including disconnects between classroom instruction and what is needed in the field.

Although there are several workforce development organizations that serve the Genesee-Finger Lakes region, the majority of those interviewed for the Finger Lakes Clean Energy Workforce Development Assessment seem out of touch with the demand for workers expressed by employers. Although they understand the need for workers in the trades, they do not seem to see how this is impacting companies in the clean energy sector, and are missing the opportunity to promote work in the trades by promoting a career in clean energy. Both workforce developers and service providers seem to lack an understanding of typical career paths within clean industry occupations and believe all jobs require high levels of education. The Finger Lakes Clean Energy Hub, via collaboration with the Genesee-FLX Climate Collective, has begun outreach and education efforts, particularly amongst workforce developers and K-12 educational institutions to increase awareness about clean energy careers.

Several local institutions already provide training specifically designated as clean energy programs or else provide general training in related trades. For example, Genesee Community College has a two-year solar technician program and is expanding its HVAC program to include clean energy training and topics. Although this program serves as a good resource for those living in Genesee County and nearby communities, at over 30 miles from the City of Rochester, the program is largely out of reach for those without access to a vehicle. Within the City of Rochester, Monroe Community College's (MCC) Finger Lakes Workforce Development Center (FWD Center) provides non-credit bearing training for in-demand industries, largely focused on advanced manufacturing and optics. They also provide an apprenticeship program with training in plumbing, pipefitting, and residential and commercial electrical. MCC's Advanced Manufacturing Center provides training in solar thermal technology, HVAC installation, and automotive repair. Beyond two-year colleges, the Genesee-Finger Lakes region is home to the Rochester Institute of Technology, University of Rochester, Nazareth University, St. John Fisher University, and SUNY Brockport.

There are several non-profit organizations dedicated to providing services to our area's poor and lower income residents as well as working to address racial and social justice concerns. These organizations have strong connections to local communities and serve as a trusted voice amongst community members. Several local employers that we interviewed said that partnering with

these organizations is a key strategy for recruiting a more diverse workforce. The Finger Lakes Clean Energy Hub and the Genesee-FLX Climate Collective have started to build relationships with several of these local organizations to integrate clean energy and climate justice into advancing their own organizational mission. For example, Ibero-American Action League provides advocacy and culturally sensitive programming for the region's Hispanic population to improve the socioeconomic status and well-being of its participants. Ibero is already a Clean Energy Hub subcontractor. Their workforce development programming currently focuses on engaging with a variety of employers, but there is potential that with enough resources, they could be a strong partner in developing the region's clean energy workforce. Similarly, Action for a Better Community (ABC) works to support and develop self-sufficiency among low-income families in Monroe and Ontario counties. They provide direct community services, such as Head Start and economic literacy and workforce development programming. ABC currently serves as the Weatherization Assistance Program (WAP) for the City of Rochester and therefore has experience in the clean energy sector. Interviews suggest that they do not have the capacity at present to keep up with the demand in this program and this could serve as a potential opportunity to expand workforce development programming in the clean energy sector and help meet the organization's own mission.

Table 8 provides an initial inventory of potential multi-disciplinary partners from across the region that could be leveraged to either coordinate programs and resources for residents and communities, connecting residents and small businesses with workforce or business development opportunities, or otherwise grow partnerships necessary to grow participation in the clean energy transition. Many of these potential partners provide training, support services, and employment opportunities to support the transition to a clean energy economy. This inventory is in no way exhaustive and will evolve as connections are developed.

Table 8: Initial Inventory of Potential Multi-Disciplinary Partners from Across the Region

Organization Type	Location	Population Served	Organization Name
Employers | Contractors	Entire Region	General Population	3rd ROC Solar LLC
			ACES
			AES
			ChargePoint, Inc.
			EDF Renewables
			EMCOR Services Betlem
			Geotherm
			GreenSpark Solar
			Halco Energy
			Heritage Wind
			Hughesco of Rochester & Buffalo Energy
			Isaac Heating and Air Conditioning, Inc.
			Li-Cycle Rochester Hub
			Norbut Solar Farms
			Regional Transit Service (RTS)
			Simply Installs Heating & Air Conditioning
			Solar & Wind FX Inc
			True Energy Solutions
			Wise Home Energy, LLC
	Monroe County	General Population	Crossfield Heating & Cooling
			Taylor Heating and Cooling
			VEO Micromobility
	Outside of Monroe County	General Population	Plug Power

Table 8: Initial Inventory of Potential Multi-Disciplinary Partners from Across the Region (cont'd.)

Organization Type	Location	Population Served	Organization Name
Service Provider	Entire Region	BIPOC Community	Ibero American Action League
		Low-income Communities	Catholic Charities
			Goodwill of the Finger Lakes
			St Joseph's Neighborhood Center
		Veterans	Veteran's Outreach Center
	Monroe County	BIPOC Community	Action for a Better Community
		Formerly Incarcerated	RAWNY - Reentry Association of WNY, Inc
		Low-income Communities	TogetherNow
	City of Rochester	BIPOC Community	Urban League
		Youth	Untrapped Ministries
	Outside of Region	BIPOC Community	Native American Community Services
Labor/Union	Entire Region	General Population	IBEW
			Rochester Building Trades Council
			Rochester-Genesee Valley Area Labor Union
			UA Local 13
	City of Rochester	BIPOC Community	Coalition of Black Trade Unionists
Workforce Developer	Entire Region	General Population	Workforce Development Institute
		Low-income Communities	PathStone
		Veterans	Helmets to Hardhats
		Youth	YAMTEP
	Monroe County	General Population	RochesterWorks!
	City of Rochester	General Population	City of Rochester
		Low-income Communities	Green Visions
	Outside of Monroe County	General Population	Finger Lakes Workforce Development Board
			GLOW Workforce Development Board

Table 8: Initial Inventory of Potential Multi-Disciplinary Partners from Across the Region (cont'd.)

Organization Type	Location	Population Served	Organization Name
Technical Training or Community College	Monroe County	General Population	ITEK
			MCC Applied Technology Center
		Youth	Monroe 2 BOCES
	City of Rochester	BIPOC Community	Multi-Craft Apprenticeship Preparation Program (MAPP)
		General Population	Finger Lakes Workforce Development Center (FWD)
	Outside of Monroe County	General Population	Finger Lakes Community College
			Genesee Community College
			Genesee Valley BOCES
	Outside of Region	General Population	Building Performance Institute
Higher Education	Entire Region	General Population	Nazareth University
			Rochester Institute of Technology -RIT-
			St. John Fisher University
			SUNY Brockport
			University of Rochester
K-12 Education	City of Rochester	Youth	Edison Tech

Regional Partners

The Finger Lakes Regional Clean Energy Hub is fortunate to build on the climate movement work of the Climate Solutions Accelerator and our region's Climate Collective partners in forging and maintaining partnerships. Transitioning the Genesee-Finger Lakes region away from fossil fuels swiftly and equitably will require the coordination, commitment, leadership, and investment of a broad range of stakeholders from across the region. The Climate Collective, backboned by Accelerator staff, uses a collective impact approach to advance locally relevant, systems-level climate solutions via a regional climate action strategy. The Clean Energy Hub staff and subcontractors form the Buildings Working Group of the Climate Collective, meeting monthly to collaborate on upcoming engagement projects, develop strategies to meet the goals of the Hub, and give feedback on NYSERDA program design and rollout to ensure an equitable transition to clean energy for our region. Several other working groups exist or are in planning stages to further inform our work, including a Renewable Energy Working Group, our Indigenous Advisory Council, and our Local Pilot Project workforce development landscape analysis that will provide the basis for our future workforce education and advocacy.

Our Hub is fortunate to partner with the Rochester ENergy Efficiency and Weatherization program (RENEW) to help connect us to braided funding opportunities. By braiding resources and working cooperatively, RENEW and their community partners have invested over $11 million into the homes of hundreds of income-qualified homeowners, making them more energy-efficient, healthier, and safer from environmental hazards. Our partners at Ibero-American Action League provide dual-language (English and Spanish) human services and are leaders in supporting our local Latino communities. With their work in housing, workforce development, radio, and refugee resettlement, they bring Hub resources to the frontlines of Rochester and Geneva communities that are vulnerable to the impacts of climate change, such as Hurricane Maria climate migrants from Puerto Rico. Connected Communities serves the EMMA and Beechwood neighborhoods (both designated DACs) to holistically revitalize their communities and break the cycle of poverty by partnering with residents. Their Resident Ambassador program has been a cornerstone of developing and vetting materials to nurture grassroots community leadership to shape and share our work as a Hub. PathStone has helped us bridge the gap between the Weatherization Assistance Program and other local braided funding opportunities and connect with contractors more closely. BluePrint Geneva will be joining us to bring their experience in environmental justice and their strong relationships and reputation in the eastern portion of our region.

Regional Assets

The Finger Lakes Clean Energy Hub sees great potential for mobilizing the region's significant natural and human assets to mitigate climate change and improve the quality of life for local residents. The region boasts a temperate climate with fertile soils, clean air, ample fresh water, and is fairly protected from severe natural disasters, such as wildfires, hurricanes, and sea-level rise. With nearly 6,000 farms, the Genesee-Finger Lakes region is a leader in NY State agriculture. Several counties rank first in sales on various agricultural products, including: milk, cattle, and maple syrup in Wyoming County, vegetables, potatoes, sweet potatoes and melons in Genesee County, grains, oilseeds, dry beans, and dry peas in Livingston County, and fruits, tree nuts, and berries in Wayne County. Five of the state's top ten counties in agricultural sales are in the Genesee-Finger Lakes, and the region is home to 111 wineries, the most of any in New York. These natural assets help buttress the region against climate disruption and position it well to develop a diverse, resilient food and agricultural ecosystem to increase local food security and respond to the threats of climate change.

The area's built infrastructure and human capital can also be leveraged in responding to climate change. The electrical grid is already relatively clean–with just over 50% of electricity generated from non-carbon emitting sources–thereby giving the region a leg up in its efforts to reduce GHG emissions via beneficial electrification. The region has a long history of innovation and entrepreneurship, from the Erie Canal to the imaging, optics, and communication industries of Eastman Kodak, Bausch & Lomb, and Xerox. This history and infrastructure, coupled with the many local institutions working in this space, including Rochester Institute of Technology's Golisano Sustainability Institute and Pollution Prevention Institute, and Venture for ClimateTech, amongst others, enables the region to become a leader in clean energy technology and clean manufacturing as we transition to a clean energy economy.

The Genesee-Finger Lakes region also has a history as the nation's wellspring for racial and social justice movements, serving as the home to famed abolitionist, Frederick Douglass, and suffragette, Susan B. Anthony, who fought vociferously for the dignity, inclusion, and civil rights of African Americans and women. The legacy of these social and racial justice movements persists today and can be seen most recently in the community's response to incidents of racial violence. Furthermore, there is a strong social service and nonprofit sector, particularly in the areas of housing and racial justice. Organizations such as the Urban League of Rochester, Ibero-American Action League, Rochester Refugee Resettlement Services, City Roots Community Land Trust, Connected Communities, S2AY Rural Health Network, Foodlink, Cornell Cooperative Extension Services, and Rural Migrant Ministries, amongst others, work to empower and support the area's most marginalized populations. To ensure that climate justice principles are incorporated into the transition to a clean energy future will require partnerships and coordinated involvement of these varied movements and organizations. Beyond the region's diversity, the area's network of cultural institutions such as Ganondagan, the Wyoming County Arts Council, the

Rochester Latino Theatre Company, the George Eastman Museum, The Avenue Blackbox Theatre, Memorial Art Gallery, The Eastman School of Music, The Little Theatre, the Naples Grape Festival, the Puerto Rican Festival, the Jazz Festival, and Fringe Festival, amongst others, cultivate a sense of community and connection to place through the power of art. The idea that "art moves hearts" is especially important given the pressing need for widespread cultural shifts and new mental models necessary to respond to climate change.

Although the region is struggling to address several overlapping and persistent challenges, such as widespread poverty, structural racism, poor health outcomes, and an aging and deteriorating housing stock, the region's natural and human assets provide major advantages to responding to climate change and their potential should be thoroughly recognized and celebrated.

Baseline Assessment of Clean Energy Program Participation

Baseline of Regional Clean Energy Programs

In service of our region's income-qualifying Disadvantaged Communities (households making less than 60% of the State Median Income (SMI)), this report took a closer look at the relative equity in the distribution of EmPower+ projects since August 2021 by county. First, we took into account how many households in each county are below 60% SMI. The results follow: 8,316 in Genesee County, 7,372 in Livingston County, 101,376 in Monroe County, 13,123 in Ontario County, 6,451 in Orleans County, 5,219 in Seneca County, 12,282 in Wayne County, 5,113 in Wyoming County, and 3,394 in Yates County. The proportion of low-to-moderate income (LMI) households to total households by county ranged from 27.9% in Ontario County to 39.8% in Orleans County. It should be noted that the cost of living across our region varies greatly, so we cannot glean absolute insight into the relative needs of each county's LMI populations by income alone.

We then took a closer look at the distribution of EmPower+ projects per 100 LMI residents in each county. The disparity we saw in uptake was significant. The results follow in order of most to least installs per 100 <60% SMI households.

The success of Wayne and Monroe Counties may be partially explained by the fact that Weatherization Assistance Program providers PathStone Corporation (Monroe County outside of Rochester), and Wayne County Action Program, Inc. (Wayne County) are also EmPower+ contractors. However, Livingston County does not have such a set up and is still doing comparatively well. Livingston County does have a relatively larger percentage of jobs done by Isaac Heating & Cooling than other counties (40.3% of all installations). NeighborWorks Community Partners also serves a significant number of EmPower clients, especially in Livingston, Monroe, and Wayne Counties.

Table 9: EmPower+ Installs per 100 Income-Eligible Households

County	Number of Installations
Wyoming	7
Genesee	8
Yates	9
Orleans	10
Seneca	12
Ontario	17
Livingston	18
Monroe	19
Wayne	20

We've also seen a range of success among municipalities designated as Clean Energy Communities through partnership with the Genesee-Finger Lakes Regional Planning Council (See Figure 8). Notably, Wyoming County has a 100% designation rate amongst its participating communities. While we don't have individual information on Clean Heating & Cooling campaigns, the overall participation rate is almost on par with the state average (59% of municipalities designated in the region vs. 62% statewide). Our Hub aims to supplement the interest among our communities with resources. We instituted a practice to ensure that any Community Campaigns we apply for through the Hub will be complemented by helping target communities submit scoping documents for Clean Heating & Cooling campaigns. This helps us reinforce individual actions with increased infrastructural capacity to pursue beneficial clean energy solutions self-selected by each unique municipality.

Figure 8: Percentage of Participating Communities That Have Achieved Clean Energy Communities Designation

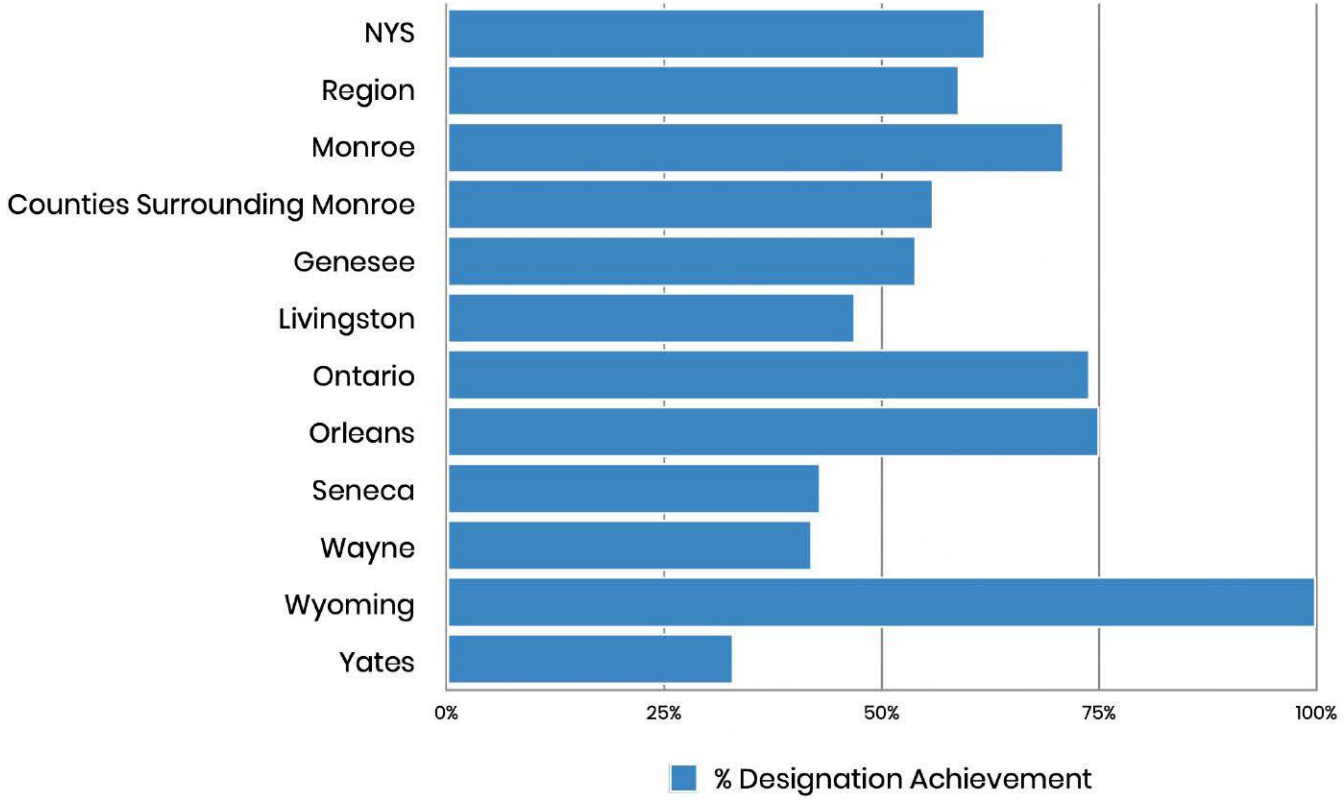


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)

Data source: NYSERDA's Clean Energy Communites Map. Download 202404)

Stakeholder and Community Engagement

Outreach Tools and Methods

To develop this report, the Accelerator and our partners combined surveys, stakeholder engagement sessions, a series of one-on-one Climate Stories interviews, a review of available reporting, use of NYSERDA's Data Visualization Tool, support from Cadmus, and internal data analysis to create data- and people-driven strategies to ensure the long-term success of our region's clean energy efforts. We coupled our research with 90+ engagement events ranging from handing out candy and resources during a Trunk-or-Treat event in the Plymouth-Exchange neighborhood in Southwest Rochester to presenting the EmPower+ program to the Livingston County Office of Temporary and Disability Assistance (OTDA). We engaged over 1,400 residents across all nine counties and provided energy advisement services to 335 residents, nonprofits, and small business owners. We began a Color Your Organization Green year-long course to guide businesses and nonprofits through the process of creating climate action plans that center clean and energy efficient improvements, modeling climate responsibility locally.

From December 2023 to April 2024, Accelerator staff along with our Clean Energy Hub subcontractors (i.e., Ibero-American Action League, Connected Communities, Pathstone, and RENEW) conducted a survey of individuals in our region on residential energy. The survey was distributed at in-person events like meetings, presentations and tabling, and also via electronic means such as email and Slack. The survey could be completed online or on paper, in English or Spanish.

Figure 9: Amount of Mentions by Residents' Top Concerns During Survey

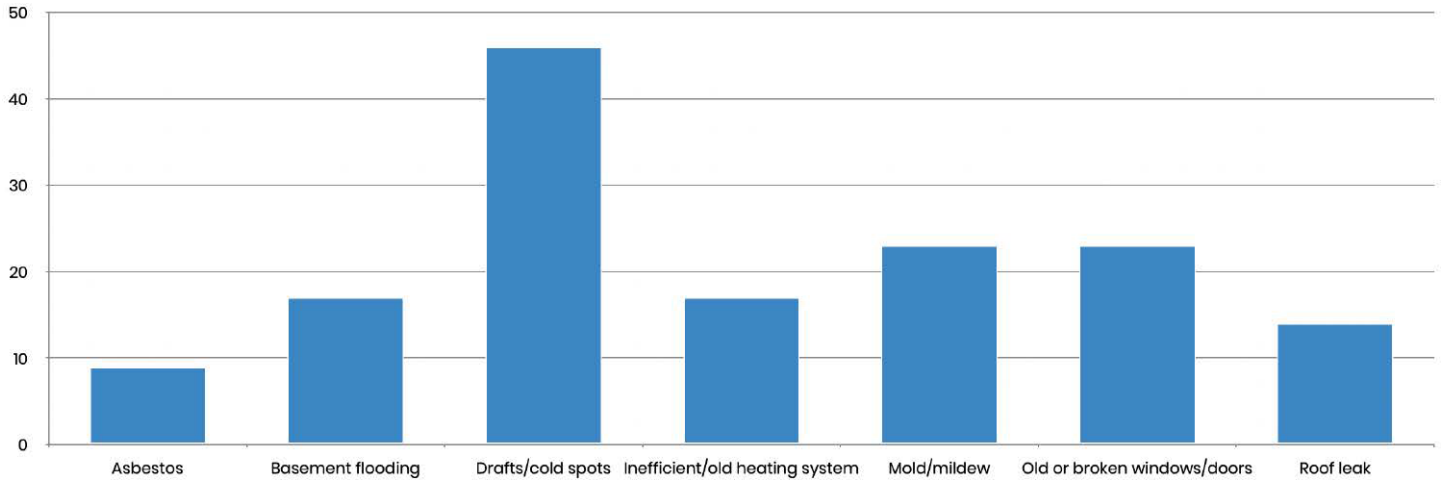


Figure by: NYSERDA's Finger Lakes Regional Clean Energy Hub (ampedproject.org)
Data source: NYSERDA's Finger Lakes Regional Clean Energy Hub Survey 12/2023 - 04/2024

The survey revealed a few major takeaways. Energy bill payment is difficult for most respondents, with only 21% of residents stating that they never had difficulty paying their utility bills in the last 12 months. The chart above indicates that health and safety funding should be considered part of the scope, as many residents had concerns about basement flooding, broken windows/doors, roof leaks, asbestos, or mold. Notably, less than half of respondents indicated that they were willing and comfortable with allowing a contractor into their home. We hope to combat this hesitation by leveraging our relationships with vetted contractors and emphasizing accountability and respect as key tenants of our vetting process.

Stakeholder and Community Engagement Feedback

The number one need that residents accessing Hub services request from us that we cannot always accommodate through current incentives is window replacements. In fact, a quick search through the Hub email found 11 residents asking specifically for help with window replacement, representing about 25% of our total inquiries in the past month. Clients are often keenly aware of what improvements would help them not just reduce their energy burden, but be more comfortable and secure overall in their homes.

The clinical approach to NYSERDA fact sheets and marketing materials has not resonated with our communities overall. Interviews with marketing consultants and community members revealed that part of the reason seems to be that NYSERDA has a hard time articulating its own value proposition. When funding streams are created with such narrow foci for limited and varying timespans, residents are unsure on what is available to whom and for how long. A poignant example is that Hubs have been instructed not to promote the first round of Inflation Reduction Act funding, which many residents ask for by name and want a solid timeline to access. NYSERDA is asking Hub staff to underpromote program offerings due to the limited funding scope, making these lucrative but brief programs no more than a flash in the pan. NYSERDA is uniquely positioned to make the connection between climate action and quality of life exceedingly clear, but as an agency, it often fails to do so.

While we do run into anti-government sentiment and some residents who “don’t take government handouts,” more often than not, the conversation does not end there. The individualized approach that our Energy Advisors take in identifying the highest priorities and needs of clients allows us to move toward addressing energy problems through the lens of health, safety, living with dignity, and benefitting from the programs that they have already paid into. For example, one staff member was approached by a resident who stated “you can take my gas stove over my dead body.” The staff member responded by acknowledging that the resident’s gas stove seemed important to them and steered them toward a conversation about insulation and drafts that became much more productive than an insistence on being right or “winning” the interaction. The human desire to feel heard trumps antagonism more often

than not, making our Energy Advisors' tact and empathy a huge component of our Hub's success.

Many regional stakeholders, our Hub staff included, have noted the lack of accountability and responsibility of the different arms of our work. NYSERDA is broken down from the Hub perspective into a few frontline Program Managers and technical consultants versus a nebulous entity that passes down recommendations that feel distant from the priorities we spend so much time documenting and communicating about. The utility companies that have a huge impact on utility rates our community members pay and the incentives that are available are not governed or beholden to NYSERDA, leaving requests for basic information sharing necessary for processing clients unanswered or declined with no repercussions. We are asking for-profit entities who exist to deliver value to their shareholders to play nice in participating in a plan that would make half of their operations obsolete, and then we are surprised when their partnership is tepid at best and obstructive at worst.

Decisions ranging from requirements to get a Community Campaign approved to deciding which data the Hubs are permitted access to are generated in a far off Microsoft Teams channel or in internal conversations in which Hubs are granted no part. At the same time, all of the feedback sessions and stakeholder outreach that Hubs help conduct are lauded by NYSERDA, the DEC, utility companies, and other state contractors as proof that they are doing the work of implementing equitable practices with little to no proof to stakeholders as to how their input was incorporated or even considered in the process of program and policy design and implementation.

Barriers and Opportunities

Barriers

Barrier	Impact	Opportunity
There is not sufficient funding for nonprofits to implement clean energy upgrades, as they are usually reliant on capital campaigns.	Nonprofits are forced to choose between raising capital funds or financing large amounts to pay for energy upgrades.	If nonprofits had access to smaller scale energy incentives (e.g. heat pump or heat pump water heater incentives) instead of only large scale incentives (geothermal, solar), they would have a less daunting fundraising journey.
Residents living in Indigenous territories are not able to access loans from NYSERDA to finance clean energy upgrades, increasing the funding gap and slowing uptake.	Funding is not going to historically underserved Indigenous households. Clients living in Indigenous territories may be distrustful of Empower+ if they are faced with an unexpected co-pay and unable to qualify for financing.	Allow access to state financing for Indigenous residents if they are already approved for grant funds through EmPower+ or other NYSERDA programs.
Many EmPower+-eligible residents have windows in critical conditions that are not covered by the program. Window repair and replacement are often top health and safety priorities for residents.	Windows are an expensive investment for low-to-moderate income residents, who may not be able to afford the upfront costs and waiting on a tax credit refund.	If windows are in poor condition, they should be eligible for replacement through the EmPower+ program, or moved to a lower package tier in Comfort Homes (instead of the “Best” package).
Contractor partners do not have a central way to communicate with residents needing Language Access services (i.e. non-English speaking, deaf, blind, etc.) in ways that ensure their complete comprehension of the scope of work and cost being proposed as well as their rights as homeowners and tenants.	Hub services and NYSERDA programs have a more difficult time reaching clients who may require Language Access services. Critical projects fall through due to lack of communication.	Hubs should create Language Access Plans in partnership with contractors and local agencies. All members of Hub staff should be trained in how to operate live interpretation services such as LanguageLine.

Installer partners can often have long wait times during the energy audit process in both residential and commercial work. Several installers identified that more funding for administrative work is needed. Initial Hub staff review of the New York Home Energy Portal found that the process for taking a project from energy audit to installation is extremely complicated and time consuming. If a simplified process cannot be established, NYSERDA should honor the work required to submit a satisfactory audit and work scope by providing funding and training resources as a matter of course for participating EmPower+ and Green Jobs Green New York installers.	Clients are less likely to return to programs if they are faced with long wait times and confusion on the first time through. Clients who never receive an audit report often complain to Hub staff about their poor experience. Hub staff have given trainings detailing the expectations of an energy audit (thermal imaging, blower door test), and some residents who have received audits did not see these services (only receiving a "walk-through" audit).	NYSERDA should increase funding amounts for completion of a successful energy audit, to improve contractor turnaround time. NYSERDA should allocate extra funding and training resources for hiring administrative staff. Audit requirements within Green Jobs Green New York should be eliminated for clients seeking financing through the program.NYSERDA should also allocate funding for Hubs to start up independent energy auditing training so they can conduct their own assessments.
Residents who are hesitant to adopt heat pumps are looking for information about the care and maintenance of these systems before they commit. NYSERDA should look to identify the contractors who specialize in heat pump upkeep and develop educational materials on heat pump upkeep.	Customers continue to opt for one to one fossil fuel replacements since they don't understand enough about the benefits of heat pumps. Clients with installed heat pumps may be operating them incorrectly (not leaving them to work at a stable temperature, not getting annual maintenance) and inadvertently impacting their energy costs.	Heat pumps should be offered as an alternative to furnaces whenever possible, and quality assurance checks post-installation should inform residents on proper usage of a heat pump system (if not already covered by the contractor).
NYSERDA does not currently track demographic information about residents who benefit from current clean energy incentive programs.	This makes it impossible for us to ensure that the programs are administered with racial equity and look for pain points and barriers for specific racial and ethnic communities. We can't fix what we don't track.	Track demographic information, including race and ethnicity, as an optional question on NYSERDA program applications. Report out on the relative equity in uptake across different demographics and look for ways to increase participation amongst underrepresented groups by engaging with those communities directly.

The amount of paperwork for NYSERDA programs is a barrier that exacerbates staff shortages for agencies partnered with the Hub.	Many WAP providers don't cross-apply residents to EmPower+ because of perceptions that it will take a long time and put them further behind on their wait lists.	Simplify paperwork for both consumers and contractors for incentive programs. NYSERDA should consider a shortened EmPower+ application for providers that work with HEAP clients.
The presence of hazards (asbestos, mold) can prevent projects from progressing past the audit stage. The only option for remediation funding is usually a lengthy waiting list with a local home improvement organization.	Low income households are forced to pay out of pocket for remediation costs before accessing critical energy efficiency program funding.	Gap funding for asbestos abatement, mold remediation, leaks, roofs, health & safety, etc.

The Finger Lakes Region would need to electrify approximately 16,134 houses per year to meet the 2030 and 2050 targets in the Community Leadership and Climate Protection Act (CLCPA). During 2022 and 2023, just over 9,100 households in the Finger Lakes region benefited from the Empower+ (8,742) and Comfort Homes (408) programs. This represents an average of approximately 4,500 households per year covered, which means a deficit of about 11,600 households per year to meet CLCPA targets. Similarly, the New York State Clean Heat Program 2023 Annual Report shows that the 3 utilities that cover the Finger Lakes Region (National Grid, RG&E, and NYSEG) provided incentives for the installation of approximately 5,800 heat pump systems during 2023, which means a deficit of about 10,334 households per year to meet CLCPA targets. If this trend continues, we will not hit CLCPA targets. The current method of helping clients directly through Energy Advisor consultations and as-needed support cannot scale up to the region's needs. Our Energy Advisors max out at a capacity of helping 650 clients per year. To give each client one-on-one support, we would need to hire 22 more Energy Advisors to join our current team of three. This would cost our Hub an additional $1,913,824 per year in staffing costs alone.

This hypothetical ignores both contractor capacity and commercial, nonprofit, and multi-family properties, but it demonstrates the need to implement responsive website and marketing strategies that lend themselves to self-service for clients who are willing and able to navigate this process. It also assumes every prospective client not only goes through with an installation, but that they are able to completely electrify at once. Infrastructural support becomes equally, if not more important, than one-on-one support for accomplishing the main charge of the Clean Energy Hubs and the CLCPA.

To create a resource of comparable quality to Energy Advisor support that identifies braided funding, the Hub should keep incentive and financing opportunities cataloged accurately and accessibly. An upcoming initiative from our Hub will propose to create this resource, which will be individually tailored to each client using a questionnaire similar to Rewiring America's Inflation Reduction Act tool. We plan to add in all local incentives and aid programs and include detailed explanations regarding application processes. One of our Energy Advisors will maintain the database to ensure that all information provided to clients is as accurate as possible.

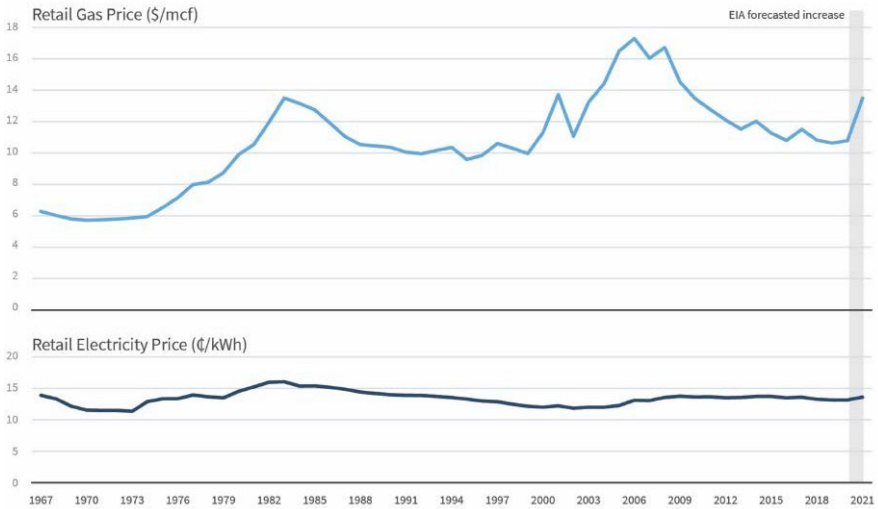
The other stark reality brought to light by the scenario above is that the parameters of funding and financing offered through state, federal, utility, and local programs are insufficient to make this rate of transition feasible, especially in our Disadvantaged Communities with distressed housing. For example, the proposed modifications to EmPower+ and eligibility rules for the incoming Inflation Reduction Act funding have severely limited their ability to serve the largest common denominator of client circumstances. Gas furnaces are currently excluded from the first round of IRA funding going live on May 31st, 2024. This excludes 2/3 of households in the Finger Lakes Region. Its biggest impacts will be felt among urban Disadvantaged Community members.

For many of our clients, EmPower+ has been a lifeline for upgrading or replacing broken and/or inefficient natural gas furnaces. Assuming an optimistic rate of 20 years per heating system, about 27,705 heating systems will need to be replaced in our region every year. That means to meet CLCPA targets, we need to ensure that 58.2% of replacements are all electric. This is not possible by only replacing delivered fuel systems, which would comprise around 9,143 systems per year.

Locking residents into replacing broken heating systems with another gas furnace is not just a detriment to their own health and long-term financial savings opportunities. A 2020 study conducted by members of the Faculty of Engineering and Applied Science at the University of Ontario Institute of Technology and published by Integrated Environmental Assessment and Management found that replacing a typical natural gas furnace with a cascade heat pump in the city of Toronto (about 90 nautical miles north of the Finger Lakes region) reduces the global warming potential by 85.4%. The study also found that the highest CO2e emissions are released during the usage life cycle stage in both heating systems at approximately 19,000 kg of CO2e, and 190 CO2e for the furnace and heat pump, respectively. The results showed that heat pumps release approximately 1% of the carbon emissions released by natural gas furnaces. If we do not seize the opportunity to make heat pumps accessible to low- and moderate-income households this year, the Clean Energy Hub will not have an opportunity to intervene and help electrify those households until their equipment breaks, which could be as far away as 2044.

Figure 10: Gas prices are historically more volatile than electricity prices

Historical Gas and Electricity Retail Residential Prices, Inflation-Adjusted



Source: RMI analysis of EIA retail gas and electricity prices and forecasts and Federal Reserve Economic Data inflation adjustment factors

Another impediment to incentive efficiency is the requirement that improvements must project at least 10% cost savings for the client. In theory, this decision from the Public Service Commission is sound. However, the formula that calculates this cost saving uses an aggregate of the last three years of fuel prices, thus underestimating the true cost projections as fossil fuels continue to rise over the life of, say, an air-source heat pump that will last up to 20 years. Fossil fuel price volatility (See Figure 10) and renewable energy generation being cheaper than fossil fuels for the first time in history means it is almost certainly more cost-efficient for income constrained residents to go electric in

the long run. Once they make the choice on heating system replacement, they are essentially locked into fossil fuels for the life of their equipment.

Similarly, the IRA guidelines that only allow New Yorkers to access appliance rebates for an electric or induction stove if they are replacing a gas stove fails to recognize that electrification is not linear if economic benefits of electrification are not consistent. When appliances break, income-constrained residents replace them using a combination of price consciousness and personal preference. We have heard in both rural and ethnically diverse communities that some view gas stoves and cooking with fire as important to their food preparation preferences. If incentives cannot compete with price and preference, we are facing the potential for thousands of clients to move from electric stoves back to gas. Considering that induction stoves also often require a complete overhaul and replacement of cookware, this exclusion is a barrier that we should not ignore.

Finally, data sharing between the Clean Energy Hubs and NYSERDA must improve. In preparation for this report, this Hub had to submit multiple Freedom of Information Law (FOIL) requests to attempt to get data from the Single Family Residential team. At the submission of this first draft, we are still waiting for data on the number of projects completed by each contractor and the number of EmPower+ and Comfort Home projects by county. This information is critical to understanding the per household equitable uptake of NYSERDA programming and the landscape of workforce development. The first FOIL request gave us only seven months of data. When we asked for at least a year (but preferably three), we were told it overstretched the original request and we would have to start over again. As a NYSERDA contractor, we expected data access and mutual trust in the creation of this document, which is a cornerstone of our overall contract and work. One solution may be for the Hubs to build relationships directly with different departments within NYSERDA to create a better sense of camaraderie and respect for each other's work.

Ultimately, we need to be able to advocate for ourselves directly as Hubs with leadership at NYSERDA. Reinforcing our joint commitment to co-design and continuous improvement should seek to highlight shared values and a spirit of generosity and collaboration between all NYSERDA and Hub staff.

Recommendations and Opportunities

The 2021 New York State Disadvantaged Communities Barriers and Opportunities Report reinforces most of the recommendations presented by the Finger Lakes Hub. However, the report specifies that it identifies the "how to" rather than the "what to do," looking at examples more broadly and not making specific programmatic recommendations. To build on the groundwork of this report, our Hub reviewed some of the example programs touted as being in alignment with program accessibility and equity.

One potential opportunity to realign with the DAC report follows. In the New Efficiency: New York Public Service Commission guidelines, utilities have been instructed to stop expending resources on base level, non-transformational activities like energy efficiency kits with LED light bulbs and weatherizing strips. At the same time, a key deliverable of the Hubs (made unfeasible by delays in issuing and awarding an RFP) is to conduct two energy literacy workshops per county per year and distribute hundreds of energy efficiency kits. Significant Hub and NYSERDA staff time, energy, and money are being put in the execution of this deliverable, diverting the time we can spend on other, more structural methods of increasing access to and uptake of clean energy and energy efficient technologies.

To exemplify the recommendation to "automatically enroll people into programs where possible," the report states, "Energy utilities refer their low-income community members to the NYSERDA [EmPower+] program to receive energy efficiency services. Additionally, OTDA refers HEAP clients to the NYSERDA [EmPower+] program to receive energy efficiency services." The reality of these processes are a little different. For utility referrals, the companies compile the names and addresses of customers with high energy usages or high outstanding balances and send those names to NYSERDA. NYSERDA then mails EmPower+ applications to those residents. Unsurprisingly, this has a fairly poor record of resulting in EmPower+ program uptake. The residents are not usually aware of why they are receiving a paper application and by the Joint Utilities Commission's own assessment, it is not achieving the results they are hoping for to comply with the Public Service Commission. The report recommends that "state and local programs assume the responsibility for coordinating across and within programs, including through information and data sharing." Implementing this recommendation requires more than blind mailing of applications in an increasingly digital world. When the Finger Lakes Hub reached out to create a warm hand off referral with RG&E/NYSEG, the utilities' consumer advocate was enthused at the prospect. However, when she reached out to try to institute this practice, she was told by a NYSERDA Senior Project Manager that "Permission to share Utility referral lists prior to receiving the customer application is not universal nor manageable on a case-by-case basis." The idea to implement a strategy documented three years ago and vetted across state agencies was dead in a single-sentence response.

In the case of OTDA referrals, however, the Finger Lakes Hub found that most HEAP case workers had not heard of EmPower+. In fact, Energy Advisors often have to explain the

HEAP Heating Equipment Repair and Replacement benefit to OTDA workers when requesting clients' HEAP award letters, even though the program is listed on the OTDA website. The path to remedy this disconnect is much easier. Energy Advisors have begun presenting to OTDA frontline workers and leadership across the 9-county region to encourage them to make direct referrals to the Hub online when interfacing with clients suffering from high energy burdens. This type of cross-training among different state departments is crucial. OTDA workers expressed relief at being able to direct their clients to resources that go beyond their programs' scope.

Automatic inclusion of EmPower+ in the scope of Weatherization Assistance Program installations has an opportunity to expand the value of intervention and take preventative measures for income-constrained families who are less likely to have resources available to accommodate emergency replacements. The DAC Report recognizes that "creating long waiting lists for high-demand programs has its own implications." This is exemplified by the Weatherization Assistance Program (WAP). Our nine-county region has seven WAP providers, each with varying wait times, application processes, and staff responsiveness. WAP is a natural point of connection for LMI households, but the wait time of up to three years depending on the provider and severity of need deters many eligible residents from accessing complementary services to NYSERDA's program offerings. To hear it from some of the providers we've connected with, the amount of paperwork is a barrier that exacerbates staff shortages. Many WAP providers don't cross-apply residents to EmPower+ because of perceptions that it will take a long time and put them further behind on their exhausting wait lists. Additionally, WAP is only available once every 15 years except in the case of fire or natural disaster that causes damage to the home. First steps of collaboration are already underway. Homes and Community Renewal and NYSERDA have an opportunity to recognize and reduce the paperwork burden that is preventing a more consistent overlap of their respective programs.

Next Steps

Recommendations

The Finger Lakes Hub has compiled a list (to be combined with the Opportunities listed in the section above) that NYSERDA, our Hub, or a collaboration between the two should undertake in order to more equitably and thoroughly serve our nine-county region and the Disadvantaged Communities within it. Due to the number and complexity of the recommendations, our Hub has chosen to refrain from setting timelines until we have joint buy-in from NYSERDA.

Recommendations for NYSERDA

- Reinstate geo-eligibility as a qualifying criteria for EmPower+ and expand it to cover all DACs
- Before geo-eligibility was discontinued, we and our contractor partners were seeing about 20% of all EmPower+ applications using it, and it only covered parts of Rochester. Usually, the applicants would have also income qualified, but this preserved the relationship and their dignity so they didn't have to give income documentation to a contractor
- Adjust EmPower+ and all programs with a cap to account for inflation. The EmPower program was originally given a $7,000 cap in 2003 when it started and was raised to $10,000 in 2020. In 2023 dollars, that same grant should now be $11,592 based on 2003 amounts or $11,773 based on the 2020 increase. Our Energy Advisors have seen cases deferred by funding gaps of less than $5,000 that could be adequately served by reflecting the increased labor and equipment costs of the last 20 years.
- Allot increased weatherization funding for EmPower+ air-source heat pump projects. Even paired with the federal HEERA rebates, households switching to a heat pump may require further insulation and air sealing for the system to operate correctly.
- Create a best practices guide for leveraging Clean Energy Communities Clean Heating & Cooling Campaigns with Hub Community Campaigns without concerns of double-dipping. Define out how much is allowed per home investment.
- Re-evaluate Green Jobs Green New York model calculations. There have been cases wherein churches were being told the payback period for a heat pump was 500 years. Additionally, remove window glazing as a study recommendation due to its high cost compared to insulation/weatherization.
- Remove the energy study requirement for Green Jobs Green New York financing for nonprofit organizations, or allow energy studies from non-Green Jobs Green New York contractors (to reduce wait time for energy study report).
- Allow vacant structures in DACs to have access to energy efficiency/clean energy tech incentives. The

opportunity to return buildings to productive use in soft markets where poverty is high can be leveraged to ensure the energy investments benefit DACs, reduce blight, and could even serve as an education tool to show nearby residents that this technology exists and is affordable.

- Redo the multi-family incentive for the Inflation Reduction Act to value naturally-occurring affordable housing. This could be based on rent charged, location, etc. But having each individual tenant prove they income qualify will only exclude these large rental properties from investment and further divide rental housing between subsidy and market rate. This is inadvertently concentrating investment in Section 8, LIHTC, and income-based housing which makes the lottery system of being placed there even more fickle and unfair for those on the outside.
- Treat Opportunities as clients and list all incentives in a single file to help us better track the number of clients we have and try to calculate individual installations better.
- Invest in more backbone support for NYSERDA (more Project Managers, staff to process budget amendments, customer support staff to help handle tickets)
- Reduce the amount of feedback and vetting needed to get Local Pilot Projects approved. The burden of proof is too high, forces Hubs to do work on the front end that should be counted as a milestone for free and NYSERDA needs to demonstrate more trust for the Hubs' judgment and let them experiment more freely.
- Create a comprehensive Language Access Plan and leverage it to serve all installers and subcontractors of NYSERDA so that non-English speakers can expect consistent service and accommodations. Work with the Office of Language Access and invite Hubs to work together on a shared service delivery plan for blind, deaf, and non-English speaking clients
- Significantly expand funding for the next four years of the Hub to increase our capacity to serve our entire region. Consider funding the creation of a dedicated Hub office located in a DAC.
- Hold equity-based initiatives like the Energy Equity Collaborative and the Joint Utilities Commission accountable to achieve specific targets.
- Make a penalty for missing NENY targets, help us coordinate enforcement through data sharing, coordinate regulation for the utility with the Department of Public Service. They should have to fully enroll their EAP programs. Coordinate goals of the Hub with what utilities have to do.
- Any policies or programs that seek stakeholder feedback should show where and how that feedback was incorporated.
- Create an energy auditing arm of NYSERDA (similar to Vermont) or provide training tracts for independent energy auditing by Hub staff. This will serve to increase uniformity in the presentation of the audit and ensure scope of work proposals from contractors are grounded in an unbiased evaluation of the home. The latter

method would reduce customer confusion and improve Hub public image.

- Figure out what program offerings are available for residents of Indigenous nations and consult with other state departments to learn about best practices for program rollouts and engagement opportunities that will be seen as relevant and respectful to Indigenous nations.
- Redo solar incentives. People with no tax liability cannot afford them and don't benefit from them. They are becoming a luxury good and not in alignment with an equitable energy future.
- Reinstate or partner with other financial institutions who can provide 0 to very low interest financing.

NYSERDA/Hub Collaboration

- NYSERDA and Hubs need to work together to have a solid and consistent working relationship with WAP providers. This should include clarity on wait times, waiting lists, and open enrollment periods and advocating for the standardization of application processes. We should work together to ask HCR to require regular communication to Hubs as a requirement or at least point of evaluation when renewing WAP contracts.
- Advocate for NYSERDA-certified installers to complete courses on things like implicit bias, language access, and cultural humility as part of the vetting process to improve the interaction between clients and contractors. To increase contractor buy-in, consider increasing contractor incentive amounts for some programs (i.e. heat pump installation) for those who have completed the training.
- Gather and consolidate best practices across current installers, NYSERDA protocols, etc. on the best practices and interventions in adapting clean energy opportunities to mobile housing.
- Cross-post network wide wins and best practices among all Hubs to increase consumer exposure to this work and sustain long term efforts without burnout.
- Overlap between NYSERDA's Clean Energy Communities program and the Department of Environmental Conservation's Climate Smart Communities program are not well understood by many municipalities, particularly those too small to support entire environmental services or similar departments. The Hub would like to develop a guide to what community actions can be considered for one or both programs that can be more easily understood by public officials with limited capacity to explore and invest in these overlapping programs. Recommended that this should be done with help from CEC and CSC coordinators around the state, including GFLRPC.

Hub Recommendations

- Increase public visibility through visual installations and semi-regular service locations to familiarize the community with the concept and services of the Hub.

- Leverage emerging Color Your Community Green teams to create grassroots community educators around clean energy technologies.
- Incentivize education of DAC residents by providing stipends for trainings
- Integrate Hub services into other community resources (i.e. mobile DMV at Ibero, Foodlink's Curbside Market)
- Bridge the gap between installer and Energy Advisor knowledge wherever possible including but not limited to modeling software education, consider building analyst certifications as an option for well-performing advisors, and facilitate as much hands-on experience and observation with vetted contractors as possible to get Advisors comfortable asking questions or pushing back on any quotes or proposals that may not align with the client's highest needs.
- Connect with code enforcement officers and housing court judges to create referral streams for distressed housing (especially rentals).
- Demonstrate common cause with organizations focusing on racial equity, eradicating poverty, housing rights, language access, and other intersectional issues that disproportionately impact DACs to bring more people and resources to the clean energy transition. This should show real solidarity and not be seen as self-serving.
- Create a Language Access Plan, apply to use the Office of General Services' contract for language access.
  - » Create a plain language glossary for technical terms that translators and interpreters won't likely know or have a direct translation for (i.e. heat pumps, refrigerant, geothermal, etc). Provide it in advance to interpreters whenever possible.
  - » Contract a website accessibility consultant to integrate accessibility features into our website (i.e. text narration, multiple common languages and Google translate wherever individual page translation is not feasible, ASL videos, closed captioning, etc).
  - » After initial language access strategies are rolled out, share back with the Office of Language Access to get feedback. Let them know when we see new languages or accessibility needs (i.e. Somali Sign Language).
  - » Share out to other Hubs about the wins and challenges of using these resources and see if we have increased language access clients after implementing our Plan.

Future Research Not Included in This Document

- The Finger Lakes Hub would like to connect with residents of the two Indigenous Nations in our region, Cayuga and Tonawanda. We plan to consult our regional Climate Collective's Indigenous Advisory Council regarding initial steps. We also need to clarify program eligibility with NYSERDA around incentive programs and collaborate with Indigenous Nations and our other Hubs to find the best fit for

- Community Solar: Our region has had several successful community solar projects (and several that received significant pushback by local residents). Apart from these direct subscriptions coordinated by outreach from the community solar installer, there is a lot of confusion about which providers of community solar enrollment are legitimate. Residents will very often get mailers from companies claiming to coordinate enrollment into clean energy. Several of these providers have active lawsuits in which they are being accused of misrepresenting their services or denying residents the discount they should receive in legitimate community solar enrollment projects. The Finger Lakes Hub would like to investigate and vet community solar enrollers as we vet our installer contractors to ensure that we are able to reliably and honestly provide residents with accurate information and referrals.
- This Hub was not able to find the number of Service-Disabled Veteran-Owned Businesses (SDVOBs) or Minority/Women-Owned Business Enterprises (MWBEs) in our research. Further study may be needed to identify how difficult it is for businesses to apply for these certifications.
- Small Businesses and Commercial Spaces: The Hub interacted with over a dozen small businesses in the first year of the Hub, with varied interest on decarbonizing workspaces and storefronts. Further research is needed on the programmatic challenges faced by businesses, but there is opportunity to overlap with nonprofit organizations (due to reliance on utility and the Green Jobs Green New York program).

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REGIONAL ASSESSMENT AND BARRIERS ANALYSIS

LONG ISLAND CLEAN ENERGY HUB

Levittown New York, 1949 *Photo Credit: Levittown Public Library*

LONG ISLAND Clean Energy Hub

NEW YORK STATE | Regional Clean Energy Hub
Partnering Organization

Cornell University Cooperative Extension Nassau County

Long Island Regional Clean Energy Hub Partners

Cornell University Cooperative Extension of Suffolk County

United Way of Long Island

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HOFSTRA UNIVERSITY

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I. Executive Summary

Purpose and Objectives

In developing the Regional Assessment and Barrier Analysis (RABA), including extensive stakeholder surveys, the Long Island Clean Energy Hub (Hub) team has identified serious obstacles and exciting opportunities to expand the benefits of clean energy investments to all our residents. Seizing these opportunities is essential to our environmental and economic future. But overcoming the obstacles means nothing less than confronting historic patterns of segregation and other forms of systemic racism that have divided the region by race, income, and access to resources, and disadvantaged communities (DACs) continue to bear disproportionate burdens in virtually every aspect of life. Any series of strategies that shies away from acknowledging the realities of this history – and attacking them -- will be doomed to fail. We are determined to succeed to the best of our collective experience, expertise, and expertise. Our team hopes this RABA will be a "living," ever-evolving document that learns and teaches as we strive to guide our plans for equitable outreach and engagement across Long Island.

We have found that some of the existing obstacles offer opportunities: The higher unemployment and lower income levels in majority-minority communities should aid in recruitment efforts for clean energy job training programs. The disproportionate prevalence of fuel oil and natural gas in homes and businesses leaves a lot of potential for conversions to cleaner sources.

Another positive outcome of the RABA process itself was the way our partners came together to produce the document. Experts and advocates with different agendas and expertise worked seamlessly to contribute to the specifics and sensibilities, raising our confidence in the ability of the team and region to advance our strategies in the months and years to come.

Even so, realizing our goals will not be easy. Although we are a state leader in clean job creation and other measures, the RABA tells us we have a long way to go before the benefits of the green energy revolution truly can be realized. As illustrative of the difficulties ahead, the rates of transition to clean energy in residential and commercial properties are not on track to comply with the Community Leadership and Climate Protection Act (CLCPA).

That is why, as we encourage residents and businesses to participate in the clean energy transition, the hub will largely focus its efforts on DACs. Thus, the RABA utilized a comprehensive baseline regional characterization, drawing on sociodemographic data, housing and infrastructure assessments, and environmental and health metrics to identify and analyze disparities between DACs and non-DACs in Long Island. Key data sources include U.S. Census data, Hub surveys, outreach events, one-on-one meetings, and regional economic and environmental reports.

Key Findings

- Housing/ Renters and Landlords: The region's housing stock is older and more energy-inefficient, particularly in DACs, where homes are less likely to be single-family detached units and more likely to be renter-occupied. Renters with landlords expressed many clean energy upgrades were beyond their reach without express permission from landlords. Further, many renters in DACs live in unauthorized housing and fear being penalized by their landlords, including eviction, and facing legal concerns for work done without their permission or without official permits
- Data: As the Hub developed the RABA, we have highlighted data that we were unable to find or has yet to be collected. Having quicker access to accurate and up-to-date data will allow us to better hone messaging and targeting of specific groups of people and neighborhoods, as we seek to avoid a "one size fits all" approach that counter-productively marginalizes DACs
- Administrative Burden: Changing incentive program paperwork requirements for contractors creates confusion, frustration and significant delays. Energy efficiency programs administered through PSEG Long Island, for example, require multiple hand-offs from Hub's energy advisors to TRC

making the process lengthier and more complex for Long Islanders. Lastly there is no referral system or "opt-in" mechanism to identify income-eligible customers already receiving other benefits.

- Workforce Development: NYSERDA's 2023 Clean Energy Industry Report credits Nassau-Suffolk for creating more clean energy jobs than any other region in the state, with Suffolk (18,689) first among all counties and Nassau (15,436) third among all counties. Despite this growth, out of the 18,689 green jobs in state-leading Suffolk, only 2,624 went to residents of disadvantaged communities. Nassau's disadvantaged communities have 2,287 of the county's 15,436.
- Education and Combating Misinformation: The Hub's success will hinge on credibly and convincingly informing Long Islanders about energy efficiency programs that can make their homes more comfortable, safe, and affordable. Residents and nonprofits across the island are relatively – but still not adequately -- familiar with longstanding income-eligible programs such as SNAP, HEAP, and WAP, but have little experience in such programs from PSEG Long Island or NYSERDA. The Hub's survey showed that there is work to do in dispelling clean energy myths and building trust around clean energy programs.

Recommendations and Next Steps

The RABA identifies opportunities to overcome barriers some highlights include;

- Housing/Renters and Landlords: Develop targeted outreach materials and communication strategies for critical groups including renters, landlords, retired homeowners, income-eligible benefit recipients, etc. Launch community-based outreach programs with trusted community partners to provide accessible, culturally relevant information on clean energy incentives, in DACs and non-DACs alike.
- Data: Build sharing agreements with nonprofits, LIPA, PSEG Long Island, and NYSERDA to access up-to-date information that will aid in targeting and messaging to help the Hub efficiently reach 92 DACs in the region. Some examples include number of jobs broken down by sector needed to achieve Long Island's CLCPA workforce goals, data on households on delivered fuels, recent heat pump installations by zip, etc.
- Administrative Burden: Clean energy contractors working with incentive programs face high administrative burdens. The Hub aims to support employers and improve communication and transparency between contractors and NYSERDA, possibly to include regional training, detailed public descriptions of eligibility, and provide contractors withs opportunities to meet with NYSERDA staff and build stronger partnerships.
- Workforce Development: The Hub will work tirelessly to close this racial and economic gap by expanding on already existing programs (Power Up Wind, Solar & Renewables program, and the state-of-the-art E3 SmartBuild), and leveraging new programs (the National Offshore Wind Training Center) to ensure inclusion of Long Island's disadvantaged communities.
- Education and Combatting Misinformation: Continue to work with trusted community partners to promote incentives, and partner with local municipalities on community campaigns. Build trust and battle disinformation via newsletters, social media, Spanish language media, and other forms of communication

By focusing on overcoming the obstacles and seizing the opportunities detailed in our exhaustive RABA, by addressing the needs of all residents, the Long Island Clean Energy Hub aims to ensure that the benefits of clean energy are shared – and sustained – in every corner of the region.

II. Baseline Regional Characterization

Baseline Regional Sociodemographic

Overview

Long Island is a complex blend of communities that defy the stubborn stereotype of "wealthy, healthy and white" suburbs. Social and environmental disparities divide Nassau and Suffolk counties. Decades of public and private actions institutionalized systemic racism – starting with "racial covenants" that barred non-whites from the region's earliest suburban developments, including the iconic postwar community of Levittown. Wealthier Long Islanders used restrictive zoning to exclude lower-income residents from their communities, a strategy that compounded the effects of racial discrimination. Political fragmentation both drove and was driven

by segregated patterns of settlement, as incorporation of dozens of villages with zoning powers and separate tax bases allowed the hoarding of resources as well as race and class exclusion. These disparities deprived racial minorities and low-income households from fully sharing in the benefits of the region's economic success and realizing the "suburban dream".

There has been slow movement towards greater integration and equality, pressed forward by social movement activism, evolving attitudes towards segregation, affordable housing programs, and broader demographic and market shifts. But segregation between communities – both by geography and within institutions and networks – persists and shapes the everyday lives of Long Islanders. Many communities of color suffer from poor housing, educational, employment, health, and outcomes, and remain disconnected from a range of opportunities and investments while experiencing heavier risks and burdens.

These disparities are manifest in the region's built and natural environment. Long Island has a rich agricultural and industrial history, but its rapid rate of suburbanization – even as it has slowed in recent years -- has posed serious challenges. Manufacturing runoff, leaky landfills, antiquated septic systems, ubiquitous automobiles and energy inefficient single-family homes add to pollution that has affected neighborhoods across Long Island. But communities of color often have experienced higher levels of environmental harm that endanger their health and devalue their homes -- environmental injustices that are difficult to fight due to their lack of political power.

Thus, it is clear to Long Island's Clean Energy Hub team that our first and overarching focus – in everything from the preparation of this RABA to the execution of its aspirations -- is equity. We are responsible for ensuring a fair and equitable distribution of clean energy investments, and to "do right" by all Long Islanders.

In the following socioeconomic profile, we contextualize the challenges of transitioning to a green energy economy. We provide basic demographic data for the region and distinguish between advantaged and disadvantaged communities (DAC/non-DAC tracts) and between low-moderate income/market rate households (LMI/non-LMI households). Since 11 of the variables below are among the 45 that are used to select DACs, the DAC/non-DAC disparities that we report partly reflect the DAC selection criteria.[1]

Age, Educational Attainment, and Disability

Long Island's residents are older than the state, with a regional median age of 41.8 years, compared to the New York State median of 39.0 years. Notably, however, the median age in disadvantaged communities is lower than the state median (37.3 years). Despite the regions' older age profile overall, the proportion of Long Island's population that has a self-reported disability (9.0%) is lower than that of the state (11.6%), though rates are much higher among the members of LMI households (17.1%).

The region's residents are more highly educated overall than the statewide average – 43% of those 25 years or older hold college degrees while only 32% have a high school education or less. There are considerable differences, however, in the educational profiles of disadvantaged communities /non- disadvantaged communities and LMI/Market Rate households. Half of disadvantaged community residents have a high school education or less, as do 46% of LMI households, regardless of where they live. This educational profile has implications for training programs in emergent green industries.

Table 1: Long Island Educational Profile

	Median Age	High School or Less	Bachelor's degree or more	Disability
NYS	39.0	37.8%	38.1%	11.6%
Nassau County	41.9	30.1%	47.5%	8.5%
Suffolk County	41.7	35.4%	38.3%	9.5%
Long Island	41.8	32.9%	42.7%	9.0%
Long Island DAC	37.3	49.6%	25.6%	9.6%
Long Island Non-DAC	42.3	30.0%	45.6%	8.9%

[1] Our analysis of the region, counties, and their DACs is based on the 2017-2021 American Community Survey. We matched the 83 of the original 85 DAC tracts, based on earlier Census geographies, to 92 post-2020 tract geographies. Analysis of low- and moderate-income households is based on the 2017-2021 American Community Survey Public Use Microdata Survey (PUMS) dataset available at https://www.ipums.org.

Long Island LMI	41.7	48.2%	25.6%	11.9%
Long Island Market Rate	39.9	22.5%	54.1%	5.9%

Race, Ethnicity (Hispanic/Latinx), and Language Spoken

A majority of Long Island's residents (58% in Nassau and 66% in Suffolk) identify as non-Hispanic/Latinx (NH) White, a higher rate than the state as a whole (55%). That proportion has shrunk in the last 20 years as the Hispanic/Latinx, Asian, and multiracial populations have grown. 19% of the region's residents are Hispanic/Latinx, while 9% are NH African American, and 7% NH Asian.

The population of disadvantaged communities is disproportionately non-White, and specifically Hispanic/Latinx (38%) and NH Black and African American (25%) – 65 of 92 disadvantaged communities were majority-minority, compared to 79 of 573 non- disadvantaged communities. The demographic composition of Nassau and Suffolk DACs differ slightly: in Nassau, the DAC population was 39% Hispanic/Latinx, 31% NH Black/African American, 22% NH white, and 5% NH Asian; in Suffolk, they were 37% Hispanic/Latinx, 18% NH Black/African American, 38% NH white, and 3% NH Asian.

Recent immigrants disproportionately settled in disadvantaged communities: while disadvantaged communities' residents only account for 15% of Long Island's population, 30% of immigrants who arrived since 2010 live in these census tracts. Accordingly, linguistic isolation is more common in disadvantaged communities: 20% of residents speak another language at home and report speaking English "less than very well", compared to 7.6% of those living in non- disadvantaged community tracts.

When differentiated through the lens of income rather than geography, the region's LMI households similarly include higher rates of Latinx (27%) and African American residents (11%) than do households in the Market Rate segment (14% Latinx and 8% African American). They were more likely than Market Rate households to have immigrated since 2010 (7% vs. 3%), and more likely to speak English less than very well (12% vs. 5%).

Table 2: Long Island Race, Ethnicity and Immigration Profile

	Race and Ethnicity				**Immigration**	
	Hispanic Latino	**NH White**	**NH Black**	**NH Asian**	**Immigrated 2010 or later**	**Speaks English less than very well**
NYS	19.2%	54.7%	13.9%	8.6%	5.3%	13.1%
Nassau County	17.2%	58.3%	11.0%	10.5%	3.4%	10.7%
Suffolk County	19.9%	66.4%	6.9%	4.0%	3.1%	8.3%
Long Island	18.6%	62.6%	8.9%	7.1%	3.2%	9.4%
Long Island DAC	38.1%	29.1%	24.9%	4.2%	6.4%	19.6%
Long Island Non-DAC	15.1%	68.5%	6.0%	7.6%	2.7%	7.6%
Long Island LMI	26.7%	53.0%	10.6%	6.6%	6.5%	12.4%
Long Island Market Rate	13.5%	69.0%	7.6%	7.2%	2.9%	5.2%

Household Income, Housing Tenure, Number of Units, Age of Housing, Housing Fuel

Long Island's median household income of $118,422 is 58% higher than the state median, and homeownership (82%) is far higher than the state's rate (55%). Long Islanders face high housing costs: 46% of renters and 29% of owners with mortgages pay over 35% of their household income, a greater share than their counterparts elsewhere in the state. Rates in Long Island's DACs are still higher, as 50% of renters and 34% of owners with mortgages pay over 35% of their income for housing.

The region's housing stock is overwhelmingly single-family detached (79%, compared to 42% for the state) and generally follows a gradient from older, denser (often pre-WWII) housing closest to New York City to the newer, post-1970 housing farther east. Some older housing stock is also located in pre-WWII towns and transit

centers along the Long Island Railroad. More than 27% of households in a building with more than two units live in disadvantaged communities (but only 14% of Long Island's households live in DACs).

Pre-1950 housing is slightly more common in disadvantaged communities (26%) than in non- disadvantaged communities (22%). But, given the later population growth in Suffolk, the differences between these groups are smaller than the geographic ones between Nassau (33%) and Suffolk counties (14%), and between Nassau disadvantaged communities (36%) and Suffolk disadvantaged communities (16%). Heating fuel reflects the same pattern of density and infrastructural development: nearly 90% of Long Islanders heat their houses with gas or fuel oil, but the proportions vary greatly between Nassau County (61% gas, 30% fuel oil) and Suffolk Counties (40% gas, 47% fuel oil). These figures suggest great opportunities for energy efficiency and "clean" heating fuel if "old habits" can be broken and incentives to consider new heating hardware can be provided.

Table 3: Household Income, Housing Tenure, Number of Units, Age of Housing, Housing Fuel

	Built before 1950	Renter-occupied housing	Heating			Housing costs >35% HH income	
			Gas	Fuel Oil	Other	MortOwn	Renters
NYS	39.4%	45.6%	59.6%	18.7%	21.7%	25.3%	41.6%
Nassau County	33.0%	18.3%	60.5%	30.4%	9.1%	29.8%	44.6%
Suffolk County	13.7%	18.2%	40.1%	47.1%	12.8%	28.9%	47.3%
Long Island	22.4%	18.2%	49.7%	39.2%	11.1%	29.3%	46.0%
Long Island DAC	26.5%	35.2%	51.8%	33.8%	14.3%	34.1%	50.2%
Long Island Non-DAC	21.8%	15.5%	49.4%	40.1%	10.6%	28.7%	44.4%
Long Island LMI	22.4%	29.8%	48.3%	38.2%	13.5%	76.6%	68.2%
Long Island Market Rate	22.3%	9.6%	51.5%	39.8%	8.7%	12.5%	6.4%

Travel Time to Work, Mode of Transportation, EV Use

Long Island's commuting patterns and modes are largely driven by a combination of factors, including density, regional labor markets, the east-west orientation of the LIRR, and funding and frequency of transit. Median travel times to work are slightly less than the statewide median (29 vs. 30 minutes), and workers from disadvantaged communities have shorter commutes (26 minutes), possibly reflecting more localized employment patterns and industrial density near these neighborhoods.

Given the region's auto-oriented development pattern, it is unsurprising that far more Long Islanders commute by car (78%) than the statewide average (58%). More residents commute by car in Suffolk (84%) than in Nassau (72%). A growing share of Long Island's car commuters drive electric vehicles, and at least at the community level there is near parity between disadvantaged communities and non- disadvantaged communities' tracts; in the average disadvantaged community tract, 4.2% of households own an electric vehicle, compared 4.4% in non- disadvantaged communities. It is unclear, however, whether this near parity indicates that subsidies and incentives have expanded electric vehicle ownership in disadvantaged communities; or whether electric vehicles are only available to the most affluent residents of disadvantaged communities.

Table 4: Travel Time to Work, Mode of Transportation, EV Use

	Median travel time	Means of transportation					
		Car, drove alone	Carpool	Transit	Walked	Cab/Bike/Motor	Home
NYS	29.8	51.3%	6.3%	24.7%	5.8%	2.3%	9.5%
Nassau County	30.5	64.8%	7.3%	14.4%	2.2%	1.3%	10.0%
Suffolk County	25.3	76.7%	7.3%	5.6%	1.3%	1.5%	7.6%

Long Island	29.2	71.1%	7.3%	9.8%	1.7%	1.4%	8.8%
Long Island DAC	26.3	67.4%	11.4%	10.4%	2.9%	2.2%	5.8%
Long Island Non-DAC	29.5	71.7%	6.6%	9.6%	1.5%	1.3%	9.3%
Long Island LMI	24.3	81.9%		7.6%	2.4%	2.0%	6.1%
Long Island Market Rate	30.0	77.0%		10.3%	1.2%	1.3%	10.3%

Buildings and Sector Assessment

Residential Building Typology:

Our residential housing typology presents especially difficult challenges compared to other regions in New York State: Our aging homes (and homeowners) may need more financial and other support, and our jurisdictionally fragmented landscape makes it harder to disseminate information (and combat disinformation). LMI renters lack the influence over their landlords to demand investments in clean energy heating and cooling systems. High housing costs and the cumulative impact of systemic inequality result in few LMI residents owning homes.

Region-wide housing typologies stratify across income levels -- as if living in two different worlds, one more prosperous and whiter, and the other poorer and predominantly of color. 826,930 or 78% of Long Island's of the housing units are single family detached homes, only 63.5% of those in our region's disadvantaged communities fit traditional images of suburban housing. Suffolk's disadvantaged communities have a far higher number of detached units than Nassau, 69.1% to 58.2%, perhaps a reflection on Suffolk's marginally lower housing costs. When it comes to larger apartment buildings of five units or more, disadvantaged communities in Nassau County have more than twice as many as non-disadvantaged communities, partly due to exclusionary zoning in higher-income communities

Table 5: Building Typology by percentage of units for region

	Single-family, detached	**1-4 units, attached**	**5 units or more**	**Mobile home, RV, van, boat**
New York	41.8%	21.9%	34.4%	1.9%
Long Island	78.6%	10.7%	10.0%	0.7%
Nassau County	77.7%	10.2%	11.8%	0.3%
Suffolk County	79.4%	11.1%	8.4%	1.1%
Nassau DAC	58.2%	15.6%	25.9%	0.2%
Suffolk DAC	69.1%	15.3%	11.5%	4.1%
Total DAC	63.5%	15.5%	19.0%	2.1%
Total non-DAC	81.2%	9.9%	8.5%	0.5%

The disparities between disadvantaged communities and non-disadvantaged communities are also seen when looking at homeownership versus rentals. Although over 72 percent of Long Islanders live in single family owner-occupied housing, the rate is only 49 percent in Nassau's disadvantaged communities. In Suffolk County's disadvantaged communities' single-family homeownership is at 58 percent, perhaps another reflection of Suffolk's lower housing costs.

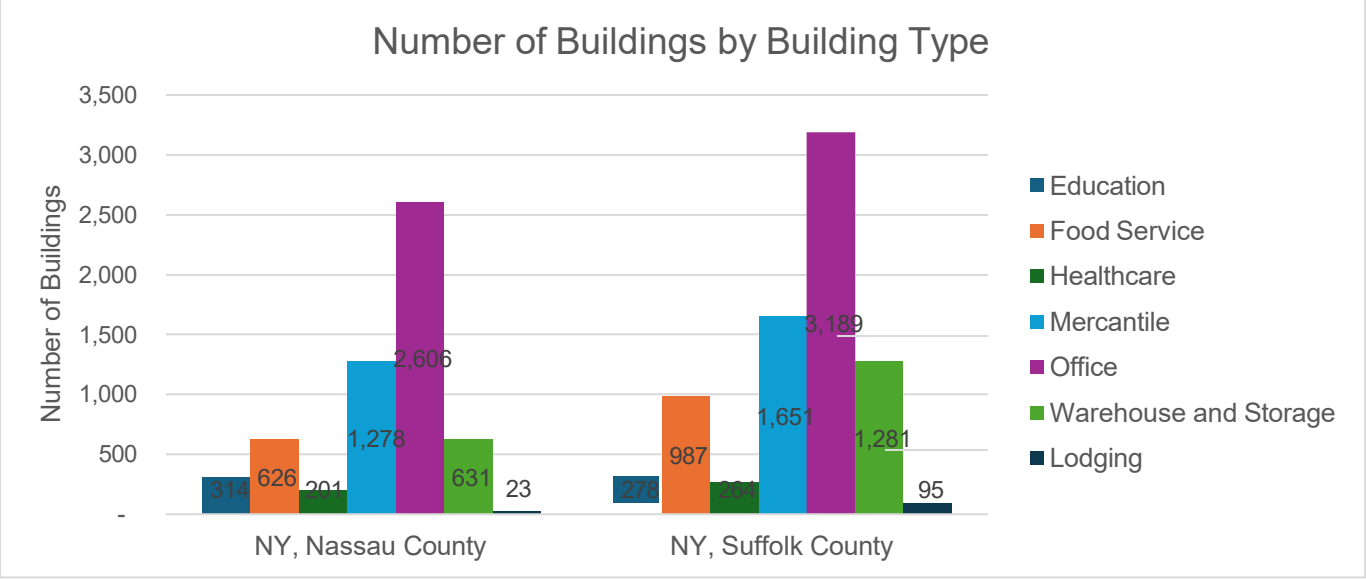
Table 6: Residential Building Percentage Owner and Renter

As percentage of total:	Single-family detached owner-occupied	Single-family detached renter-occupied	1-4 units attached owner-occupied	1-4 units attached renter-occupied	All 1-4 units owner-occupied	All 1-4 units renter-occupied
New York	37.7%	4.1%	9.2%	12.8%	46.8%	16.8%
Long Island	72.5%	6.2%	5.8%	4.9%	78.2%	11.1%
Nassau County	72.4%	5.3%	4.8%	5.4%	77.2%	10.7%
Suffolk County	72.5%	6.9%	6.7%	4.4%	79.2%	11.4%
Nassau DAC	49.1%	9.1%	5.6%	10.0%	54.7%	19.1%
Suffolk DAC	57.6%	11.5%	8.2%	7.1%	65.8%	18.6%
Total DAC	53.2%	10.3%	6.9%	8.6%	60.1%	18.9%
Total non-DAC	75.7%	5.5%	5.6%	4.3%	81.3%	9.7%

Industrial/Commercial Building Typology:[2]

Long Island's industrial and commercial buildings also present unique challenges. In Nassau County more than half of its industrial buildings, 2,948, were built before 1959. Figure 1 shows the different types of buildings across Nassau County. In Suffolk County, 2,905 of its 7,745 industrial buildings were built before 1959. Figure 2 shows the different types of buildings across Suffolk County.

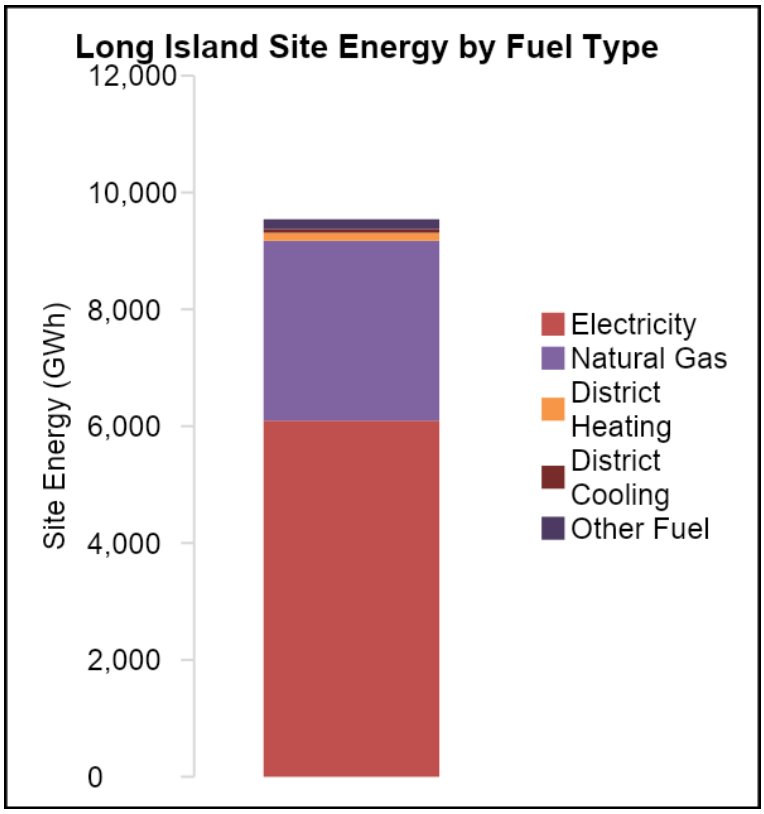
Figure 1: Nassau and Suffolk Count Industrial and Commercial Buildings by Type



[2] NYSERDA provided data: Building Stock Data

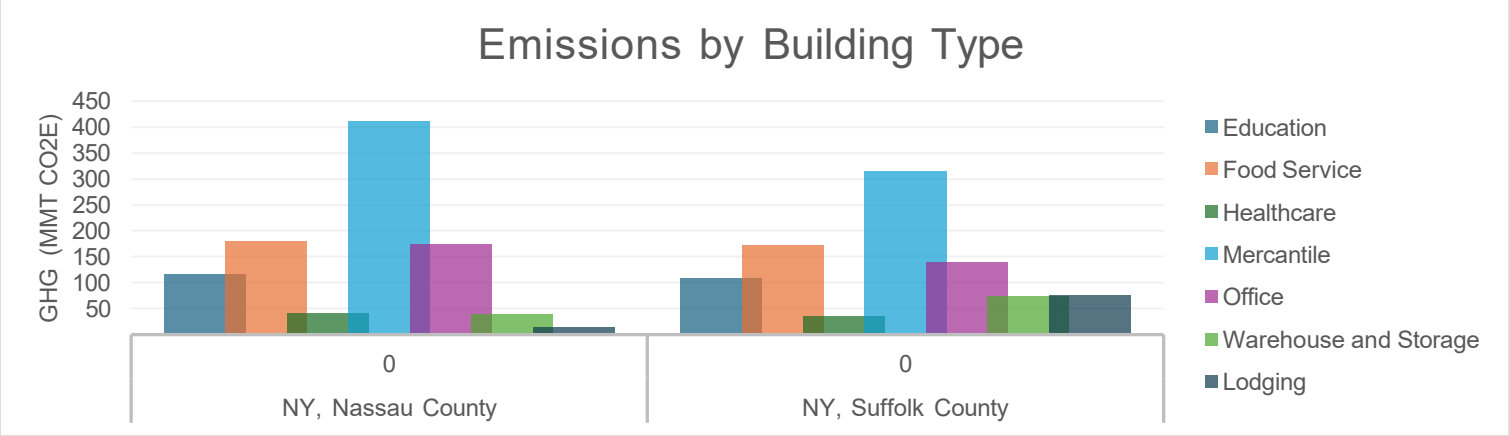
In both Nassau and Suffolk Counties, energy utilization in both the industrial and commercial sectors is primarily electricity and natural gas. Electricity consumption stands at 6,096 GWH and natural gas follows behind at 3,080 GWH, highlighting its lasting role in powering industrial establishments. Figure 2 shows fuel type of Long Island's industrial building.

Figure 2: Long Island Industrial Buildings Fuel Type



Across Long Island, various industries contribute to greenhouse gas emissions (GHG) through their operations. Mercantile enterprises, food service and offices are significant contributors with 726 MMT CO2E, 353 MMT CO2E, and 314 MMT CO2E, respectively as seen in Figure 3. Understanding the emissions from these sectors is crucial for devising effective outreach strategies to promote clean energy initiatives across Long Island.

Figure 3: Emissions by Building Type



Regional Clean Energy Workforce

Long Island is *already* a leader in the clean energy sector, well-positioned to leverage investments in infrastructure, research, and training to remain a job-generating engine of clean energy economic growth. Clean energy opportunities across various industries, from trades like plumbing and carpentry to professional roles such as accountants and computer analysts. These jobs, both blue- and white-collar, offer good pay and have the potential to improve the lives of individuals and communities. The demand for skilled workers in engineering, construction, and other fields will continue to increase as the clean energy sector expands, creating more employment opportunities.

According to NYSERDA's 2023 Clean Energy Industry Report Nassau-Suffolk has created more clean energy jobs than any other region in the state, with Suffolk (18,689) first among all counties and Nassau (15,436) barely edged out by Queens (15,498) for second. These numbers show significant growth over the past decade since the state set ambitious goals for reducing its carbon footprint. A range of data – such as increased electric vehicle registrations, solar installations, and green training programs suggests that Long Island will continue to set the pace in the transition to clean energy.

Although not currently available, the Hub aims to collect data on the number of jobs needed to achieve Long Island's CLCPA workforce goals, broken down by sector, as well as current training capacity to fill the positions.

Just as we found for housing, however, the data pertaining to clean energy data points to stark differences around race and income. For instance, out of the 18,689 green jobs in state-leading Suffolk, only 2,624 went to residents of disadvantaged communities. Nassau's disadvantaged communities have 2,287 of the county's 15,436. Beyond the concerning implications regarding race and income, these figures indicate opportunities for growth in communities across Long Island.

The clean energy workforce on Long Island encompasses a variety of industries and occupations involved in renewable energy, weatherization energy efficiency, and other related fields. Some key sectors and job categories include:

Renewable Energy (RE) Installation: Renewable energy installation is a vibrant and growing subcategory within the regional clean energy workforce This category includes professionals involved in installing and maintaining RE systems such as solar panels, wind turbines, and geothermal. The offshore wind generation sector will create thousands of new training and career development opportunities. The Offshore Wind Training Institute (OWTI) will train 2,500 New York workers[3] beginning this year through 2027 to support both offshore and onshore renewable energy projects. Many CUNY, SUNY, and Suffolk Community College campuses also provide training. In March of 2023, the Suffolk County Legislature authorized the purchase of a $1.46 million state property to build a workforce training facility in Brentwood, one of Long Island's most disadvantaged communities. The site will host the National Offshore Wind Training Center (NOWTC) which will be funded by $10 million from Sunrise Wind (a joint venture of Ørsted A/S and Eversource Energy), in partnership with the Long Island Federation of Labor-AFLCIO, the Nassau and Suffolk Building and Construction Trades Council, Suffolk Community College, the International Brotherhood of Electrical Workers, the Utility Workers Union of America, BlueGreen Alliance and Minority Millennials. The NOWTC is expected to train and certify hundreds, if not thousands, of workers under Global Wind Organization (GWO)[4] training standards for offshore wind. Additionally, NOWTC will offer curriculum and support services for entry into pre-apprenticeship training for the construction and manufacturing sectors and it will work closely with the Brentwood community, particularly those 14 to 24, to create pathways to a broad range of careers.

The United Way of Long Island offers a free training program and certification through their Power Up Wind, Solar & Renewables program, utilizing the state-of-the-art E3 SmartBuild Training Center in Deer Park. The United Way's Workforce Development Training Academy also provides free highly skilled training focused

[3] https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Supply-Chain-Economic-Development/Workforce-Development
[4] https://www.globalwindsafety.org/trainingstandards/browse

on creating a foundation and pathways to secure careers in the renewable energy industry for those unemployed and looking for work, veterans, young adults, and others entering the job market across Long Island.

Opportunities for well-paying jobs abound, even now. New York recently completed the largest offshore wind pipeline in the nation totaling more than 4,300 megawatts and representing nearly 50 percent of the capacity needed to meet New York's nation-leading offshore wind goal of 9,000 megawatts by 2035.[5] In 2022, Long Island saw 8,111 new solar PV installations, a jump of nearly 19% from the 6,825 systems installed the previous year, according to state figures. In all, about 79.3 megawatts of solar were installed across Long Island in 2022, compared with 64 megawatts in 2021.[6] Long Island has a head start in creating the workforce of the future, today and tomorrow.

Energy Efficiency: The energy efficiency sector focuses on reducing energy consumption through various measures such as energy audits and installations of energy efficient systems and requires energy auditors and HVAC and heat pump installers. Long Island has many accredited businesses approved to work on energy efficiency and installation rebates can be accessed through PSEG Long Island and National Grid programming through certified contractors. Long Island energy efficiency, heat pump installers, and home weatherization and HVAC contractors have been enthusiastic utilizers of programs like NYSERDA's On-the-Job Training and Clean Energy Internship programs.

Electric Vehicles: As the adoption of electric vehicles (EVs) increases, so does the need for technicians who can repair and maintain such vehicles and their charging infrastructure. Long Island is at the forefront of EV adoption in the State of New York. As of December 31, 2023, there were 51,332 electric vehicles registered on Long Island, representing 28% of the total 197,358 electric vehicles in New York State, despite Long Island making up only 15% of the state's population. Registered EV vehicles on the road grew 45% from 35,426 at the end 2022 to 51,131 by December 2023.[7] Among all registered electric vehicles, 62% are battery electric vehicles and 38% are plug-in hybrid vehicles. Among all registered electric vehicles, 62% are battery electric vehicles and 38% are plug-in hybrid vehicles.

Training in EV technology, battery systems, and charging infrastructure is becoming increasingly popular, creating jobs for electricians, technicians, and maintenance. Both BOCES and Suffolk Community College campuses on Long Island are incorporating electric and hybrid vehicle technologies into their automotive training programs.[8] NYSERDA Charge Ready and Make Ready has been encouraging the installation of Level 2 and/or DCFC chargers that can earn incentives to offset infrastructure costs associated with preparing a site for an EV charging station. Additionally, the state's Charge Ready NY 2.0 program offers incentives to public, private, and not-for-profit organizations that install Level 2 EV charging stations at workplaces, multi-unit dwellings (MUD's), or public facilities that are owned and operated by municipal or state government entities.

The public-private Drive Electric Long Island coalition, led by the U.S. Green Building Council, hosts workshops and disseminates information about careers in the EV workforce. As more drivers make the switch to EVs, deploying charging infrastructure to match demand is essential. Community institutions, including schools, NYSERDA's electric school bus initiative, hospitals, colleges, and libraries, are well-positioned to install charging stations due to their high traffic and longer parking durations.[9]

Green Building Professionals: Long Island has seen a sharp increase in projects focused on energy-efficient buildings, LEED (Leadership in Energy and Environmental Design) certification, and sustainable materials. In 2022, New York ranked third in the Top 10 States for LEED, marking a remarkable improvement as it didn't make the top 10 in 2021 at all. This trend has resulted in job opportunities for

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[5] https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/NY-Offshore-Wind-Projects

[6] https://www.newsday.com/long-island/long-island-solar-energy-system-installations-2022-pseg-xpa5a8go

[7] https://driveelectriclongisland.org/wp-content/uploads/2024/03/State-of-Electric-Vehicles-on-Long-Island-report-2024.pdf

[8] https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Workforce-Development-and-Training/Energize-Your-Future/Careers-in-Electric-Vehicles-and-Charging/EV-Mechanic

[9] https://www.nyserda.ny.gov/All-Programs/ChargeNY/Charge-Electric/Charging-Station-Programs

architects, engineers, construction workers, and project managers with expertise in green building practices.

In partnership with the New York State Home Builders Association and the Asthma and Allergy Foundation of America, NYSERDA has established the Building Better Homes – Emissions Free and Healthier Communities program. This first-of-its-kind program will partner with home builders and developers to advance carbon-neutral homes and whole neighborhoods across the State.[10]

Long Island is experiencing a rise in green building projects that prioritize sustainable construction materials, energy-efficient designs, and environmentally friendly practices. Buildings like the Jones Beach Energy & Nature Center can serve as a model for sustainable construction and practical training for new construction, showcasing the commitment to building in harmony with nature. Similarly, New York State's first LEED Platinum building, the Advanced Energy Research and Technology Center at Stony Brook University, can be used as a high-quality model for professionals in green building design. Professionals in green building design, including architects, engineers, and contractors, are already in high demand.

Training programs that cover sustainable building practices, such as LEED certification and green materials, are essential. NYSERDA has also prioritized a "net zero" carbon-neutral buildings roadmap. SUNY New Paltz developed a suite of "net zero" carbon trainings for new construction[11] and building retrofit projects based on "Passive House" principles that focus on highly insulated building envelopes, airtight construction, elimination of thermal bridging, and balanced ventilation.

Other Clean Energy Careers: The expansion of the clean energy sector has spurred the need for professionals ~~who~~ can analyze data, optimize clean energy systems, install energy efficient technologies (heat pump, solar, geothermal etc.). Jobs that are in demand include, installation, manufacturing, sales, and distribution[12] all requiring additional training. Several initiatives and organizations in the region are focused on supporting clean energy and electric vehicle industries. Key players include:

● **New York State Energy Research and Development Authority** (NYSERDA): NYSERDA plays a significant role in advancing clean energy initiatives in New York, including electric transportation. They offer various programs and funding opportunities to support workforce training and development in the clean energy sector. These programs include high-efficiency HVAC and water heating, building electrification/heat pump technologies, insulation and air sealing, high-efficiency lighting and controls, building automation and controls, smart grid and energy storage, electric vehicle charging station installation and maintenance, large-scale, land-based renewable energy generation that is actively supported through New York's Clean Energy Standard.[13]

● **Local colleges, universities, and nonprofits**: Institutions such as Stony Brook University, Farmingdale State College, and Suffolk Community College offer programs related to clean energy and electric vehicle technologies. These include;

- Suffolk County Community College Solar Installer Certificate Program, Collegiate Science and Technology Entry Program (CSTEP), United States Department of Energy Office of Science Education Opportunities Community College Institute (CCI), Heating, Ventilation, Air Conditioning and Refrigeration Technology Certificate,
- Farmingdale. PHEV Workshop, Energy Industry Fundamentals, Geothermal Accredited Installer Workshop, Certified Geothermal Inspector, Wind Turbine Technology and Sustainable Energy Certificates, Solar Photovoltaic Systems Workshop, Solar Thermal Workshop, EV Symposium and Ride N' Drive 2023.
- Hofstra University Sustainability Studies program
- Molloy University's Sustainability Institute
- Nassau Community College Certificate in Sustainable Design and Renewable Energy

[10] https://www.nyserda.ny.gov/All-Programs/NY-Sun
[11] https://www.newpaltz.edu/sustainability/view-programs-and-progress/zero-net-carbon-training/
[12] https://www.nyserda.ny.gov/About/Publications/New-York-Clean-Energy-Industry-Report
[13] https://portal.nyserda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt000000MdOBOAA3

- Stony Brook University's Advanced Energy Research and Technology Center (AERTC), Center of Advanced Technology (CAT) in Integrated Electric Energy Systems (CIEES), Center of Excellence in Wireless and Information Technology (CEWIT) and School of Marine and Atmospheric Sciences (SOMAS)
- United Way of Long Island Power Up Wind, Solar & Renewables program, utilizing the state-of-the-art E3 SmartBuild Training Center

A full list of workforce programs can be found in Appendix B

Regional Partners

Long Island has a wealth of organizations, with hundreds embedded in our communities, that would make excellent partners for the LI Clean Energy Hub. The Hub must prevent redundancy, encourage collaboration, consolidate efforts, and build upon existing work. For example, the Nature Conservancy created a Long Island Solar Roadmap in 2020[14], which outlines opportunities and barriers to installing low-impact solar across Long Island. By meeting with their team and learning from their work, we can focus our outreach more effectively. Other opportunities include collaboration with EAC Network and Community Development Long Island (CDLI) both provide Weatherization Referral and Packaging programs (WRAP) to low-income households and United Way's Project Warmth, Long Island's only non-governmental emergency fuel fund, providing one-time grants to oil and utility customers facing heating emergencies. Exploring partnerships with nonprofits to provide clean energy to Long Island's disadvantaged communities will provide critical outreach opportunities for the LI Clean Energy Hub.

The LI Clean Energy Hub has categorized these partners into the following groups:

- Workforce Development
- Health and Human Services
- Academic/Research
- Government
- Utilities
- Business Organizations
- Financial Institutions
- Environmental Organizations
- Community-Based Organizations in DAC
- Contractors

A full list of workforce programs can be found in Appendix C

Regional Assets

The two county Long Island region has several regional assets that can be utilized to grow participation in clean energy programs and utility-scale energy projects. This transformation would impact the economy and quality of life in Nassau and Suffolk by advancing technology, improving the environment, and creating new future-facing businesses and jobs. These assets include local and regional initiatives, as well as existing sites that are candidates for repurposing.

Research and Development Institutions: Long Island is home to several prominent institutions that focus on clean energy technologies. Stony Brook University and Brookhaven National Laboratory are both nationwide leaders in renewable energy research and can contribute to the development and implementation of advanced clean energy projects. To date, this clean energy research has not translated to direct engagement with consumers, but we hope to forge new relationships and synergies through the Hub.

[14] https://solarroadmap.org/

Workforce Training: The United Way of Long Island (UWLI) and NYSERDA have created the E3 SmartBuild Training Center, a home demonstration facility that offers expanded career opportunities to residents and local businesses in the green construction and energy efficiency industry. With this lab, UWLI is developing workers with the skills to build a community that leaves less of an environmental footprint. Training programs offered at the E3 SmartBuild Training Center include weatherization, green building practices, sustainability, certification courses, and other energy-related training. Nassau BOCES has an environmental technician certificate, which it developed with Hofstra's National Center for Suburban Studies, that trains Long Islanders in the cleanup of environmental problems.

Existing Infrastructure: Former industrial sites or brownfields can be transformed into renewable energy generation facilities or used for energy storage projects. These sites have been identified and may present opportunities in disadvantaged communities, although care must be taken to avoid perpetuating environmental injustices in communities that have already faced disproportionate environmental impacts. One example is low-impact solar, which can be installed on already existing parking structures, ground mounted, or installed on rooftops. Table 10 highlights Long Island's low-impact solar potential.

Table 10: Solar Potential; low impact ground, parking, rooftop combined

County/Municipality	Location Megawatts (MW)
Suffolk	County wide 4,575 MW
Nassau	County wide 4,851 MW
Brookhaven	Town wide 3,634 MW
Islip	Town wide 1,957 MW
Hempstead	Town wide 1,769 MW
Oyster Bay	Town wide 1,921 MW
Disadvantaged Communities Examples:	
Shirley	Brookhaven Airport 87 MW
Brentwood	E. of Suffolk Community College 26 MW
Uniondale	Nassau Community College 26 MW
Valley Stream	Green Acres Mall 7 MW

Municipal Participation: Long Island is home to two counties, 13 towns, two cities, and 97 villages. Unlike cities with a centralized government or rural counties that serve as government centers, Long Island's suburbs have highly fragmented government structures which include almost 1,000 different governing structures such as county, town, city, village, school districts, water districts, fire districts, sewer districts, etc. This government fragmentation is a significant barrier to creating equity and perpetuates segregation by race and class. By fragmenting government-zoning authority, municipalities can determine where affordable housing is placed; the Island's fragmented taxing authority allows few communities to reap tax revenues from businesses used by the entire region and hinders regional planning in areas that can affect all Long Island such as transportation and development.[15]

Despite these barriers, municipalities across Long Island participate in NYSERDA's Clean Energy Communities (CEC) program and DEC's Climate Smart Communities (CSC) program:

- CSC certified silver; Suffolk County
- CSC certified bronze; Towns of East Hampton, Babylon, Huntington, Hempstead, North Hempstead, and the City of Long Beach
- 20 other communities are registered with CSC but have not been active[16]
- CEC Advanced v3.0; Suffolk County, Towns of Babylon, East Hampton and Southampton, Village of Sag Harbor
- CEC Designated Status; 26 communities, 6 large and 20 small
- CEC Not Designated; 12 communities[17]

[15] Hartigan, S., powell, john, & Kearney, G. (2002, July). *Racism and the opportunity divide on Long Island*. Institute on Race and Power. Retrieved February 23, 2022, from https://erase.nonprofitsoapbox.com/storage/documents/education/IRPERCENT Full_Report_with_Maps.pdf

[16] https://climatesmart.ny.gov/actions-certification/participating-communities/

[17] https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Communities/Tracking-Progress/CEC-Map

Several municipalities also administer federal ~~CDBG~~ Community Development Block Grants programs focused on home improvements for income-eligible seniors and homeowners with physical challenges. These projects can include weatherization projects, and the Hub will work with local governments to maximize weatherization opportunities. Few municipalities have tackled clean energy without the financial and technical support of the state or federal government. The Town of Hempstead Energy Park includes a "net zero" solar home, wind turbines, and Long Island's first hydrogen fueling station stands apart for its forward thinking. The Town of North Hempstead has multiple sustainability programs including hosting workshops about energy conservation, creating a climate change task force, and integrating climate change into its municipal operations planning.

Focusing on opportunities in already engaged communities will give the Hub a head starts in reaching residents and businesses and contributing to the goals of both the municipality and the Hub. These programs will also allow us to assess and address the needs of municipalities serving disadvantaged communities so that these programs foster inclusivity.

These regional assets, when effectively leveraged, can contribute to the growth of participation in clean energy programs and the successful implementation of advanced clean energy projects on Long Island.

III. Baseline Assessment of Clean Energy Program Participation

Baseline of Regional Clean Energy Programs

Long Island has received strong bipartisan support for clean energy, leading to various federal, state, local, utility, and not-for-profit initiatives aimed at promoting clean energy for the region. Below is a summary of key programs that have promoted clean energy and serve as the foundation for expanding clean energy opportunities for Long Islanders

Federal Initiatives: Federal programs such as the Weatherization Assistance Program (WAP), Home Energy Assistance Program (HEAP), and the Low-Income Home Energy Assistance Program (LIHEAP) provide financial assistance to homeowners in disadvantaged communities for utilities, home weatherization, and reducing health and safety risks. Additionally, the federal government offers various tax credits through the Inflation Reduction Act, supported by the Department of Energy (DOE) and the Internal Revenue Service (IRS), to incentivize homeowners to invest in solar energy, wind energy, energy-efficient appliances, battery storage, Electric Vehicles (EVs), EV charging stations, heat pumps, biomass stoves, insulation, and efficient external doors.

State Programs: Unlike most of the state, Long Island does not have programs funded through the Systems Benefits Charge (SBC) available through NYSERDA. Currently Long Islanders can sign up for Empower+ but the program is unfamiliar with residents, non-profits and social service organizations creating a significant barrier to signing up new customers. The Hub does not have access to Office of Temporary and Disability Assistance (OOTDA) data to identify HEAP and SNAP recipients creating another barrier in our outreach efforts. NYSERDA's Comfort Home program is run by PSEG Long Island. The Hub faces a barrier in accessing data for residents awaiting information about their Comfort Home application. Without the data available to most hubs about application status, missing documents etc., The Hub and its clients faces another layer of administrative burden. The Department of Tax and Finance provides tax credits for electric vehicles, public charging stations, and solar. The Office of Temporary Disability Assistance administers the No Cost Clean and Tune, Heating Equipment Repair and Replacement (HERR), and the federal HEAP. NYSERDA provides financing for residential renewable energy, "smart" energy, and energy efficiency. Incentives are also available for solar energy, air source and ground source heat pumps, heat pump water heaters, and insulation.

Public and Private Regional Programs: PSEG Long Island and National Grid provide multiple rebate programs for Energy Star appliances, electric vehicles, and various heating assistance for income-eligible residents. Suffolk and Nassau counties help residents apply for the federal HEAP and several state programs. The Town of Babylon can provide low-cost financing for home energy efficiency projects. The Towns of East Hampton, Riverhead, Smithtown, and Southold have limited programming for home repairs with different

program eligibility requirements for home energy efficiency improvements. The Towns of North Hempstead and Oyster Bay administer federal CBDG funding for home improvement programs, which can provide funding to income eligible senior citizens for home weatherization projects. Funding is generally limited and subject to availability. The local organization Community Development Long Island (CDLI) administers the Weatherization Assistance Program on behalf of the state, through federal funding, for Nassau and Suffolk County residents.

Non-Profits: Long Island is fortunate to have many nonprofits that assist residents with federal and state programs, particularly for low-income communities. Several large organizations, such as United Way Long Island (UWLI), CDLI, and the Long Island Housing Partnership (LIHP) have their programs providing money and/or low-interest loans to homeowners for repairs, job training, energy efficiency, and emergency heating costs.

A comprehensive list of these programs can be found in Appendix D.

Cost Savings and Emission Reduction Efforts

In 2022, PSEG Long Island released an independently verified evaluation of the utility's 2021 energy efficiency programs. The report evaluates six PSEG Long Island initiatives: Commercial Efficiency Program, Energy Efficient Products, Home Energy Management, Home Comfort, Home Performance, Residential Energy Affordability Partnership

> "In 2021, PSEG Long Island spent $74.96 million implementing the Energy Efficiency and Beneficial Electrification Portfolio. The investment led to 1,094,625 of total MMBtu savings and avoided 1.655 million short tons of CO2 emissions – the equivalent of removing over 321,000 combustion engine cars for a year. PSEG Long Island's efforts led to $209 million in net societal benefits, with a societal benefit cost ratio of 1.71. Overall, the 2021 activities reduced the Long Island's electricity use by 1.56% and peak demand by 0.85%." [18]

Table 11 shows the energy savings realized by the program after independent evaluation (Ex-Post Net Savings) for the six individual programs in MMBtu.[19]

Table 11: Summary of 2021 Energy Program Performance

Sector	Program	Ex-Post Net Savings in MMBtu
Commercial	Commercial Efficiency Program	245,042
Residential	Energy Efficiency Products	339,821
	Home Comfort	95,001
	Residential Energy Affordability Program	3,966
	Home Performance	23,449
	Home Energy Management	106,447
	Subtotal Commercial Portfolio	245,042
	Subtotal Residential Portfolio	568,684
	Total Portfolio	813,726

[18] https://www.lipower.org/wp-content/uploads/2022/08/2021-Annual-Report-Volume-I.pdf pg. 1
[19] https://www.lipower.org/wp-content/uploads/2022/08/2021-Annual-Report-Volume-I.pdf pg. 17-18

Table 12 highlights the benefit/cost ratio for each program utilizing the Societal Cost Test (SCT) as the primary metric. The SCT considers multiple factors such as avoided costs from energy production and carbon impact, and increased electricity use that reduces overall energy consumption (i.e., shift from fossil fuels to electricity) among other measurements to provide a more accurate picture of cost-effectiveness. The report emphasizes that a benefit/cost ratio higher than 1 indicates that the portfolio benefits outweigh the costs. Notably, income-qualified programs are typically not required to be cost-effective, which means cost-ineffectiveness is not unusual in such programs.[20]

Table 12: Societal Cost Test Results for Energy Efficiency and Beneficial Electrification Portfolio

Sector	Program	Net Present Value Benefits ($1,000)	Costs ($1,000)	Benefit Cost Ratio
Commercial	Commercial Efficiency Program	$63,555	$51,983	1.22
Residential	Energy Efficiency Products	$96,878	$28,264	3.43
	Home Comfort	$436,893	$36,893	1.66
	Residential Energy Affordability Program	$1,127	$1,517	0.74
	Home Performance	$7,928	$13,611	0.58
	Home Energy Management	$2,868	$2,691	1.07
Total Residential Portfolio		$145,695	$68,326	2.13
Total Portfolio [*]		**$209,250**	**$122,182**	**1.71**
*Portfolio costs include $1.87M of advertising that was not allocated to individual programs				

Only one of the six programs evaluated, the Residential Affordability Energy Program (REAP), specifically targets low-income communities. To participate in PSEG Long Island's, REAP program, household income must correspond with the U.S. HUD low-income guidelines. The report notes that in April 2019, the income eligibility guidelines changed from 70% to 80% of the area median income, allowing more customers to qualify. This likely accounts for the increase in REAP participants from 2020 to 2021; the REAP program had 1,175 customers in 2020 compared to 1,548 participants in 2021, an increase of 32%. The program improves energy efficiency and helps low-income customers save energy through an energy audit, installation of free energy savings measures, and education on behavior changes that can provide additional energy savings. REAP accounts for only 3,966 MMBtu of net energy savings, or less than 0.7 percent of savings from all listed residential. This suggests expanding the income eligibility will help disadvantaged communities and LMI families financially and increase energy savings.

Table 13 shows Ex-Ante Utility Gross Savings (energy and demand savings recorded by utility, not independently verified) of each component of the REAP program, with lighting replacements accounting for the largest share of savings at 40 percent. This suggests that even relatively minor, inexpensive changes in individual households can have an outsized impact financially and environmentally.

Table 13: Ex-Ante Utility Gross Savings

[20] https://www.lipower.org/wp-content/uploads/2022/08/2021-Annual-Report-Volume-I.pdf pg. 22-23

Program Component	Ex-Ante Utility Gross Savings in MMBtu (%)
REAP Lighting	40.00%
Energy Star Refrigerators	1.40%
Power Strips	17.50%
Aerators	2.20%
Domestic House Water (DHW) Pipe Insulation	1.90%
DHW Temperature Turndown	0.10%
Energy Star Dehumidifier	2.60%
Low Flow Showerhead	7.20%
Room Air Conditioners	2.70%
Thermostatic Valve	2.20%
Room Air Purifier	22.30%
Total	100%

The report notes that over 90 percent of REAP customers receive power strips, nightlights, and lighting that contribute to energy savings, but those numbers drop off sharply when looking at other energy-saving opportunities as seen in Table 14. This data demonstrates the enormous potential to hasten the green energy revolution, if the Hub and other efforts can persuade landlords and home and business owners to make larger, more impactful investments.

Table 14: Percent of REAP Program Participants Receiving each Measure Category

Category	Percent Receiving
Power Strips	96.6%
Night Lights	94.6%
Lighting	91.6%
Room AC	31.1%
Room Air Purifier	19.1%
Energy Star Dehumidifier	13.2%
Energy Star Refrigerators	11.5%
DHW Aerators	11.0%
DHW Low Flow Showerhead	8.2%
DHW Thermostatic Shower Valve	8.0%
DHW Pipe Insulation	5.3%
DHW Temperature Turndown	3.0%

Existing NYSERDA Community Campaigns

With few NYSERDA programs available on Long Island, it will be critical for the Hub to form close working relationships with important regional entities such as LIPA, PSEG Long Island, National Grid, and the New York State Department of Public Service (DPS). These entities can provide in-depth information on initiatives and data around clean energy. DPS is charged with tracking the CLCPA requirement that at

least 35 percent (with a goal of 40 percent) of the benefits of clean energy investments are directed to disadvantaged communities. It is essential for the Hub to monitor this data to realize these ambitious goals.

EmPower+
NYSERDA's Empower+ program focuses on low- and moderate-income households to save energy and make energy improvements in their homes. Table 15 shows income levels requirements by county for both the low income and moderate-income incentives.

Table 15: Income Levels for EmPower+ on Long Island

	EmPower+ Low Income Incentive[21]	EmPower+ Moderate Income Incentive[22]	Median Income
For a household of 4 in the county of Suffolk:	Household income is $70,056 or less.	Household Income is greater than $70,056 but less than $102,000	Suffolk: $122,498
For a household of 4 in the county of Nassau:	Household income is $70,056 or less.	Household Income is greater than $70,056, but less than $102,000	Nassau: $137,709

Long Island Green Homes: Concluding in 2022, The Long Island Green Homes Consortium (the "Consortium") was a regional marketing and outreach program that promoted energy efficiency retrofits of existing homes on Long Island. The Consortium partners included the Sustainability Institute at Molloy, reLI, CDLI, UWLI, and the towns of East Hampton, Huntington, North Hempstead, Smithtown, and Southampton.

Residents across Long Island received information about the program through multiple channels, including regular town communications; print ads; telephone; email; social media campaigns featuring homeowners who have utilized the program; and online outreach including the program website, Google ads, etc. Strategies to increase conversion rates from audits to energy retrofits included providing a non-profit third party to review audit reports for the homeowner and provide quality control over vendor/customer relations.

Between 2017 and 2022, 3,851 leads were generated, and 2,395 were referred to contractors. However, in 2020, PSEG Long Island changed its intake process and no longer tracked leads generated by the Consortium. Based on rates of conversion from leads to audits and projects, it was estimated that approximately 1,245 audits, and between 498 and 670 home energy upgrade projects resulted from the program. Additionally, approximately 274 home upgrades resulted from audits but were completed outside of the program. Thus, the more audits, the more progress toward clean energy investments and their financial and environmental returns.

IV. Stakeholder and Community Engagement

Outreach Tools and Methods

Long Island Clean Energy Hub is dedicated to distributing clean energy benefits to all communities across Nassau and Suffolk counties, but experience tells us that the focus must be on disadvantaged communities. We know that without targeted outreach disadvantaged communities will suffer the same deprivations of economic and social benefits that we have seen again and again due to Long Island's history of segregation and other manifestations of racism. To address this, we will conduct thorough outreach, including a carefully designed survey, focus groups, individual interviews, open houses/meetings, and collaboration with regional partners and trusted community members in disadvantaged communities across Long Island.

The Hub deployed a survey to learn more about barriers facing disadvantaged communities on Long Island. The survey was available online and on paper, and available in both English and Spanish from February 22 through April 16th, 2024. After the data was reviewed, 361 valid responses (screened for bots/multiple responses) were analyzed by the National Center for Suburban Studies at Hofstra University

[21] https://www.nyserda.ny.gov/All-Programs/EmPower-New-York-Program/Eligibility-Guidelines
[22] https://www.census.gov/quickfacts/fact/table/suffolkcountynewyork,nassaucountynewyork/LND110210

(Survey data weighted by age, income, race/ethnicity, sex, and tenure, using the SPSS raking tool and data from the 2017-2021 ACS.). Survey respondent's racial breakdown was 6.1% API, 15.0% NH Black, 15.2% Hispanic, 56.8% NH White, 5.8% more than one race. The National Center for Suburban Studies used raking with Census-based race, age, sex, income, and tenure variables to generate individual-level weights.

To maximize participation and response rates in our survey, the hub has created positions called community navigators, also known as community ambassadors. These individuals serve as a two-way communication channel, conveying the benefits of the program to the community while also providing feedback to Hub leadership about local activities, opportunities for communication and neighborhood events.

At the United Way, success stories from community ambassadors highlight the impact of grassroots advocacy and community-driven initiatives, bolstering the program's credibility. At Hofstra, community navigators have facilitated connections between diverse business owners and Ascend Long Island, a partnership between JP Morgan Chase and the university, which focuses on training businesses and providing access to capital for business and job growth across Long Island. The Hub intends to utilize these successful relationships to train members of specific communities, enabling them to become trusted messengers in the clean energy sector.

Marketing:
Similar to Hofstra, UWLI actively establishes partnerships with various nonprofit organizations to disseminate comprehensive information about our programs through printed materials, social media, educational programs, and other resources. This collaborative effort not only extends the reach of initiatives but also creates a network of support within targeted communities.

Recognizing the importance of cultural relevance, the Hub will actively incorporate elements of local culture, language and community into its outreach materials and events. This creates a more personal connection with the community but also enhances the relatability of our programs. Success stories in this regard underscore the positive impact of culturally sensitive engagement, demonstrating the program's resonance within diverse communities.

The Hub's survey asked the importance of several statements on a scale (not important, slightly important, moderately important, very important) to develop messaging for future campaigns. "I want to save money on my energy bills," and "I want to make my home healthier and safer" received the highest percentage of "very important" amongst all respondents. Table 16 highlight the opportunity to craft messaging for specific communities with different messaging resonating among different cross sections of respondents.

Table 16: Survey responses to messaging

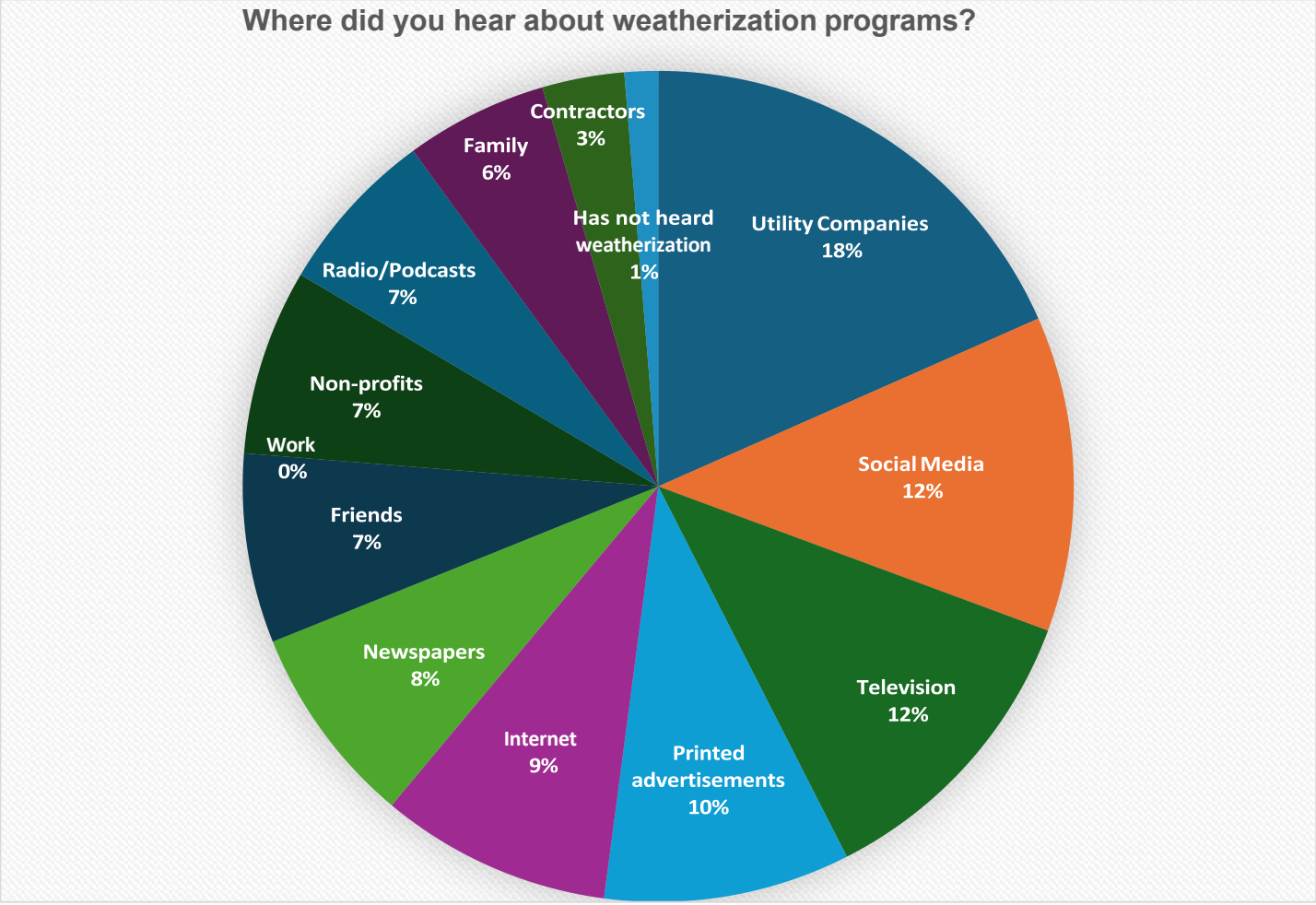
Rated "Very Important'"

	All	Racial Minority	White, income less than $100,000		Racial minority, income less than $100,000	Own	Rent
I want to make my home more comfortable	46.7%	57.6%	46.3%		67.8%	43.8%	58.7%
I want to make my home healthier and safer	57.8%	71.2%	48.8%		72.4%	56.4%	63.5%
I want to save money on my energy bills	58.1%	63.1%	48.8%		65.2%	57.6%	60.0%

I want to help the environment	55.1%	51.9%	56.1%		48.8%	56.3%	49.2%
I want to improve my home value	51.1%	54.5%	35.0%		56.6%	52.7%	43.3%

The Hub's survey asked respondents, "Where did you hear about weatherization programs?" The results in Table 17 highlight the creativity the Hub will need to reach residents and the challenges facing the Hub with "Has not heard of audits and weatherization" as the second largest response.

Table 17: How respondents learn about clean energy



The Hub hopes to review marketing data from programs like the Long Island Green Homes Consortium LIPA, PSEG Long Island, and National Grid to inform our marketing strategy. A review of best practices and program successes to maximize our outreach efforts while also reviewing the barriers to avoid repeating the same mistakes. The Hub hopes to utilize other opportunities including the annual Long Island Green Guide, published by reLI, to promote the Hub.

Working with Municipalities:
The Hub's partners have deep relationships with government entities and will leverage these relationships to advance the Hubs goals and expand our relationships in disadvantaged communities and information is effectively conveyed, resonating with the unique demographics of the communities. reLI has worked with the Town of East Hampton to establish the Energize East Hampton Initiative to conduct outreach and education

programs and provide a one-stop website for town residents and businesses to find all available information on energy efficiency and renewable energy programs in one place, providing another opportunity to expand the Hub's reach.

In collaboration with Molloy University's Sustainability Institute, reLI has participated in and contributed to the Clean Energy Leadership Task Force (CELTF), a quarterly gathering of the island's municipal leaders and staff. Many of these municipalities have joined NYSERDA's Clean Energy Communities initiative, and/or the NYS DEC's Climate Smart Communities program. The Hub hopes to establish similar initiatives including a portal to facilitate, broaden, and simplify public participation in the clean energy transition, expanding or revising the CELTF to include more officials from disadvantaged communities and other municipalities with significant LMI populations.

Clean Energy Outreach Tools and Methods

Replicating the successes of UWLI, the hub will create tailored Community Workshops. These workshops[23] address specific energy-related concerns, illustrating how the Hub's programs can directly impact and improve the lives of community members. Success stories from these workshops showcase the program's effectiveness by highlighting the tangible benefits experienced by individuals and families.

The Hub will also replicate UWLI's Interactive Online Sessions to leverage webinars and online sessions to engage with a wider audience. These sessions are interactive, allowing community members to ask questions and provide feedback in real time. The first clean energy workforce training program, conducted in Spanish, Power Up![24] was concluded this spring.

For around ten years, reLI has organized free annual Solar Tours of existing installations for those interested in solar electric arrays for their homes or businesses. The tours attracted up to 3000 visitors, and the local media has extensively covered the event. Many of the solar home tour sites have also showcased home energy efficiency upgrades and related technologies. These open houses have been highly effective as they facilitated direct peer-to-peer exchanges between solar homeowners and interested neighbors, complemented by factsheets and the presence of energy efficiency and solar professionals on-site. This model of a peer-to-peer outreach event could be adapted in various forms and settings, such as open houses demonstrating a home energy audit, application of weatherization measures, or showcasing homes with heat pumps and other building electrification features.

Stakeholder and Community Engagement Feedback

Affordability, Safety, and Comfort: When asked, "Which of the following best describes how often it was a challenge for you to pay your energy bills in the last 12 months" (not challenging, rarely challenging, sometimes challenging, often challenging, always challenging), households with incomes with less than $100,000 unsurprisingly had a higher percentage of often or always challenging (28.7%) compared with households making over $100,000 (7.7%). When race is considered, the data becomes more complex; respondents that self-described as a racial minority and an income over $100,000 found energy bills often or always challenging to pay at a rate of 17.6%, more than triple the rate of white respondents at the same income level as seen in Table 18.

Table 18: How challenging is it to pay electric bills?

Which of the following best describes how often it was a challenge for you to pay your energy bills in the last 12 months	
	Often or always challenging
White, income less than $100,000	28.9%
Racial minority, income less than $100,000	29.0%

[23] https://www.unitedwayli.org/POWERUP%21

[24] https://www.litimes.org/2024/02/27/pronto-united-way-graduates-spanish-speakers-in-power-up/

White, income $100,000 or more	4.8%
Racial minority, income $100,000 or more	17.6%

The Hub deployed several questions to determine respondents' priorities around safety and comfort in their home. When asked “which of the following problems keeps your home from being comfortable?”, too cold/drafty was the top problem for respondents across race, income and homeownership. Being overheated in the cold represented the second largest problem for respondents, perhaps indicating the importance of the Hub to focus on heating systems in messaging. Table 19 shows a detailed look at barriers to home comfort.

Table 19: Barriers to home comfort

Which of the following problems keeps your home from being comfortable?

	All	White	Racial Minority	White, Income less than $100,000	Racial Minority, Income less than $100,000	White, Income more than $100,000	Racial Minority, Income more than $100,000	Own	Rent
Too cold/drafty	42.3%	38.8%	47.3%	42.2%	47.4%	37.9%	48.1%	41.7%	44.8%
Overheated in cold	22.4%	19.6%	26.5%	33.3%	25.3%	16.0%	28.8%	20.3%	31.8%
Too hot in hot weather	12.2%	14.0%	9.6%	17.4%	5.3%	13.0%	17.3%	11.2%	16.7%
Dampness/ mold	12.0%	10.3%	14.3%	15.6%	11.6%	8.9%	19.2%	10.2%	19.4%
Basement flooding	11.9%	7.0%	19.2%	6.7%	24.2%	6.5%	11.5%	11.2%	13.6%
Leaks through roof, ceiling, windows	5.6%	3.7%	8.2%	6.5%	12.8%	3.0%	0.0%	3.7%	13.4%

Among almost every group, reducing utility bills was top priority for our respondents. The Hub noted that reducing drafts remains a priority for respondents. Further, the Hub found it noteworthy to mention that despite several recent instances of flash flooding across Long Island, basement repair/flooding remained a low priority. Table 20 shows a detailed look at respondents' comfort and safety preferences.

Table 20: Home comfort and safety needs

What do you need to make your home more comfortable, safe, and affordable? (Check all that apply)

	All	White	Racial Minority	White, Income less than $100,000	Racial Minority, Income less than $100,000	White, Income more than $100,000	Racial Minority, Income more than $100,000	Own	Rent
Reduce utility bill	40.2%	38.1%	43.2%	40.0%	38.9%	37.9%	51.9%	41.4%	34.8%
Reduce drafts	38.7%	43.9%	30.8%	37.8%	34.7%	45.6%	25.0%	42.2%	22.7%
Repair/replace heating systems	24.5%	22.4%	27.4%	34.8%	25.3%	19.5%	31.4%	23.5%	28.8%

Repair/replace old/broken windows	23.6%	25.2%	21.2%	17.6%	21.7%	21.6%	10.5%	24.4%	19.7%
Repair/replace cooling systems	20.2%	15.4%	27.2%	26.7%	29.8%	12.4%	21.2%	18.6%	27.3%
Repair/replace roof	14.1%	10.7%	19.2%	21.7%	18.9%	7.7%	19.2%	13.9%	13.6%
Repair basement flooding	7.0%	8.4%	4.8%	6.5%	5.3%	8.9%	3.8%	6.5%	9.1%

Priorities and Barriers: The Hub identified several household improvements/upgrades and asked respondents, "which of the following home improvements are high, low, or not a priority?" Heating systems receive the highest priority among all respondents, however when the data is looked through the lens of race, some clear distinctions emerge. As noted in prior sections, racial minorities, often regardless of income, have highly prioritized many household upgrades compared to white respondents. Renters, when asked "which of the following home improvements are high, low, or not a priority?," each home improvement category was at a higher rate of priority compared to homeowners, as show in Table 21.

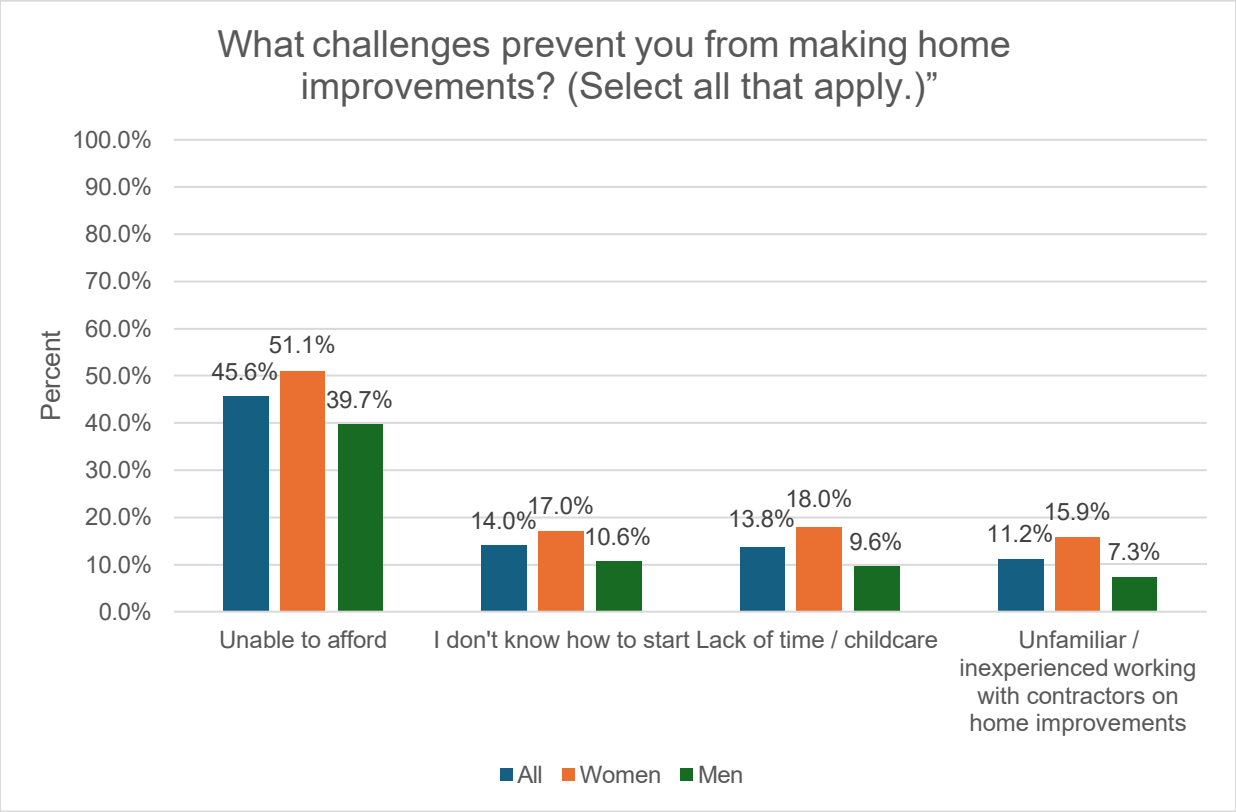
Table 21: Priority home improvements

Which of the following home improvements are high, low, or not a priority?							
High Priority							
	All	White	Racial Minority	White, Income less than $100,000	Racial Minority, Income less than $100,000	Own	Rent
Heating Systems	23.8%	16.2%	35.5%	22.7%	45.3%	22.0%	32.3%
Cooling System	21.6%	14.6%	31.6%	20.5%	40.2%	18.8%	34.4%
Electrical Upgrades	21.4%	16.7%	28.3%	27.9%	31.0%	20.5%	25.4%
Plumbing	21.4%	10.7%	37.2%	25.6%	38.8%	19.7%	28.6%
Kitchen and Bath Reno	22.5%	17.4%	29.9%	20.5%	29.4%	22.1%	25.0%
Roof	22.2%	17.7%	28.9%	25.0%	34.5%	20.8%	28.3%
Windows and doors	29.5%	22.9%	39.4%	32.6%	42.4%	26.9%	40.3%
Aesthetic Improvement	21.3%	14.7%	31.1%	14.0%	32.1%	20.1%	26.7%
Basement	14.6%	23.2%	33.8%	14.0%	19.5%	13.0%	21.7%
Accessibility	10.0%	7.6%	14.2%	19.5%	20.3%	8.3%	16.7%
Other structural	14.7%	9.6%	22.1%	16.7%	28.6%	13.1%	22.0%

When asked “what challenges prevent you from making home improvements? (Select all that apply.)” lack of/poor internet access, and hearing, vision and/or other disabilities were not a significant barrier to most respondents.

The Hub also asked a question about language being a barrier, but the results were incomplete, and we will continue to explore this as a potential barrier moving forward. This question was the first to see a significant difference between self-identified genders. Table 22 highlights that women feel there are higher barriers for home improvements across several categories.

Table 22: Barriers to home improvements- gender



Respondents identifying as a racial minority listed significantly more barriers than their white counterparts. Only 3.3% of white responders saw “as a renter this is not under my control,” as a barrier compared to 19% of racial minorities. Table 23 calls attention to these differences.

Table 23: Challenges to making home improvements

What challenges prevent you from making home improvements? (Select all that apply.)”

	All	White	Racial Minority	White, Income less than $100,000	Racial Minority, Income less than $100,000	White, Income more than $100,000	Racial Minority, Income more than $100,000
Unable to afford	45.6%	43.5%	47.9%	58.7%	52.6%	39.6%	39.2%
Uncomfortable letting people into my home	8.7%	5.1%	13.7%	8.9%	12.8%	4.1%	15.4%
Lack of time / childcare	13.8%	12.1%	16.4%	23.9%	13.8%	8.9%	21.2%

Unfamiliar / inexperienced working with contractors on home improvements	11.2%	8.4%	16.4%	17.4%	12.8%	6.5%	23.1%

Working with Contractors: More than half of our respondents (50.6%) said they "would allow a contractor into their home for an energy audit." When respondents were asked the reasons for not allowing a contractor in their home, "trust and safety" along with "benefits are unclear" high amongst barriers. Based on experience with LI Green Homes Consortium, the Hub had hypothesized that legal concerns such as work done without permits, illegal apartments and/or open permits and home conditions, e.g., not wanting to allow contractors into messy/dirty spaces would be among the largest concerns for respondents. But when respondents were asked the reasons for not allowing a contractor in their home, "trust and safety" along with "benefits are unclear" rank high amongst barriers. The Hub will likely revisit this question when we are able to collect data on referrals to contractors.

Table 24: Barriers to working with contractors

	All	**Household income less than $100,000**	**Household income more than $100,000**	**White**	**Racial Minority**	**Female**	**Male**
Trust / safety	65.0%	33.3%	35.5%	41.3%	19.0%	29.6%	41.5%
Home condition	12.0%	5.1%	14.2%	11.5%	12.2%	3.8%	22.7%
Legal concerns	3.8%	5.1%	3.7%	3.8%	4.9%	2.5%	6.1%
Benefits unclear	40.9%	23.1%	47.7%	47.1%	24.4%	43.8%	36.9%

Trust:
Respondents were asked three questions to measure their trust in energy efficiency programs. Asked on a scale (strongly disagree, disagree, neutral, agree and strongly agree) if "my utility company can help me reduce costs through rebates" 45.6% of respondents agreed or strongly agreed. Analysis by race, gender, homeownership, and income showed no difference of statistical relevance.

When asked "New York State helps homeowners and renters reduce their energy costs," 30.3% of respondents agreed or strongly agreed. The Hub and the State will be challenged to change this perspective among Long Islanders.

Lastly, when asked "government energy efficiency programs require large upfront costs," 47.2% agree or strongly agree, however the survey showed that racial minorities, regardless of income, agree or strongly agree that energy efficiency programs require large upfront costs as shown in Table 25.

Table 25: Energy Efficiency and Upfront Costs

	Government energy efficiency programs require large upfront costs						
	Agree or Strongly Agree						
	All	White	Racial minority	White, income less than $100,000	Racial minority, income less than $100,000	White, income $100,000 or more	Racial minority, income $100,000 or more

	47.2%	39.9%	58.0%	38.1%	48.3%	40.6%	75.0%

EV incentives: Interest in EV incentives are similar between male and female survey respondents (31.7% v. 30.3%) and between white and diverse respondents (30.2% v. 33%). Interest in EV incentives is similar between male and female survey respondents (31.7% v. 30.3%) and between white and diverse respondents (30.2% v. 33%).

Homeowners are more interested than renters in EV incentives at a rate of 32.7% v. 21.6%, providing an opportunity to promote charging stations with landlords. The survey also showed that white respondents making less than $100,000 annually are significantly less interested in EV incentives as seen in Table 26. As the Hub continues its outreach and research, we hope to learn more about the disconnect with this section of the population.

Table 26: Interest in EV incentives

	Interest In EV Incentives
	Yes (as % of those responding)
White, income less than $100,000	**15.4%**
Racial minority, income less than $100,000	33.3%
White, income $100,000 or more	32.6%
Racial minority, income $100,000 or more	31.7%

Full survey results are available in Appendix E

V. Barriers and Opportunities

The following tables offer a concise overview of barriers and opportunities facing Long Islanders, developed from experience and past work of Hub members and the survey. This includes clean energy opportunities and recommendations for overcoming obstacles, broken down by various stakeholder groups, such as renters, landlords and specific communities of interest.

Table 27: Regional Barriers and Opportunities Table: Physical and Economic Structures and Conditions

Regional Barriers Identified by Market Segment	**Opportunity to Address Barrier**
Renters have limited ability to improve their homes and accrue savings. Since they don't own the property, they do not typically have the autonomy to make investment or renovation decisions, even if they learn about programs that could benefit them. Renters also may be reluctant to complain about existing living conditions or ask for repairs, fearing reprisals. Even when financial resources can be secured, many are not sufficient to cover out-of-pocket expenses. Furthermore, renters may fear that substantial improvements to the property may increase rent and price them out of the residence.	Tailor outreach materials to reflect renter-specific information. Employ educational campaigns that break down complex information into accessible formats, using visuals and plain language, are more likely to capture the attention of diverse audiences. Subsidize clean energy investments by renters through grants or tax credits, deploy Clean Energy Hubs Kits, when available. Encourage renters to follow energy conservation guidelines, and to take advantage of public/nonprofit programs that provide or subsidize weatherization and upgrades.

Landlords may be unwilling to open their residences to home energy audits and weatherization inspections if they suspect that such inspections could reveal previously unaddressed home living safety hazards and/or violations of tenant protections. Landlords who did make improvements (of any kind) also may be concerned that inspections could lead to higher property tax assessments.	Include landlords in the planning and execution of programs that typically succeed by engaging in collaborations with local nonprofits, community organizations, and grassroots initiatives. Building strong broad-based partnerships enhances outreach efforts.
Landlords may not be interested in investing in upgrades because they don't realize the financial and other benefits to them.	Highlight incentives for electrification and energy that are available to landlords by creating and tailoring outreach and educational materials to them.
Homeowners/Renters/Landlords/Business/Contractors/DAC may have sticker shock after reviewing a home retrofit proposal after an energy audit. This often results in rejection of the higher cost changes, or no action at all.	Consider presenting recommendations as a long-term plan, prescribing free or low-cost changes upfront to build consumer trust, although this will require multiple touchpoints.
Homeowners/Renters/Landlords/Business/Contractors/ DAC all must contend with Long Island's aging housing stock. Barriers include increased cost to upgrade, or clean energy may take a back seat to more critical priorities. Mold, asbestos, lead pipes, roofing repairs, housing code violations and other issues do not have funding for remediation.	Aging housing stock also provides a great opportunity for significant change to Long Island's energy footprint as small changes can have an outsized result in older homes. Consider streamlined community-wide programming in tracts where housing ages are similar.
East End: Geography, Long Island has remote locations that can increase contractor prices	Need to find contractors on the east end, not only focused on wealthy clients on the east end
Contractors: Contractors are not itemizing work scope, and the energy audits are too general. Quotes from PSEG/NYSERDA certified programs are significantly higher than other contractors on Long Island. Overall, this hurts trust with customers. Contractors possibly making money off low-income programs. Energy Audits are too general	Ask PSEG to deliver itemized contractor reports more carefully reviewed to ensure certified contractors are treating low-income customers fairly.
All: childcare, illness and other priorities prohibit low-income families from affording significant upfront costs.	Programs in other states (Maine) provide FREE heat pumps and installation to any SNAP eligible households
DAC/LMI: "tax credits" are unrealistic and create significant upfront costs, Long Island's labor market is more expensive, making upfront costs significant and out of reach for most DAC/LMI families	Programs in other states (Maine) provide FREE heat pumps and installation to any SNAP eligible households
ALL: lack of public examples of the benefits of clean energy in public buildings, especially those in DACs	Work with trusted local nonprofits (libraries, schools, government buildings etc.). to help them transition to clean energy, help leverage their testimonials to spearhead community projects

Table 28: Regional Barriers and Opportunities Table: Financial and Knowledge Resources and Capacity

Regional Barriers Identified by Market Segment	Opportunity to Address Barrier
Homeowners/Renters/Landlords/Business/Contractors/DAC are all constrained by time. The administrative burden of clean energy programs falls to the consumers in each market segment who often lack the experience or finances to handle it. "Administrative burdens perpetuate inequity because they tend to be most heavily placed on supports for low-income people rather than those that serve the population as a whole."[25]	Continuously simplify the process of accessing incentives and benefits to stop hindering participation in clean energy programs. It will be critical for statewide programs to revise processes and reduce administrative burden to reach goals of the Hub.

[25] https://www.nyserda.ny.gov/ny/Disadvantaged-Communities pg. 20-21

Regional Partners like not-for-profits, and faith and community groups play a crucial role in advocating for and implementing clean energy initiatives. However, limited resources may have hindered their engagement in the "green" economy. Ensuring that these organizations have access to funding, technical support, and training can enhance their participation and amplify their impact in advancing clean energy goals.	Consider a pilot program to ensure that regional partners are benefitting from clean energy and energy efficient incentives. This will help them lower costs and create strong trusted messengers who can speak to programmatic successes and engage their clients. Building strong partnerships improves their reach and impact.
Regional Partners do not share a collaborative framework to deal effectively with divergent priorities and competing agendas. Insufficient communication channels may lead to misunderstandings and hinder successful engagement. Regional organizations, specifically non-profits, educational institutions, and advocacy groups, are often short staffed or under-funded.	Provide a single point-of-contact and web portal to access all programs and simplify and streamline information and enrollment processes. Consider creating auto-enroll for customers where possible, perhaps connecting social services programs to clean energy programs.
Regional Partners participation of municipalities has allowed for low-cost regular communication to constituents and given potential customers greater confidence in the program. But budget staff constraints and other budget limitations made it difficult for most municipalities to provide long-term, consistent outreach and customer support services.	Work to build relationships with municipalities and co-design programs/projects, considering long-term funding and staffing to maintain programs. Consider a state or bi-county pilot program to provide funding for cooperating local governments or co-create programs with municipalities
Small and Medium-sized Enterprises (SMEs), including local retailers, restaurants, and service providers, may face barriers to participating in the clean energy economy due to limited resources and/or access to financing.	A community campaign engaging SMEs and presentations at Chamber meetings, trade organizations and other community groups could provide information on resources for clean energy incentives. Consider having a Hub staffer dedicated to specifically work with local businesses. Offering success stories from participating businesses and trusted messengers may increase participation.
DAC/LMI may lack awareness of programs and initiatives due to lack of access to technology. This critical deficiency underscores the importance of crafting strategies to bridge the information gap and ensure that these communities are informed and empowered to access valuable resources.	Focus educational programming on places with technological access (libraries, nonprofits etc.). Consider providing direct technical support workshops to assist homeowners and renters (like CEC program), and even computers and Wi-Fi service to LMI residents as school districts and not-for profits did for their resource-poor students during the pandemic.
DAC/LMI may lack access to financing options, may have poor credit, job insecurity and other financial issues. Heat Pumps specifically put DAC/LMI families in a negative financial place for several year.	Ensuring free and low-cost efficiency options are accessible and providing information about financing from trusted messengers will increase success.
DAC/LMI customer contribution requirements are causing a decline in the clean energy work scope	Itemizing contractor work scopes, expand group of contractors PSEG recommends and we will encourage PSEG to be more critical of work scopes.
DAC/LMI wrap around services are time consuming and difficult to navigate, eroding trust and extending processes	Ask LIPA/PSEG Long Island to allow REAP customers to be geo-eligible in a DAC.
Contractors have uneven knowledge about rebates for customers and prices are inconsistent	Need PSEG Long Island to be more critical of contractor work scope and make their programs easier to participate in?
ALL cost savings take too long to impact residents or are confusing to residents	?
ALL many homes need funding for general maintenance and improvements for health and safety which could hinder clean energy projects	Partner with nonprofits and companies to help homeowners
ALL without healthy competition between energy companies or participation in system benefits charge, Long Islanders have few choices and less programs than the rest of the state	?

Table 29: Regional Barriers and Opportunities Table: Perspectives and Information

Regional Barriers Identified by Market Segment	Opportunity to Address Barrier
DAC/LMI often face challenges in accessing diverse and effective communication channels. Traditional outreach methods may not reach these communities adequately, leading to a lack of awareness about available programs.	Collaborating with local media outlets, community centers, places of worship, libraries, billboards, electronic signage, social media, and community radio stations. Using outlets with a deep connection to the local community ensures that you reach individuals through channels they regularly use, in their preferred language.
DAC/LMI outreach efforts may fall short if they do not consider the cultural diversity within these communities. Information presented in a way that does not resonate with their cultural context may go unnoticed or be perceived as irrelevant or even disrespectful.	Respectfully engaging community leaders and members of the DAC/LMI communities in the planning process ensures that the strategies are culturally sensitive, relevant, and aligned with the communities' values, aspirations, and needs.
DAC/ LMI language plays a pivotal role in effective communication. Insufficient translation services or a lack of materials presented in languages commonly spoken within DAC/LMI communities can hinder understanding and awareness. It is also important to create and maintain a pipeline of contractors and support staff that can speak to customers who English is not their first language.	Provide outreach materials in languages commonly spoken within the community. This addresses linguistic barriers and ensures that information is accessible to a broader audience. Offering electronic information in other languages helps community members access incentives, programs, and initiatives Small in-person events and workshops also remain effective; as does direct interaction, where they can ask questions, provide feedback, and establish personal connections.
Diverse Communities, although the Hubs mission focuses on DAC, it is clear from survey that diverse communities that make a household income over $100k struggle to pay energy bills at a rate over 3 times higher than white respondents with the same income.	Consider expanding specific outreach (TBD) to include diverse communities without concern for income eligibility
Renters and Landlords, the LI Hub survey highlighted that renters are less interested in homeowners in EV incentives (renters 21.6% vs homeowners 32.7%).	Provide outreach materials to renters on EV incentives. Work with Landlords to incentivize EV charging stations to increase renter opportunity to utilize EVs.
Contractors may find homeowners hesitant to invest after an energy audit if they distrust the recommendations based on the audit as part of a sales pitch to generate a contract.	One potential solution is to share audit reports with all participating vendors who serve the location. Vendors would then bid for the homeowners' business in an open, transparent manner. Another approach would be for more control and standardization of prices of energy improvements made through incentivized programs.
Homeowners/Renters/Landlords/Business/Contractors/DAC may have little or no trust in messages from utility companies, government, salespeople, or generally people from outside their immediate community.	Recruit community leaders, members of community-based organizations, or trusted residents in each market segment with grassroots expertise to conduct outreach, provide information and assist residents interested in

	implementing clean energy improvements. Train more contractors from DAC/LMI communities, such as Hofstra's Ascend Long Island aims to do.
ALL: PSEG Long Island and NYSERDA programs are difficult to understand and access. Our survey found that messaging around cost savings and healthy homes was very important to residents. Very few materials discuss health benefits of clean energy and Long Island is not capitalizing on the significant state and federal funding in health equity	Change materials, work closely with hospital systems, state and federal agencies to bridge the enormous funding gap for DAC/LMI Long Islanders to participate in the clean energy transition.

Table 30: Regional Barriers and Opportunities Table*:* Programmatic Design and Implementation

Regional Barriers Identified by Market Segment	Opportunity to Address Barrier
Homeowners/Renters/Landlords/Business/Contractors/DAC all lack baseline or benchmarking and impact assessment data.	Vigilantly work to track information about programmatic needs, addressing disparities and evaluating programs effectiveness. Metrics are the key not only to understanding a program's effectiveness but establishing credibility with the investing and taxpaying public.
Homeowners/Renters/Landlords/Business/Contractors/DAC clean energy programs are not designed to work with other state, federal, and local programs creating excessive administrative burden due to multiple applications across programs.	Multiple programs with multiple eligibility requirements create administrative burdens that reduce participation. When possible, work with agencies, utilities, and nonprofits to simplify and streamline applications, particularly income eligible programs that often collect the same information over and over
Regional Partners like utilities are often unable or unwilling to share data and information on their clean energy programs hindering opportunities for follow up and education.	Future partnerships with utilities must include a firm agreement on data collection and information sharing.
Organized Labor has a critical role to play in the clean energy transition and must accelerate efforts to find pathways for employment for DAC/LMI community members.	Both labor organizations and DAC/LMI communities will benefit from a collaboration to provide culturally sensitive training opportunities that lead to well-paying, career-oriented jobs for all Long Islanders.
Long Islanders: low-income designations are not on par with Long Island's high cost of living, preventing many residents in need of assistance from obtaining clean energy. Creates an extremely small pool of low-income homeowners.	?
Program Eligibility: DACs should have geo-enrollment; it is a waste of time and resources to have to prove income eligibility when the state has already said the area is disadvantaged	Change program requirements
ALL: solar energy programs are not incentivized on Long Island, no net metering	Encourage PSEG Long Island/LIPA to incentive community solar

ALL: administrative burden; eligibility requirements are too strict and specific, not allowing for flexibility needed to help DAC/LMI residents, programs are confusing and hard to apply/red tape. The administrative process between hub/NYSERDA/PSEG is too slow, has too many handoffs and erodes trust when clients feel like they are being shuffled around and not helped.	Work with NYSERDA/PSEG Long Island to streamline programing, share data when possible and have open lines of communication.
Contractors: Contractors are frustrated with programs, too cumbersome to participate in/sign up for, changing program requirements, reimbursements are late, and projects are delayed by NYSERDA. Hub is concerned that contractors are overestimating (no itemized audit) and passing costs onto customers.	Work with NYSERDA/PSEG Long Island to streamline programing, share data when possible and have open lines of communication.
ALL: programs do not address Hot pump hot water programs for LMI residents	Work with NYSERDA/PSEG Long Island to streamline programing, share data when possible and have open lines of communication.
ALL: programs change too frequently including eligibly and rebate amounts, paperwork requirements and difficult software programs. Lack of consistency erodes trust with contractors, municipalities and residents	Work with NYSERDA/PSEG Long Island to streamline programing, share data when possible and have open lines of communication.

Table 31: Regional Barriers and Opportunities Table*:* Additional Barriers

Regional Barriers Identified by Market Segment	Opportunity to Address Barrier
Landlord and Renters- landlords are unaware of programs and are hard to reach and renter/landlord relationships are often described as tense or nonexistent. Renters without legal status, are unlikely to raise issues with a landlord. With so many programs needing landlord approval, this is a significant barrier in reaching renters, particularly in low-income communities.	Difficult to find lists or contacts of landlords, hope to use real estate associations to reach them
ALL: Trust- residents in survey have expressed lack of trust in contractors, NYSERDA, LIPA, and PSEG Long Island. Low-income customers have expressed concerns that they don't feel prioritized, and funding is insufficient to make clean energy transition for Long Islanders and administrative burden is high with few results. Changing program requirements hinders relationship building	Processes must be simplified to build trust with customers/residents. Incentives and rebates need to be maximized for DAC/LMI. Heat Pumps are out of reach for most LMI/DAC Long Islanders with current funding.
Businesses and Non-Profits: NYSERDA and PSEG Long Island have not prioritized programs for DAC businesses and non-profits or outreach to those groups to reach their clean energy goals. We must be reaching a hand to COMMUNITIES to create trusted messengers, reduce GHG, reverse environmental injustice and improve health outcomes	Working partnership with state, PSEG Long Island and LIPA on creating more holistic approach to community outreach, particularly in disadvantaged communities.
Municipalities: Municipalities also lose trust in the Hub when state programs frequently change, and funding is not consistent year after year.	Working partnership with state, PSEG Long Island and LIPA on creating more holistic approach to community outreach, particularly in disadvantaged communities, simplifying processes, longer term funding packages endorsed by state electeds to keep programs consistent

VI. Next Steps

Renters	
Recommendations	Tailor outreach materials to reflect renter-specific information. Focus on low-cost measures, such as weatherization, lighting upgrades, which are likely to be effective regardless of landlord participation. Deploy Clean Energy Hubs Kits when available. Work with municipalities on code or legislative changes to protect tenants from landlord reprisals or unreasonable rent hikes and new model(s) for renters and landlords to share savings.

Complexity	High - Renters are spread out geographically, have no civic organization or advocacy group that helps to organize them, the development of multifamily and affordable housing faces significant opposition in local municipalities, and communication and outreach are difficult because physical access is limited.
Potential Impact	Low - Over 93 percent of Long Islanders live in single-family homes. Despite this, rentals are often concentrated in disadvantaged census tracts. It will be important to prioritize our outreach to disadvantaged communities to increase our impact.
Additional Resources	Consider a mailing or a joint mailing with PSEG Long Island to educate on energy efficiency opportunities in rental units
Timeline	**TBD**

Landlords	
Recommendations	Highlight incentives for electrification and energy that are available to landlords by creating and tailoring outreach and educational materials to them. Build strong broad-based partnerships with landlords.
Complexity	High - Landlords are spread out geographically, decision makers may not be reachable (management companies). Landlords do have civic organizations they work with which will help with outreach
Potential Impact	Low – Over 93 percent of Long Islanders live in single-family homes. Despite this, rental units are often concentrated in disadvantaged census tracts.
Additional Resources	Consider hosting an event targeting landlords with the help of our regional partners to discuss clean energy solutions, savings and financing
Timeline	**TBD**

Regional Partners	
Recommendations	It will be important for the hub to offer our regional partners support in advancing their own clean energy projects. This will help them lower costs and strong partnerships improves reach and impact.
Complexity	Medium – These are groups we already have relationships with, Medium – These are groups we already have relationships with, making outreach easy. Given the complexity of the programs and applications, the Hub will need to devote resources to helping nonprofits with limited technical ability to apply for clean energy initiatives
Potential Impact	High – helping regional partners will not only reduce emissions, but it also helps to create trusted messengers who can speak to programmatic successes and engage their clients
Additional Resources	Consider a pilot program that exclusively works to ensure regional partners advance clean energy projects, consider events or pilots by organizational type
Timeline	**TBD**

Business Communities	
Recommendations	Community campaign engaging businesses and presentations at Chamber meetings, trade organizations and other community groups could provide information on resources for clean energy incentives. Technical workshops for businesses in coordination with regional partners
Complexity	Low – the business community on Long Island is well represented through the LIA and chambers giving the hub unique access to contact information for business owners across Long Island.
Potential Impact	High - with 13,424 industrial buildings across Long Island, the opportunity is immense
Additional Resources	Consider having a Hub staffer dedicated to specifically work with local businesses
Timeline	**TBD**

Municipalities	
Recommendations	Build relationship with municipalities to tap into their regular low-cost communication with residents (town, village, and county newsletters, local library newsletters etc.), Encourage municipal clean energy projects and connect muni leaders to CSC and CEC programs. Work with munis on building codes and zoning to eliminate barriers to clean energy uptake by businesses and residents.
Complexity	Medium –municipal staff and budget constraints make it difficult for most municipalities to provide long-term, consistent outreach and customer support services, will need by in from elected officials
Potential Impact	High – opportunity to reach residents across Long Island
Additional Resources	Consider a state or bi-county pilot program to provide funding for cooperating local governments or co-create programs with municipalities
Timeline	**TBD**

Administrative Burden	
Recommendations	The administrative burden of clean energy programs falls to the consumers in each market segment who often lack the experience or finances to handle it. “Administrative burdens perpetuate inequity because they tend to be most heavily placed on supports for low-income people rather than those that serve the population as a whole.” Continuously simplify the process of accessing incentives and benefits to stop hindering participation in clean energy programs. Ability for residents to automatically qualify for initiatives (IE enrollment in SNAP triggers a free clean energy hub kit)

Complexity	High –The hub will make recommendations, but we will be reliant on the state to make substantive changes
Potential Impact	High – simplifying programs and eliminating burdens make the programs more accessible to everyone
Additional Resources	It will be critical for statewide programs to revise processes and reduce administrative burden to reach goals of the Hub.
Timeline	**TBD**

Aging Housing Stock	
Recommendations	Aging housing stock also provides a great opportunity for significant change to Long Island's energy footprint as small changes can have an outsized result in older homes. Consider streamlined community-wide programing in DAC tracts where housing ages are similar.
Complexity	Medium –although potential is large, older homes often come with higher price tags for energy initiatives. It will be important to build trust with residents and present multiple opportunities for energy efficiency at multiple price points including free clean energy hub kits.
Potential Impact	High – 22.4%of Long Islanders live in a home built before 1950 and in Long Island's DAC represents 26.5% of homes built before 1950.
Additional Resources	Offer additional funding for pre-1950 homes
Timeline	**TBD**

Sticker Shock	
Recommendations	Energy Audits may result in sticker shock, potentially scaring away virtually every market segment. Consider presenting recommendations as a long-term plan, prescribing free or low-cost changes upfront
Complexity	High –This process would require multiple touches for each interested party making it very labor intensive although it will help to build consumer trust
Potential Impact	High – if the energy audit has already been completed the hub will invest time into ensuring energy efficiency next steps are taken, regardless of the price point or scale
Additional Resources	Consider a state or bi-county pilot program to provide funding for cooperating local governments or co-create programs with municipalities
Timeline	**TBD**

Language Barriers in DAC	
Recommendations	Provide outreach materials in languages commonly spoken within the community. This addresses linguistic barriers and ensures that information is accessible to a broader audience. Offering electronic information in other languages helps community members access incentives, programs, and initiatives Small in-person events and workshops also remain effective; as does direct interaction, where they can ask questions, provide feedback, and establish personal connections. We will also work to create and maintain a pipeline of contractors and support staff that can speak to customers who English is not their first language.
Complexity	Medium –multiple common languages require multiple translators and people who can present complex initiatives in common languages
Potential Impact	Medium – Nassau County has 29.4% of people speaking other languages in the home compares to Suffolk County's 23.1% and linguistic isolation is more common in disadvantaged communities
Additional Resources	Consider a state or bi-county pilot program to provide funding for cooperating local governments or co-create programs with municipalities
Timeline	**TBD**

Communication with DAC	
Recommendations	DAC often face challenges in accessing diverse and effective communication channels and collaborating with local media outlets, community centers, places of worship, libraries, billboards, electronic signage, social media, and community radio stations. Using outlets with a deep connection to the local community ensures that messaging reaches individuals through channels they regularly use
	Medium –The hub is already connected to the channels listed above however we may need to create a budget to fund these outreach tools
Potential Impact	High – this is our greatest opportunity to reach DAC across Long Island
Additional Resources	Additional funding for advertising in both traditional and DAC centered media may be necessary
Timeline	**TBD**

Cultural Competency

Recommendations	Working with regional partners engaging community leaders and members of the DAC/LMI communities in the planning process ensures that the strategies are culturally sensitive, relevant, and aligned with the communities' values, aspirations, and needs.
Complexity	Medium –regional partners are fluent in cultural competency but contractors, auditors and others less familiar with DAC may need more support
Potential Impact	Medium – important to opportunity to reach DAC in a meaningful way
Additional Resources	n/a
Timeline	**TBD**

Data	
Recommendations	Regional Partners like utilities are often unable or unwilling to share data. Future partnerships with must include a firm agreement on data collection and information sharing, vigilantly work to track information about programmatic needs, addressing disparities and evaluating programs effectiveness
Complexity	High –There is limited or no baseline data on clean energy programs on Long Island. There are also no standardized formats for data collection or a secure place to house and share meaningful data. Metrics are the key not only to understanding a program's effectiveness but establishing credibility with the investing and taxpaying public.
Potential Impact	High –measuring outcomes to allow for continuous improvement of programs and outreach
Additional Resources	State legislation/regulation to report emissions data would ensure cohesive standardization, the state will likely be the only place with the resources to collect, house, share and continually support clean energy data
Timeline	**TBD**

Trust	
Recommendations	The Hub will recruit community leaders, members of community-based organizations, or trusted residents in each market segment to build trust with utility companies, government, salespeople etc. Training will be provided in grassroots efforts to conduct outreach, provide information, and assist residents interested in implementing clean energy improvements. Train more contractors from DAC/LMI communities
Complexity	Easy –The hub has already begun this work to complete the RABA and will continue outreach particularly in DAC as the project continues
Potential Impact	High –building trust and fighting disinformation will be critical to the hub's success.
Additional Resources	n/a
Timeline	**TBD**

Lack of Government Coordination	
Recommendations	Multiple programs with multiple eligibility requirements create administrative burdens that reduce participation. When possible, work with agencies, utilities, and nonprofits to simplify and streamline applications, particularly income eligible programs that often collect the same information over and over
Complexity	High –Outside the scope of the hub, but we hope to work with the state and local municipalities to streamline information collection and "auto-enroll" opportunities.
Potential Impact	High – simplifying programs and eliminating burdens make the programs more accessible to everyone
Additional Resources	State legislation/regulation is necessary to change and simplify processes
Timeline	**TBD**

Labor	
Recommendations	Organized Labor has a critical role to play in the clean energy transition and work to accelerate pathways for employment for DAC/LMI community members. Both labor organizations and DAC/LMI communities will benefit from a collaboration to provide culturally sensitive training opportunities that lead to well-paying, career-oriented jobs for all Long Islanders.
Complexity	Low –The hub is already working with labor on Long Island
Potential Impact	High –critical to all workforce training efforts
Additional Resources	n/a
Timeline	**TBD**

Single Point of Contact	
Recommendations	Provide a single point-of-contact and web portal to access all programs and simplify and streamline information and enrollment processes. opportunities
Complexity	Medium –The hub already has a website but will need consistent support from staff
Potential Impact	High –critical to disseminating consistent information
Additional Resources	State resources in maintaining a web platform will be critical
Timeline	**TBD**

Financing for DAC	
Recommendations	Ensuring free and low-cost efficiency options are accessible and providing information about financing from trusted messengers in multiple languages will increase success
Complexity	Low- the hub is exceptional at creating educational and outreach information and providing it to DAC
Potential Impact	Unknown
Additional Resources	n/a
Timeline	**TBD**

VII. REFERENCES:

Appendix A: Footnotes/References

Appendix B: Regional Workforce Programs

Appendix C: Regional Partners

Appendix D: Regional Clean Resources and Programs

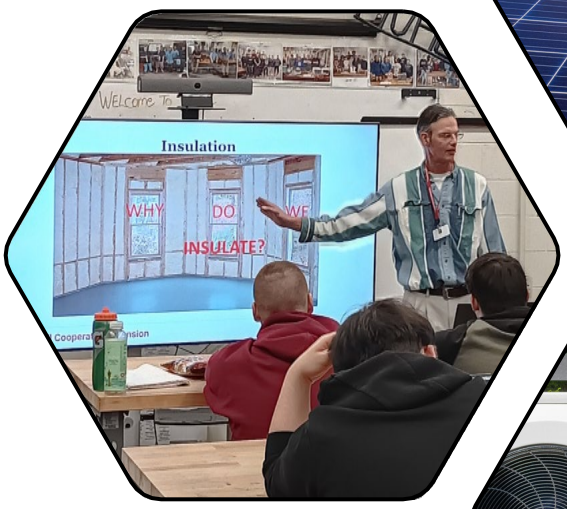
Appendix E: Long Island Clean Energy Hub Survey Results

SUSTAINABLE WESTCHESTER

NEW YORKERS FOR CLEAN POWER

Cornell Cooperative Extension
Smart Energy Choices — Mid-Hudson

CBI
CATALYZING COLLABORATION



2024
MID-HUDSON
ENERGY NEEDS ASSESSMENT

A Regional Assessment and Barriers Analysis by the
Mid-Hudson Clean Energy Hub

NEW YORK STATE | NYSERDA
Regional Clean Energy Hub

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I. Executive Summary

Objectives:

As part of NYSERDA's Regional Clean Energy Hubs program, Cornell Cooperative Extension Dutchess County and its partners are developing a Regional Assessment and Barriers Analysis of regional needs, barriers, and opportunities to advance an inclusive clean energy economy. The assessment compiles demographics, building and energy data, NYSERDA program data, and qualitative input from local stakeholders of the needs, barriers, and opportunities around accessing the clean energy economy. An interactive Story Map accompanies this analysis as a transparent vehicle for sharing findings and inviting public participation before, during, and after the creation of an Equitable Engagement Plan for the Mid-Hudson Regional Clean Energy Hub serving Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, and Westchester Counties.

Through our analysis and stakeholder engagement we will grow our understanding of the barriers and historical inequities facing Mid-Hudson community residents, especially marginalized communities in accessing government investments in clean energy. Taken together, this analysis and stakeholder engagement forms the core of a living and evolving strategy for energy outreach and education that meets the needs of our diverse and unique region. The report that follows includes a baseline of the current energy landscape of the Mid-Hudson region, a directory of community assets which includes organizations in the clean energy transition space that can be leveraged to build capacity, an analysis of the barriers and opportunities to accessing clean energy programs, and a transparent strategy for stakeholder engagement, and other relevant regional context to most effectively serve disadvantaged communities within the region. In addition, our analysis identifies regional clean energy workforce trends and gaps--with particular attention to service-disabled veteran-owned businesses (SDVOBs) and minority and women-owned business enterprises (MWBEs)--and includes recommendations for increasing the diversity of the local clean energy industry.

Background:

Through a review of academic literature and industry reports, we identified several cultural and social barriers to participating in energy programs. Academic literature identifies several cultural and social barriers including: misinformation, lack of awareness, lack of trust, limited financing options, to support the most affected group and to address energy injustice. In this context, this review also focuses on how racial inequity and institutionalized discrimination historically and continuously perpetuate the cycle of poverty and place marginalized and low-income communities at a disproportionate rate of experiencing high energy burdens. Understanding the social drivers of high energy burdens among minority groups and the social determinants to their participation can enhance energy efficiency programs, weatherization programs, and institutions to more equitably address this issue. We incorporate our findings from the literature review into the barriers identified in Section V. The full literature review and all sources cited in this report can be found in Appendix A.

Baseline Regional Characterization:

The 2019 Climate Act requires the State to invest or direct resources in a manner designed to ensure that disadvantaged communities (DACs) receive at least 35 percent, with the goal of at least 40 percent, of overall benefits of spending (NYSERDA, n.d.-c). Forty-five percent of all census tracts in the Mid-Hudson Region have been designated a disadvantaged community.

There are over 900,000 occupied building units in the Mid-Hudson Region. Across all seven counties, single-family homes dominate the number of housing units (56%), the vast majority of which are heated by either fuel oil (36%) or utility gas (45%). Multifamily buildings of five or more dwelling units represent the second-largest (21%) segment of the building stock in the region and are also primarily heated with fuel oil and utility gas. In fact, just under 12% of all residential building units in the region

heat with electricity with the greatest uptake in larger, 5+ unit, multifamily buildings. Section II of this report looks more closely at each County's housing units by heating fuel, and outlines some broad patterns across the region as well as characteristics unique in some counties. The data available did not allow for the building analysis at the census tract level.

Many households are already under considerable housing insecurity and hardship even before energy costs are taken into account. Liberty, Monticello, Kingston, Ellenville, New Paltz, Saugerties, Poughkeepsie, Beacon, Newburgh, Middletown, Matamoras, Kiryas Joel, Warwick, Brewster, Peekskill, Haverstraw, Monsey, Nyack, White Plains, Port Chester, Yonkers, Mount Vernon and New Rochelle all have above-average housing burdens compared to NYS and Federal averages. The Mid-Hudson Region is often noted for its historic buildings, villages, and cities. However, these buildings can also be very energy inefficient. Nearly 3 out of every 5 buildings in our region (59%) were built before 1970 (U.S. DOE, LEAD Tool), five years before the U.S. produced their first set of energy codes and standards. In the entire Mid-Hudson Valley, 65% of occupied building units are owner-occupied. However, that number falls to just 21% in NYS designated disadvantaged communities, compared to 79% in census tracts without that designation. While New York State has set a target of keeping household energy burden below 6% of household income, our assessment of the data indicates many communities in our region are far from this target.

New York State's bold climate goals require a skilled workforce. The Just Transition Working Group's 2021 jobs study finds that by 2030, meeting the state's clean energy targets will create 211,000 new jobs, with new jobs exceeding those displaced by 10 to 1. By 2050, those numbers grow to 268,000 new jobs, or a 54% increase in workforce statewide. Those jobs are in the electricity, fuels, buildings, and transportation sectors (Just Transition Working Group, 2021). Though these jobs will not be distributed perfectly evenly around the state, those numbers can provide some rough local estimates. According to census data, the seven counties in the Mid-Hudson region are home to approximately 11.5% of the state's population. Proportionately, 11.5% of 268,000 jobs would mean around 31,000 new jobs in the Mid-Hudson region by 2050.

Baseline Assessment of Clean Energy Participation:

New York State is embarking on a transition to an inclusive clean energy powered economy. All residents, businesses and communities across the State will have access to new opportunities to benefit from this transition including clean energy careers, home improvements, even rebates for businesses and personal transportation. In the last 5-years (2017-2022) alone, NYSERDA has directed over $232 million in Mid-Hudson communities. Just over 33% of that has been invested in DACs, 2% shy of the minimum target set forth in the climate act. On top of NYSERDA's investment, utility customers in the Mid-Hudson have contributed a collective $1.8 billion in the same time frame towards energy- and cost-saving upgrades.

Workforce development and training are essential components of building a resilient and equitable clean energy economy that is inclusive of all New Yorkers. Simply put, New York State cannot reach its clean energy goals without the trained professionals to translate these goals into action.

To take just a few programs on the path to electrification and decarbonization as an example--EmPower+ and Multifamily Building Solutions for building performance, NYS Clean Heat for heat pumps, and NY-SUN for residential solar systems--the labor bottleneck is clearly near the front of that pipeline with building performance and the low-income program, EmPower+ in particular. In any given county in our region, between 15-25 contractors are able to serve low-income customers with no-cost energy efficiency upgrades. This also includes contractors with business addresses outside the region or even outside the state, but who also participate. Just 22 contractors participate in EmPower+ who are based inside the region.

Stakeholder and Community Engagement:

Between the Fall of 2023 and Summer of 2024, the Mid-Hudson Regional Clean Energy Hub (guided by consultants from the Consensus Building Institute), conducted one-on-one stakeholder interviews, nine public meetings, online and paper surveys, and follow-up focus groups to cover a breadth of geographic, and socioeconomic audiences. The survey had 322 respondents that were largely consistent in ethnicity with regional demographic data and reached 42% of the 536 census tracts in our region and 35% of survey responses came from designated DACs.

Respondents' awareness and engagement with several NYS energy programs varied significantly (Figure 9). For example, over 80% of respondents know about the HEAP, while fewer than 60% were were at all familiar with the Weatherization Assistance Program. Results also suggest a gap in program awareness and engagement between white and BIPOC respondents, however based on some gaps in survey data, these differences could not be confirmed to be statistically significant. Only about one in every five people aware of energy affordability and clean energy incentive programs applied. Comparatively, data reported to NYSERDA by the Mid-Hudson Regional Clean Energy Hub has noted one in three interested households take action on a project after talking with an Energy Advisor, underscoring the importance of personalized, live assistance from knowledgeable, trusted, educators as an accelerator to the general market. Nearly 73% of survey respondents either agreed or strongly agreed with the statement, "I would feel more confident in pursuing energy assistance programs if a non-profit were available to help me."

Barriers and Opportunities:

Clean Energy Programs

Stakeholder feedback and survey results yielded a number of barriers to participating in clean energy programs and clean energy careers across four main categories: physical barriers, economic barriers, knowledge barriers, and program design barriers. In Appendix B, we further delineate these barriers chronologically.

Most notable amongst the barriers identified include a high presence of physical barriers in our region related to an aging building stock. There are multiple health and safety (H&S) issues affecting both renters and homeowners (Appendix E, Figure 14) and a high proportion (over 30%) of survey respondents reporting symptoms related to extreme heat and extreme cold exposure, difficulty paying their energy bills, and concentrations in southern Westchester County and rural Sullivan County of energy burden exceeding 12% of income.While our results point to between 14-25% of households being unaware of energy and cost-saving programs, an much greater proportion is aware but disengaged (between 46-61%), citing lack of trust and difficulty during the application process as the primary reasons they did not proceed. Out of the people who participated in an energy assistance program, 63% had a negative experience with the application process, citing that the process was very long, tedious and stressful.

Importantly, there is an opportunity to build off of existing public education on clean energy opportunities available broadly with clarified strategies for targeting different market segments and better distinguishing between awareness-building and awareness-to-action strategies.The Clean Energy Communities (CEC) program has been a key driver in municipal climate action. Across the Mid-Hudson Region, local governments' have completed or are in the process of completing over 150 municipally-lead campaigns to engage their communities in clean energy programs. This is a prime area of overlap between the Regional Clean Energy Hubs and CEC program to enhance and align community campaign goals.

Clean Energy Workforce

We categorize barriers to clean energy careers in one of four categories: i) Physical Barriers, ii) Financial & Economic Barriers, iii) Knowledge, Perception, & Information Barriers, and iv) Program Design and Implementation Barriers. In the accompanying Story Map and Appendix B, Table 2, we further break down these barriers depending on the labor market actor, either job seekers, training

providers, educational institutions, funders & policy makers, and established contractors & employers. Overall, interviewees highlighted the need for wrap-around services including transportation, technological needs, childcare access, mental health, and housing as the predominant barriers for underserved populations to obtain the training necessary for employment in the clean energy industry.

There is a great opportunity for stronger industry partnerships, e.g. direct connections and partnerships between workforce training programs and contractors. There is a need for better forecasting and job availability to support training efforts: no one wants to train or be trained for jobs that do not materialize. Models like job apprenticeships that generate demand and connect with training programs are beneficial. Building relationships with unions in particular were mentioned several times by interviewees. There is opportunity for the Regional Clean Energy Hubs to play a role in brokering these relationships between wrap-around service providers, training programs, job-seekers and employers. This could take the shape of presentations during workplace and training program orientations, conferences, and/or maintaining a clearinghouse for regional clean energy job opportunities.

Next Steps and Recommendations:

Based on our regional baseline characterization, building sector assessment, stakeholder engagement, and survey results, the Mid-Hudson Regional Clean Energy Hub has developed the following set of recommendations for our program. Detailed in the full report, we further develop recommendations that are outside of the contracted scope of work of the Hubs to be considered by NYSERDA, contractors participating in clean energy programs, and other organizations aligned with energy justice & the clean energy transition.

- Segment outreach, messaging, and educational resources between "awareness building" and "awareness-to-action" strategies. For example, the Hub may build awareness for clean energy and energy affordability more broadly by better distinguishing rebate programs from tax credits (or the term "incentives" more broadly) to prevent homogenizing and disengagement based on familiarity with the tax process. We also believe Hubs should de-emphasize programmatic details in outreach activities while emphasizing Hub services, customer experience, and outcomes. Then, as individuals become more aware of programs and incentives through lead intake, the Hub may promote "enrolling" leads in a holistic, coaching program that walks clients through a more structured step-by-step program of energy efficiency to electrification to renewable energy.
- Continue to strengthen relationships and outreach channels with organizations serving specific market segments: low-income; modest-income and Asset-Limited-Income-Constrained-and-Employed (ALICE); cultural groups, small-business; non-profits; landlords and property management groups. Leverage these partnerships and coalitions for awareness building campaigns allowing the Hub to focus on navigation services and aware-to-action activities.
- Strengthen relationships between trade associations, participating contractors, training programs, and other workforce development entities to address barriers to growing the clean energy labor market. Develop strategies to support layering services and subcontracting for more holistic projects that will get homes ready for energy upgrades and reduce time between projects.
- In the absence of more publicly available quality assurance data, the Hubs may be able to strengthen our evaluation role of services that exist within our scope of work to gain further insight into customer experience. Customer intake and exit surveys evaluating the services of the Hub, consumer confidence, program design, and customer experience with participating contractors.
- Continue to build out educational materials focusing on hard-to-reach market segments including, landlord and property managers, underrepresented ethnicities, and job seekers from underserved communities.
- Leverage existing funding, pilot project funding, and community campaign funding to support

collective action networks (e.g. Mid-Hudson Regional Sustainability Coalition and the Regional Climate Action Roadmap) and mutual-aid networks.
- Increase capacity in delivering services via multiple languages prevalent in DACs.
- Increase scale of workforce development activities like workplace and training program orientations, conferences, working groups, and/or further developing a clearinghouse for regional clean energy job opportunities.

The conclusion of this report details next steps and projected timelines to implementing these recommendations as well as posits new research questions based on our findings that we will seek to incorporate into future analyses.

II. Baseline Regional Characterization

1. Regional Characterization

People from all over the world have come to reside in the Hudson Valley, adding to our rich cultural diversity. See map of the Mid-Hudson counties in Figure 1. This can present a challenge to communicating with utility customers about their energy needs, navigating programs, and providing energy services. The highest concentration of households whose primary language is one other than English is located in the southern portion of the region in Rockland and Westchester Counties. It is worth noting that because DAC designation follows census tracts, that certain towns and villages encompassing multiple census tracts with and without DAC designation may find it difficult to access and redistribute funding for the particular DAC(s) within their borders. Unless otherwise cited, the statistics mentioned in this section can be found in the accompanying story map.

Figure 1. Mid-Hudson Counties.

i. Dutchess County

Dutchess County is located on the east side of the Hudson River, north of Putnam county and south of Columbia county, and consists of 31 DACs by census tract. Many of these disadvantaged communities are areas within larger municipalities that also encompass non disadvantaged communities. There are a number of census tracts within Poughkeepsie that are designated disadvantaged communities. These census tracts also show the highest number of non-English speakers in the county. For example, 28% of Poughkeepsie City's population is non english speaking.

In Dutchess county 30% of the homes are renter occupied, and of those homes 54% of renters are spending more than 30% of their income on rent. In one census tract within Poughkeepsie City, 86% of occupied buildings are renter occupied. Of these renters, 46.57% are spending more than 30% of their income on rent. In another census tract just south of this, 82% of occupied homes are renter occupied, and 63.53% of these homes spend over 30% of their income on rent. Perhaps the most extreme example can be seen in a census tract in Wappingers Falls Village. This area has a very high housing burden with 70.30% of renters spending over 30% of their income on rent.

ii. Orange County

Orange County is located on the Western side of the Hudson River, central to our region and the I-84 corridor. Of Orange County's 79 census tracts, 42 of them are designated as disadvantaged communities (DACs), primarily concentrated in the cities of Newburgh, Middletown, and Port Jervis. A considerable concentration of non-English speakers exists within Orange County, with six census tracts having over 20% of their population being non-English speakers. This is especially pronounced in the City of Newburgh, where four of its census tracts have over 20% non-English speaking populations.

iii. Putnam County

Putnam County lies east of the Hudson River, just south of Dutchess and north of Westchester. It is the only county within the Mid-Hudson region with no designated DACs in any of its 19 census tracts. Most of Putnam County has a 0-5% population of non-English speakers, with the exception of Lake Carmel (6%), Mahopac (7%), and Brewster Hill (14%). Of the total renter-occupied units in the county, 53.53% spend

over 30% of their income on rent. Brewster Hill has a 56.33% housing burden with 12% unemployment. Carmel has a 69.25% housing burden with 5% unemployment. An area in Mahopac has a 56.38% housing burden.

iv. Rockland County

Rockland County is New York state's second-southernmost county and the southernmost county on the western side of the Hudson River, bordering northern New Jersey. Rockland County has the third-highest median household income in the Mid-Hudson Valley — $97,423 — yet, of the county's 66 census tracts, 18 of them meet New York State's criteria for designation as a disadvantaged community (DAC). Most of these census tracts are located close to the major highway route I-87 or along the Hudson River. The remainder of Rockland's census tracts did not meet the DAC criteria. Some of the non-DAC census tracts, however, border closely or are within the same towns and villages with higher concentrations of DAC census tracts.

Concentrations of non-English speakers in Rockland correlate with a census tract being designated as a DAC. Of the ten census tracts with the highest concentrations of non-English speakers, six of them are DACs located in Haverstraw, Spring Valley and Suffern. The four census tracts that are non-DAC are located in Monsey and New Square.

Of all housing units in the county, 100,438 are occupied. Approximately 32.68% of these units are occupied by renters, and the occupants of 18,404 of them (about 56.1%) pay 30% or more of their income toward rent costs. The remaining approximately 67.31% of Rockland's housing units are occupied by their owner(s).

v. Sullivan County

Sullivan County is the Northwestern-most point of the Mid-Hudson region, surrounded by Ulster County to the East and Orange County to the South. Parts of Northern Sullivan are located in the Catskills, and it is bordered by the Delaware River to the West – which separates New York State from Pennsylvania. Sullivan is the region's most rural county – all of its census tracts are considered "rural" according to the USDA (USDA, n.d.-b). At 75,116 residents, Sullivan County has the smallest population of all 7 counties in the Mid-Hudson region.

The proportion of DACs is about average when compared to the other 6 counties; 41.67% of Sullivan's 24 census tracts are classified as Disadvantaged Communities. Sullivan ranks lowest when it comes to median household income ($57,751), public transit use (2.2%), broadband rate (68.4% of households), and college rate (25.5%). Most of Sullivan County is English-speaking, but DACs like Kiamesha Lake and South Fallsburg have a higher proportion of non-English speakers. Renter-occupied housing in Sullivan also tends to congregate around these same Disadvantaged Communities. In Liberty, Monticello, Kiamesha, and South Fallsburg (all DACs), over 50% of housing units are renter-occupied, with Liberty and Monticello facing significantly high rental costs.

vi. Ulster County

Ulster County is the largest county by area in the Mid Hudson Region. Bounded by the Hudson River on the east, Sullivan County to the west, Orange County to the south and Greene and Delaware Counties to the north, over 150,000 acres of Ulster County are Forest Preserve within the Catskill Park. Nearly all of that acreage is classified as wilderness and wild forest. Of the County's 19 towns, 9 contain areas designated as DAC's. The County seat of Kingston is the only city and most of it has also been designated as a DAC, as have the County's three villages—Ellenville, New Paltz, and Saugerties.

vii. Westchester County

As the gateway between New York City and Upstate New York, Westchester County is a densely-populated region of significant geographic, demographic, and economic diversity – despite it being regarded as one of the wealthiest counties in the state. Westchester's median household income is the highest of all counties in the Mid-Hudson region at $110,139 – however, 99 of Westchester's 219 census tracts (45.2%) are designated as Disadvantaged Communities (DACs). Most of these DACs are located in Southern Westchester – which borders the Bronx – and along the Hudson River.

Areas designated as Disadvantaged Communities see numerous census tracts where over 30% of community members speak no English (including Peekskill, Mount Kisco, Ossining, Tarrytown/Sleepy Hollow, White Plains, Port Chester, New Rochelle, Mount Vernon, and Yonkers), showing that language has to be adequately considered and accounted for in programs and outreach around them. Additionally, more than half (51.7%) of renter-occupied housing in Westchester sees over 30% of their income go towards paying rent (also known as housing burden) and tends to be more prominent in these same DACs.

2. Building Sector Assessment

In the Mid-Hudson Region, residential buildings make up nearly 99% of the existing 900,000+ occupied buildings. About 34% of all residential buildings in the region are renter occupied, and 66% owner-occupied. The most commonly seen residential building in the region is single-family detached at 56%. About 23% of residential buildings in the region are 5+ family units, and only approximately 2% of all residential units are mobile homes. The majority of these buildings are heated by either fuel oil (36%) or utility gas (45%). Unless otherwise cited, the statistics mentioned in this section can be found in the accompanying story map.

i. Dutchess County

Dutchess County has 13% of the residential housing in the region. Dutchess County aligns closely with the regional averages for renter occupied and owner occupied units, with 69% owner-occupied. Residential buildings are primarily single-family detached (63%), followed by 5+ units (15%), 2-4 units (13%), single-family attached (6%), and then mobile homes (3%). Most homes in Dutchess County are heated by fuel oil (50%), utility gas (28%), or electricity (14%).

The designated disadvantaged communities in the cities of Beacon and Poughkeepsie have high population densities along with aging housing stock. 82% of the homes in a census tract of Poughkeepsie City were built prior to 1960. Additionally, 59% of homes in one of the census tracts in Beacon city were built before 1960. These two cities represent the areas of Dutchess county with some of the highest need of energy efficiency upgrades to their homes.

Areas of highest energy burdens in Dutchess county include a census tract of Red Oaks Mill with an average energy cost per year of $2,959. Another census tract in Myers Corner has a high energy burden with an average energy cost of $3,100 per year. Other areas of high energy burden include a census tract in Freedom Plains. None of these noted areas are considered disadvantaged communities, and do not have a large number of older homes.

ii. Orange County

Orange County has about 16% of the residential housing in the region. Orange County aligns closely with the regional averages, with 68% owner-occupied. Residential buildings are primarily single-family detached (63%), followed by 5+ units (17%), 2-4 units (11%), single-family attached (7%), and then mobile homes (2%). The majority of Orange County's housing stock was constructed before 1980, with single-family homes accounting for approximately 60% of the housing stock. However, there's been an increase in multifamily buildings, now comprising roughly 35% of the housing stock. Mobile homes and vacant housing units make up the remainder.

Of the occupied housing units in Orange County, 31% are renter-occupied, with 21,369 units (approximately 61%) facing rent burdens exceeding 30% of their income. The remaining 69% of housing units are owner-occupied. The primary heating fuel in Orange County is utility gas, used in the vast majority of single-family homes and multifamily buildings. Electricity and fuel oil are the second and third most common heating fuels. Mobile homes primarily rely on fuel oil and propane.

Energy prices in Orange County, as of 2021, were: $19.66/MMBtu for distillate, $48.88/MMBtu for electricity, $24.62/MMBtu for kerosene, $13.35/MMBtu for natural gas, $30.79/MMBtu for propane, and $6.77/MMBtu for wood. These prices reflect a significant increase over the past 20 years, contributing to high annual energy costs and energy burdens across the county. These increases have led to notably high average annual energy costs and energy burdens across Orange County, with a significant number of census tracts experiencing energy burdens between 7% and 11%, primarily concentrated in the central and eastern areas of the county. The high average annual energy costs are more dispersed throughout the county, with a slight cluster observed in the central region, notably in the City of Newburgh and surrounding areas.

iii. Putnam County

Putnam County makes up only 4% of the residential housing in the region. Putnam County has significantly more owner-occupied units than the other counties in the region (84%). Residential buildings are primarily single-family detached (78%), single-family attached and 2-4 units (both 7%), 5+ units (6%), and then mobile homes (1%). Primary fuel type for housing in Putnam County is fuel oil or kerosene (57.4%), followed by electric (21.3%).

Nineteen (19) percent of Putnam County's housing units were built in 1939 or earlier. A census tract in Putnam Lake has the greatest percentage of aged housing, with 53% being built before 1960. One in Lake Mohegan has 45% of its housing stock built before 1960, and one in Lake Carmel has 42% built before 1960. 49% of homes were built before 1960 in Nelsonville Village in Cold Spring.

All census tracts in Putnam have an energy burden of 6% or less, except for one in Mahopac, with an energy burden of 7%. This is the same census tract in Mahopac with a comparatively high housing burden from the rest of the county, as well as a larger population of non-English speakers.

iv. Rockland County

Rockland County has 12% of the residential housing in the region. Rockland County aligns closely with the regional averages for renter occupied and owner occupied units, with 68% owner-occupied. Residential buildings are primarily single-family detached (57%), followed by 5+ units (19%), 2-4 units (15%), single-family attached (8%), and then mobile homes (1%).

Like many other counties in the Lower and Mid-Hudson Valley regions, the majority of Rockland's housing stock was constructed prior to 1980; 53% of the stock was constructed between 1950 and 1979. Due to historical zoning law bias, which favored the development of single-family homes, single-family homes still account for the largest percentage of housing stock type (approx. 65%). Roughly 57% of single family homes in Rockland are detached units, and 8% are attached units. However, population growth within Rockland over the past few decades has resulted in the construction of multifamily buildings (two or more units). Multifamily buildings account for about 34% of Rockland's housing stock.

The vast majority of Rockland's single family homes (attached and detached) and multifamily buildings utilize utility gas as their space heating fuel. The second-most utilized is electricity, followed by fuel oil. The few mobile homes present in Rockland utilize fuel oil primarily, followed by propane.

As of 2021, energy prices were the following per million British thermal unit (MMBtu): $18.59/MMBtu for distillate; $57.10/MMBtu for electricity; $22.93/MMBtu for kerosene; $13.35/MMBtu for natural gas; $31.74/MMBtu for propane; and $6.77 MMBtu for wood. These prices are indicative of the energy price increase trend that has occurred over the past 20 years. Between 2001 and 2021, the costs of the following energy sources increased by the following: $8.36 for distillate; $15.96 for electricity; $14.19 for kerosene; $1.98 for natural gas; and $5.45 for propane. Between 2020 and 2021, the costs of

these energy sources increased by the following percentages: 18% for distillate; 6.1% for electricity; 57.7% for kerosene; 7.8% for natural gas; 21.2% for propane; and 20% for wood.

v. Sullivan County

Sullivan County has 5% of the residential housing in the region. Sullivan County aligns closely with the regional averages for renter occupied and owner occupied units, with 69% owner-occupied. Residential buildings are primarily single-family detached (72%), followed by 5+ units (19%), 2-4 units (15%), notably Sullivan has the highest proportion of mobile homes in the region (9%), and single family attached make up 4% of the residential buildings.

Sullivan is predominantly made up of single-family detached housing, which comprises 72.1% of all housing units in the county – though notably, Sullivan is also home to 17% of the entire region's mobile home units. Housing in Sullivan is primarily heated with fuel oil and propane – particularly in the case of mobile homes – with very limited usage of utility gas. Sullivan does not have a particularly high proportion of pre-1960s homes, though historic homes are more prominent in Central (around Liberty Village and Monticello) and Northwestern Sullivan. The map on housing density shows how spread out Sullivan's population is, even in areas that have more renter-occupied housing. 44.53% of housing units in Sullivan are unoccupied, more than double the rates seen in the other 6 counties.

Nearly every census tract in Sullivan County is experiencing energy burden, with the exception of one area in South Fallsburg. Energy burden is highest in Livingston Manor (10%), followed by Liberty Village and Rock Hill (both at 9%). Sullivan's rural classification allows for access to some funding opportunities that serve rural communities – such as the USDA's Single Family Housing Repair Loans & Grants (USDA, n.d.-a) and the Rural Sullivan Housing Corporation (Rural Sullivan Housing Corporation, n.d.).

vi. Ulster County

Ulster County has 9% of the residential housing in the region. Ulster County has 69% owner-occupied residential building units. Residential buildings are primarily single-family detached (68%), followed by 2-4 units (13%), 5+ units (8%), mobile homes (6%), and single-family attached (4%).

Housing insecurity and energy burden are greatest among residents in Kingston and the villages where the highest percentage of renters reside. In the Village of New Paltz and the City of Kingston, the majority of renters and owners spend more than 30% of their income on rent/mortgages. The County's housing stock is diverse—two thirds are single family detached houses and 1 in 10 live in mobile homes. From early 17th Century buildings in the National Landmark Historic District of Huguenot Street in New Paltz to new manufactured homes sited slab-on-grade by Habitat for Humanity in Saugerties, the diversity of homes is apparent.

vii. Westchester County

Westchester County contains 41% of the residential housing in the region. 62% of these units are owner-occupied. Residential buildings are primarily single-family detached (44%). Westchester has the largest number of 5+ family units with 35%, 25% of that being 20+ family units. 15% are 2-4 family units, followed by single-family attached (6%), and mobile homes (0%).

Single-family detached homes make up 43% of all housing units in Westchester county, with multi-family homes making up a near-equally significant portion at 33%. Fuel oil and utility gas are the dominant heating fuel types – with the exception of 5+ unit multifamily housing, where electricity provides heating for nearly 1 in 5 properties. The majority of housing units (61.3%) are owner-occupied, and 38.3% are renter-occupied. When it comes to housing age, the data presented here shows a high proportion of pre-1960s homes across the county, particularly in Southern Westchester. This is seen in DACs as well as non-DACs, including Larchmont, Mamaroneck, Rye, Bronxville, Hastings-on-Hudson,

Scarsdale, and Dobbs Ferry. All of these areas see more than 50% of homes being built prior to 1960, with the U.S. Census reporting a median age of 67 years (U.S. Census Bureau, 2022).

Energy burden (where energy costs exceed 6% of a household's income) is seen countywide, but is more extreme in southern than northern Westchester municipalities. Energy burden tends to be more significant in areas that have a high proportion of pre-1960s homes, owner-occupied housing, and/or low-income households. However, there are some areas where the reason for significant energy burden is unclear – for example, one census tract in Harrison has a significant energy burden at 15%, but only 8% of households were built before the 1960s, only 8% were renter-occupied, and it is not designated as a Disadvantaged Community. Further research is needed to understand the nature of energy burden in market-rate communities.

3. Regional Clean Energy Workforce

New York State's bold climate goals require a skilled workforce. The Just Transition Working Group's 2022 jobs study finds that by 2030, meeting the state's clean energy targets will create 211,000 new jobs, with new jobs exceeding those displaced by 10 to 1. By 2050, those numbers grow to 268,000 new jobs, or a 54% increase in workforce statewide. Those jobs are in the electricity, fuels, buildings, and transportation sectors (Just Transition Working Group, 2021). Though these jobs will not be distributed evenly around the state, those numbers can provide some rough local estimates. According to census data, the seven counties in the Mid-Hudson region are home to approximately 11.5% of the state's population. 11.5% of 268,000 jobs would mean around 31,000 new jobs in the Mid-Hudson region by 2050. The 2021 Climate Action Council Draft Scoping Plan specifies that the greatest concentration of new jobs will be found in the residential HVAC and weatherization industries (NYS Climate Action Council, 2022). Local research firm Pattern for Progress has designated the Hudson Valley as a region experiencing the demographic phenomenon known as the Great People Shortage, referring to steady population decline resulting in fewer candidates for jobs, fewer children enrolled in schools, fewer volunteers for community needs, and lower demand for consumer goods. As we approach 2030, the Hudson Valley faces an increase in demand for clean energy workers in conjunction with this shrinking labor pool (Hudson Valley Pattern for Progress, 2023).

Communities for Local Power (CLP), an Ulster County nonprofit based in Kingston, has offered paid clean energy workforce training since 2020. They keep detailed internal records on their program, which is county- and foundation-funded and provides comprehensive wraparound support, down to taxi services and literacy tutoring (Communities for Local Power, n.d.).The data CLP has collected (obtained through interview) indicates three primary categories of roadblocks faced by trainees in completing their training and successfully obtaining clean energy employment: insecurity in housing, transportation, and childcare. Regional data supports their local findings.

The "Great People Shortage" report cites housing cost and availability as the top motivation given by people moving out of the Hudson Valley (Hudson Valley Pattern for Progress, 2023). In a separate 2023 report titled "Out Of Reach," Pattern breaks down the cost of housing in the region as compared to local wages. From 2019 to 2023, rents across the Hudson Valley increased on average by 45%, while wages have not kept pace. As of 2023, there is no county where a worker could earn that county's average wage, work 40 hours a week, and pay 30% of their income for a single-bedroom apartment at market rate. In Rockland County, where the shortfall is greatest, it would take 105 hours per week at the average wage of $15.91 per hour to afford a one-bedroom apartment (Hudson Valley Pattern for Progress, 2022). For reference, the average starting wage for an HVAC/R technician in the Hudson Valley is $21.83 per hour (NYSERDA, n.d.), which Pattern calculates would be a sustainable wage for a one-bedroom apartment in Sullivan county, but not in Dutchess, Orange, Putnam, Rockland, Ulster, or Westchester. Furthermore, the housing available is inconsistent with the changing needs of Hudson Valley residents, with the Great People Shortage report citing more, smaller families competing for the same stock of larger, more

expensive homes. Housing in the Hudson Valley is insufficient in quantity, too expensive for most residents, and, due to zoning requirements, difficult to build (Hudson Valley Pattern for Progress, 2023).

Transportation access is highlighted in the StoryMap which accompanies this report. Each of the seven counties in the Hudson Valley has local public transit, though usage rates vary from county to county. The highest rates of public transit use are concentrated in Westchester county. The northern and western ends of the Hudson Valley region have public transportation use rates of 12% or less. Fifteen percent of Hudson Valley job seekers listed transportation as a barrier in seeking employment (Hudson Valley Pattern for Progress, 2023).

The Hudson Valley has experienced a 27% decline in childcare providers since 2007, with present capacity for at most 28% of local children under 10. Despite the population contraction cited in the Great People Shortage report, the decrease in childcare businesses has exceeded the regional decline in birthrates. Median-earning households in the Hudson Valley spend 13-15% of their income on childcare for one child, despite federal guidelines that childcare costs not exceed 7% of a family's annual income (Hudson Valley Pattern for Progress, 2024).

4. Regional Partners and Assets

At the time of this report, the Mid-Hudson Regional Clean Energy Hub consists of 16 staff members across 10 organizations. Cornell Cooperative Extension Dutchess County leads the project with subcontracting arrangements to CCE Sullivan, Sustainable Westchester, New Yorkers for Clean Power, and the Consensus Building Institute. The Mid-Hudson Regional Clean Energy Hub is supported and counseled by an Advisory Committee of 8 volunteers from communities throughout our region. Additional support is provided by CCE Communications, shared Communications Manager supporting five regions of the Hub network with CCE involvement, CCE Orange, CCE Putnam, CCE Rockland, CCE Ulster, and the Hudson Valley SNAP-Ed NY Program.

In addition, our program has received a total of 37 letters of support and MOUs with local nonprofits, community-based organizations, social service agencies, Weatherization Agencies, HEAP certifiers, local governments, Clean Energy Communities, Climate Smart Communities, energy contractors, investor-owned utilities, workforce development agencies, chambers of commerce, and sustainability focused advocacy, planning, & education groups. Partners include Community Housing Innovations, Hudson River Housing, the Municipal Housing Authority of the City of Yonkers, Rebuilding Together Dutchess County, Taconic Resources for Independence, Westhab, Putnam Community Action Program, Dutchess Community Action Program, Delaware Opportunities, Regional Economic Community Action Program (RECAP), Ulster County Community Action Committee, Hudson Valley Regional Council, Westchester County Board of Legislators, Dutchess County Planning and Development, Sullivan County Office of Sustainable Energy, City of Mount Vernon, City of New Rochelle, Chris Burdick, NYS Assemblymember, 93rd District, Westchester County's Director of Energy Conservation and Sustainability, Bloc Power, Energy Management Solutions, Health Homes Energy Consulting, Geothermal Works, Central Hudson, New York State Electric & Gas (NYSEG), Consolidated Edison, Dutchess County Regional Chamber of Commerce, Purchase College, Westchester Community College, Climate Reality Project–Westchester Chapter, Climate Reality Project–Hudson Valley & Catskills Chapter, Groundwork Hudson Valley, Bedford 2030, Sustainable Putnam, Federated Conservationists of Westchester County, and Partners for Climate Action.

In addition to our partners, there are several organizations and programs that the Hub can leverage. For example, several people we spoke with in regards to workforce training mentioned that partnering with trade centers, local organizations like BOCES and Soulful Synergy, and community colleges for education and training is critical.

III. Baseline Assessment of Clean Energy Program Participation

1. Baseline of Regional Clean Energy Programs

i. Dutchess County

Due to older housing stock, Dutchess county benefits greatly from taking advantage of state funded energy efficiency programs. NYSERDA has invested a total of $39,783,226 into energy efficiency projects through programs in Dutchess county. Residents have leveraged a total of $267,142,934 funds towards energy efficiency upgrades in their homes. As a whole NYSERDA has invested more money into non designated disadvantaged communities than in their DAC areas of Dutchess county. Funding invested in non DAC areas has been a total of $24,459,249 compared to $15,323,977 in DAC areas. Although Dutchess county does not exhibit the greatest gap in funding between DAC and non DAC areas in the Mid Hudson region, this still highlights the importance of outreach and engagement for NYSERDA programming in areas of Dutchess that need it most. One successful example of targeted investment can be seen in the designated disadvantaged community of MacDonell Heights in the town of Poughkeepsie with the highest investment of NYSERDA dollars in the county at $3,529,277. Annual energy bill savings in Dutchess county total $11,019,418, and Dutchess has seen an annual reduction of 811,478 metric tons in CO2 emissions because of NYSERDA investments.

ii. Orange County

Orange County, NY has implemented various programs to advance its clean energy initiatives, leveraging resources and partnerships to promote sustainability. These efforts include the Community Choice Aggregation (CCA) program, enabling residents and small businesses to collectively purchase renewable energy at competitive rates, thereby reducing greenhouse gas emissions and supporting the transition to cleaner sources. Additionally, the Energy Improvement Corporation (EIC) has facilitated Property Assessed Clean Energy (PACE) financing, empowering property owners to invest in energy efficiency and renewable energy projects with no upfront costs, and stimulating local economic growth while reducing energy consumption. Furthermore, Orange County has partnered with organizations like Sustainable Hudson Valley to provide technical assistance and support to municipalities in developing comprehensive clean energy plans, fostering a culture of innovation and collaboration towards a greener future.

NYSERDA's impactful initiatives have been pivotal in advancing clean energy in Orange County, NY, with significant financial investments and strategic support. Specifically, NYSERDA has allocated millions of dollars towards programs like the Clean Energy Communities initiative, resulting in savings for participating municipalities and a Y% reduction in greenhouse gas emissions. With its substantial funding, the NY-Sun program has facilitated the installation of solar PV systems across the county, representing a significant portion of the state's renewable energy capacity. Additionally, NYSERDA's investments in workforce development have contributed to the training of hundreds of individuals, ensuring a skilled labor force ready to drive the transition towards sustainable energy in Orange County. Between the years of 2017-2022, NYSERDA has invested $23,102,852 in designated DAC communities and $29,795,810 in non-DAC communities.

iii. Putnam County

There are no DACs to compare to these values, but in terms of NYSERDA funding for programs, $6,054,384 has been invested in Putnam County. In census tract 106, a rural area that covers much of northwest Putnam County (Nelson Corners, North Highland), there was $5,307,953 in leveraged funds. Annual energy bill savings in Putnam County from programs totaled $2,446,502 annually, with a projected lifetime savings of $44,061,556. Annual CO2 emissions reductions are 8,522 metric tons in Putnam County, projected to be 162,989 metric tons lifetime. The majority of the reduction is in Carmel, where lifetime CO2 emission reduction is 17,660 metric tons.

iv. Rockland County

Given how widespread high average annual energy costs and energy burdens are throughout Rockland County, a strategy that has a demonstrated track record of addressing these issues successfully is the implementation of residential energy efficiency work.

NYSERDA has invested $31,053,716 dollars into Rockland County via its portfolio of energy efficiency programs. Of this figure, $4,926,090 has gone into projects within disadvantaged community census tracts and $26,127,626 has gone into projects within non-disadvantaged community census tracts. The disadvantaged community census tracts with the top five highest levels of investment are located within the villages of Haverstraw, Spring Valley, and Hillburn respectively. The census tracts with the top five highest levels of customer leveraged funds (money that customers had to provide to pay toward the overall cost of the NYSERDA project) are also located within the villages of Haverstraw, Spring Valley, and Hillburn.

In Rockland's disadvantaged community census tracts, energy usage decreases as a result of energy efficiency work average 352.74 megawatts/hour per year and 22,166 megawatts/hour per lifetime. In Rockland's non-disadvantaged community census tracts, it averages at 1,465.84 megawatts/hour per year and 53,881 megawatts/hour per lifetime. In terms of energy bill savings resulting from energy efficiency work, the annual average for disadvantaged community census tracts is $105,350.44 per year and $2,158,655.44 per lifetime. For non-disadvantaged community census tracts, it averages at $206,160.59 per year and $9,895,708.59 per lifetime. When the savings for the two types of census tracts are compared, energy bill savings are 51% greater per year and approximately 45.85% greater per lifetime in non-disadvantaged community census tracts. This is in part due to the smaller number of disadvantaged community census tracts in Rockland.

In terms of carbon dioxide emission reductions, they average at 323.37 metric tons per year and 6,644.88 metric tons per lifetime for each disadvantaged community census tract. In non-disadvantaged community census tracts, they average at 641 metric tons per year and 14,071 metric tons per lifetime.

v. Sullivan County

NYSERDA contributed $7.14 million in funding to Sullivan from 2017-2021, which made up 16.13% of all funding towards clean energy projects in the county – the largest share of NYSERDA funding seen across all 7 counties in the Mid Hudson region. Forty-three (43) percent of this NYSERDA funding has been directed towards DACs, which is above the guidelines put forth by New York State's Climate Act and one of the highest rates across the whole Mid Hudson region.

Although NYSERDA funding in DAC census tracts is higher on average ($306,950) than non-DAC census tracts ($290,809), geographic data suggests that DAC funding is not evenly spread out. Such funding has been most significant in the southern portion of Mongaup Valley, which has received over $1.48 million for a population of 3,742. Other DACs have received significantly less funds – including more highly-populated areas in Liberty Village, Loch Sheldrake, and Monticello Village, all of which have received around $200,000-$300,000 in NYSERDA funding. Non-DACs like Rock Hill, Jeffersonville, and Grahamsville received a high amount of NYSERDA funding, but also saw more customer-leveraged funds than other municipalities in Sullivan.

Heat and electricity savings have been most significant in Mongaup Valley and Kiamesha Lake (both DACs) as well as Narrowsburg, Smallwood, and Rock Hill (non-DACs). The same DACs also benefited the most from energy bill savings, in addition to Grahamsville (a non-DAC). More work is needed to ensure that the emissions and cost-saving benefits associated with clean energy projects are distributed equitably across Sullivan's municipalities – particularly among its DACs.

vi. Ulster County

Over 35 million dollars in NYSERDA funds and over 208 million dollars in leveraged funds have been spent in Ulster County for energy efficiency and clean energy projects. Heavy investment and early

adoption countywide is likely due to a number of factors. Awareness of climate-related issues may be attributed, in part, to high profile legislators' inputs into significant legislation such as New York State's historic Climate Act as well as associations with well-known NPO's–New Yorkers for Clean Power, Clearwater and well-established environmentalist networks. This awareness, coupled with well-documented billing errors by the County's major utility provider (Central Hudson serves most of Ulster County with the exception of a rural northwest portion which is in NYSEG's territory) have likely compelled residents to use available financial resources to best advantage. In 2023 Central Hudson ratepayers utilized rebate programs to aid in 158% of programs' CO2e emissions reduction targets--4205 metric tons acquired reduction/2665 metric tons planned reduction (NYSERDA, n.d.-b).

vii. Westchester County

From 2017-2022, NYSERDA has invested over $60m in Westchester County for energy- and cost-saving upgrades, 32% of which has been directed towards DACs (similar to the Mid Hudson region as a whole.) When accounting for population size, Westchester has one of the lowest rates of NYSERDA funding per capita – Westchester comes in at $61 per capita, which is less than half of Dutchess and Orange Counties and less than one third of Ulster County. NYSERDA funding makes up less than 8% of all funding towards clean energy projects in Westchester.

NYSERDA funding in DAC census tracts averages at $194,289, compared to $339,981 in non-DACs. Geographic analysis provides further evidence that NYSERDA funding is lower in areas with a high proportion of low-income, renter-occupied housing. This is more pronounced in Southern Westchester, where DACs with more renter- than owner-occupied housing – i.e. Yonkers, Mount Vernon, and New Rochelle – have seen limited investment compared to those in Northern Westchester, such as Mount Kisco and Peekskill.

DACs have experienced a fraction of the benefits from clean energy programs that non-DACs have; when compared to DACs, non-DACs have seen 2.48 times the annual CO2 emissions reductions and 2.59 times the amount of annual customer bill savings. While the high proportion of single-family housing in non-DACs partially explains these trends – single-family detached homes have greater control over making energy upgrades compared to apartment dwellers – the prevalence of energy-related burdens in DACs indicate more work to be done towards equitable distribution of funding and benefits. In addition to greater energy cost burdens, DACs are more likely to face emissions-related health burdens – such as asthma, which on average affects 63.56% of community members in a given DAC (compared to 22.96% in non-DACs.) The high energy-related burdens facing DACs therefore do not match up to current investment and emissions reduction efforts.

Westchester County is a regional leader on clean energy initiatives, leveraging resources and partnerships to promote sustainability. These efforts include the first in the state - Community Choice Aggregation (CCA) program, enabling residents and small businesses to collectively purchase renewable energy at competitive rates, thereby reducing greenhouse gas emissions and supporting the transition to cleaner sources. Additionally, the Energy Improvement Corporation (EIC) has facilitated Property Assessed Clean Energy (PACE) financing, empowering property owners to invest in energy efficiency and renewable energy projects with no upfront costs, and stimulating local economic growth while reducing energy consumption. Furthermore, Westchester County has partnered with organizations like Sustainable Westchester to provide technical assistance and support to municipalities in developing comprehensive renewable energy projects, fostering community campaigns focused on energy efficiency, solar and clean heating and cooling, as well as collaboration towards a greener future.

2. Contractor Participation in Clean Energy Programs

Clean energy contractors are distributed unevenly across the Hudson Valley, as indicated by this data pulled from NYSERDA's Participating Contractor lists (Table 1). The region particularly lacks participating contractors in the EmPower+ program (NYSERDA, n.d.-d).

	EmPower+	Multifamily Building Solutions Providers	NYS Clean Heat	NY-SUN
Dutchess	18	**58**	267	183
Orange	23	57	247	187
Putnam	*15*	56	167	179
Rockland	23	*57*	*152*	185
Sullivan	*15*	*55*	161	*167*
Ulster	20	*55*	248	177
Westchester	**25**	56	**316**	**207**
	# fewest participating contractors available			
	# most participating contractors available			

Table 1. Participating contractors in Hudson Valley

In the Story Map, labor participation rate is presented alongside the rate of unemployment. High participation with low unemployment signifies a strong labor market. Low participation indicates a high proportion of retirees, individuals not legally permitted to work, or able-bodied, working-age people who have given up on looking for a job and left the workforce. Unemployment numbers do not account for discouraged workers who have dropped out of the workforce altogether. Rather, they indicate whether people who are looking for work are having success in finding it (Majaski, 2023). Municipalities with a high proportion of individuals unsuccessfully seeking employment include Poughkeepsie, Newburgh, Mount Vernon, and Monticello, according data linked in our Story Map.

3. Existing NYSERDA Community Campaigns

The Clean Energy Communities (CEC) program has been a key driver in municipal climate action. Across the Mid-Hudson Region, local governments' endeavors toward fostering a healthy and sustainable environment has been strongly backed by NYSERDA's Clean Energy Communities program, providing the resources and funding to municipalities successfully execute and achieve those goals. By providing technical assistance, general support and specific guidance, Hudson Valley Regional Council's CEC Coordinators are a key piece in enabling CEC adoption and implementation across the region. Detailed in the table below is a summary of CEC participation by County, provided by the Hudson Valley Regional Council (HVRC).

	Completed Clean Heating and Cooling	In-Progress Clean Heating and Cooling	Completed Community Solar	In-Progress Community Solar	Completed Electric Vehicles	In-Progress Electric Vehicles	Totals
Dutchess County	3	5	4	1	5	3	**21**
Orange County	5	1	3	2	5	1	**17**
Putnam County	3	0	3	0	2	0	**8**
Rockland County	1	1	3	1	1	1	**8**
Sullivan County	0	1	1	0	0	1	**3**
Ulster County	7	0	7	3	7	0	**24**
Westchester County	26	4	17	7	14	2	**70**

Table 2. CEC participation by county

The highest uptake of the CEC is in Westchester County, due to Sustainable Westchester's partnership with HVRC and the local municipalities. Together they have promoted and worked with CEC since inception, with a focus on both high impact action items and community campaigns. By collaborating with municipalities, volunteers and the CEC coordinators, Sustainable Westchester has been involved in over 80 community campaigns (demand response campaigns are not listed in the table above), accessing over $430,000 in CEC funding for Westchester County municipalities, plus over 100 high impact actions.

Aiming to replicate the success of the campaigns led in collaboration with Sustainable Westchester, in 2023, HVRC pushed to bolster campaign participation in the rest of the Region, leading groups of municipalities through the campaign process together. Communities collaborated on events, such as Shandaken and Olive's EV and Heat Pump event at the Catskill Visitor Center and Orange County's webinar hosted in collaboration with their participating municipalities covering all the campaigns.

The grants offered by CEC are a proven motivator for communities to take climate action, including clean energy upgrades like air source heat pumps at the Croton Fire House, electric vehicle charging stations in Marbletown and Nyack, Solar in Poughkeepsie and Kingston, and all-electric non-road vehicles in Orange County, just to name a few. These projects have been visible to our communities and display the value of the technologies.

IV. Stakeholder and Community Engagement

1. Outreach Tools and Methods

i. Informational Interviews

Over the fall of 2023, the Consensus Building Institute (CBI) spoke to eight people representing community interests who are working directly or indirectly with disadvantaged communities in the clean energy field or an adjacent field. The purpose of these interviews were to: CBI connect to community leaders / members; Learn from local people what needs and barriers are; Identify opportunities for improvement; Gauge community engagement needs and best practices for their communities, and; Suggestions for Advisory Committee.

The interviewees were asked the following questions:

- Energy: What energy needs are being met and what needs are not being met? Why? Where do you see opportunities?
- Workforce: Are your community members currently taking advantage of green/clean energy jobs? Why or why not? Where do you see opportunities?
- Engagement: We will embark on in person and virtual community engagement. Do you have any suggestions for how to best meet your community needs?
- Community Liaisons/Advisory Committee: Does anyone come to mind, including yourself?

ii. Advisory Committee

The team created the Mid-Hudson Energy Hub Advisory Committee, who are well networked in their community, liked and trusted by residents, and good at getting things done and people up, out, and engaged. Advisors were tasked with advising on strategies for impactful outreach and education, the development of new partnerships, other opportunities to position DACs to participate in and benefit from the clean energy transition, and the creation and dissemination of the Energy Needs Survey tool. Eight people were selected for the advisory committee, with diverse backgrounds and geography across the Mid-Hudson. The Advisory Committee kicked off their first meeting in March and has met approximately bimonthly since then. See list of Advisory Committee members in Appendix C.

iii. In-Person Public Meetings

The team led a series of Community Energy Gatherings for each of the counties in the Mid-Hudson between the months of May and June (forthcoming). The meetings in May were held in Dutchess, Rockland, Putnam, Ulster, and Sullivan. In June, we are hosting meetings in Sullivan, Orange, and Westchester. The purpose of these gatherings were to share information about what the Mid-Hudson Clean Energy Hub can provide, how Energy Advisors can support and connect them to resources, and learn about barriers and opportunities via open discussion and dissemination of the survey (see next section). The meetings were publicized via email, social media, and personal invitations to trusted community members. The initial meetings in May were in a structured public meeting format that consisted of free dinner, an opening slideshow presentation about the Mid-Hudson Energy Hub, small group discussion about barriers and opportunities, and time to fill out the survey (see agenda in Appendix C). Based on community and advisory committee feedback, the meetings were later tailored to be in an “open house” format, where community members could grab food, ask Energy Advisors questions specific to their needs, fill out the Energy Needs survey, and receive a $20 gift card for their time.

iv. Energy Needs Survey

The team developed a survey to better understand how to make clean energy upgrades and clean energy jobs more accessible for New York State residents (see Appendix D for full survey questions). The first 250 people to respond to the survey received a $20 gift card for their time. The survey takes approximately 20-30 mins to complete. The survey was disseminated via Community Energy Gatherings (see above), via social media by trusted partners, and via the Advisory Committee and Energy Advisors personal outreach. As of May 23, 2024, there have been 53 responses to the survey.

v. Workforce Development Focus Groups and Individual Interviews

Interviews were conducted by Cal Trumann (New Yorkers for Clean Power, a fiscally sponsored project of Catskill Mountainkeeper Inc.) with support from note-takers Melanie and Charlotte, of the Consensus Building Institute. Each interview lasted 45-60 minutes, and the questions were co-created by several Mid-Hudson Hub team members. Ten interviews were completed encompassing service providers for Dutchess, Putnam, Sullivan, Westchester, Orange, Rockland, and Ulster counties. The interviewees included training providers and organizations like community colleges, the Workforce Development Institute, and the Sustainable Refrigeration Council, which is national. The full list of interviewees is kept confidential. See interview questions in Appendix F.

2. Stakeholder and Community Feedback

These results summarize stakeholder and community feedback from 1-1 interviews, public meetings, survey results, and focus group engagement. We summarize the survey results in this section and elaborate on particular barriers and opportunities in the following section. All survey questions and figures can be found in Appendix D and Appendix E, respectively.

There was a relatively even split between male and female respondents. Few respondents self-identified differently (Appendix E, Figure 2). Most respondents were in the 31-50 year range (Appendix E, Figure 3) and live in single family homes (Appendix E, Figure 4). English and Spanish were the two most frequently spoken languages, with several less-common languages also noted (Appendix E, Figure 5). Survey respondents were predominantly white, which is representative of the area's demographics (Mid-Hudson Valley Community Profiles, 2024) (Figure 6). Amongst survey respondents, BIPOC respondents were equally likely to rent or own their home, while white respondents were more likely to own than to rent (Appendix E, Figure 7).

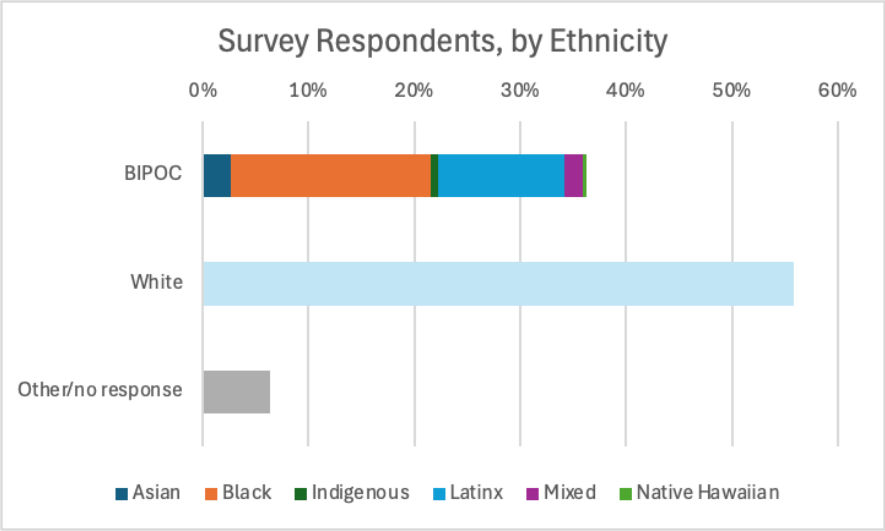

Figure 6. Ethnicity of Survey Respondents

Statistical analysis of survey results did not identify significant correlation between socio-economic factors and likeliness of applying for energy programs. Rather, participants reported negative experiences with program design, perceptions/misconceptions, and physical barriers to the building structure as reasons for a lack of interest in or difficulty applying for the programs. Many stakeholders don't understand the programs available and when they do, find the program process tedious and stressful. However, of those we engaged with, many of them who received help from third parties, such as the Hubs, found the programs to be manageable and said the process was worth the benefits. Nearly 73% of survey respondents either agreed or strongly agreed with the statement, "I would feel more confident in pursuing energy assistance programs if a non-profit were available to help me" (Figure 8, Appendix E).

The survey sought to understand respondents' awareness and engagement with several NYS energy programs. The degree of familiarity and active involvement with these programs varied significantly (Figure 9, below). For example, over 80% of respondents know about the HEAP, while fewer than 60% recognize the WAP. HEAP, EAP, and EmPower have significant buy-in from people who know about the program. On the other hand, there is little buy-in from people who are aware of the WAP, heat rebates, solar rebates, and tax credits. Only about one in every five people aware of these programs applied. Comparatively, data reported to NYSERDA by the Mid-Hudson Regional Clean Energy Hub has noted one in three interested households take action on a project after talking with an Energy Advisor, underscoring the importance of personalized, live assistance from knowledgeable, trusted, educators as an accelerator to the general market.

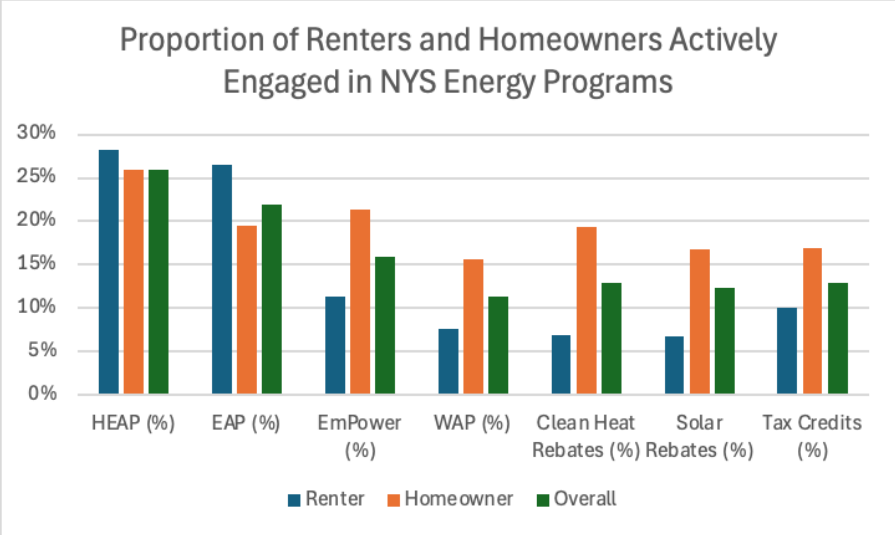

Figure 9. Awareness and Engagement in NYS Programs

Program awareness and engagement varied among homeowners and renters. For example, as shown in Figure 10 (Appendix E), homeowners seem to be more aware about HEAP than renters. Likewise, a particularly large number of homeowners seem to be aware but disengaged in the program. There were similar differences in program engagement in the other programs analyzed (Figure 11, Appendix E). A greater proportion of renters seem to be actively engaged in the HEAP and EAP, while a greater proportion of homeowners are actively engaged in EmPower, WAP, NYS clean heat rebates, solar rebates, and tax credits. These differences in program engagement based on homeownership status are not surprising, given that many of these programs provide benefits for investments usually made by homeowners, not renters.

Though the survey did not yield enough observations to verify the statistical significance of these findings, there seems to be major differences in program awareness and engagement between white and BIPOC respondents. For the seven NYS programs analyzed, most actively engaged respondents were white (Figure 12, Appendix E). White people accounted for 74%-86% of all actively engaged respondents in the programs analyzed. There is a large gap in engagement even while adjusting for differences in the overall number of white and BIPOC respondents. For all programs, a higher proportion of white respondents are actively engaged, though the difference in engagement is different for each program (Figure 13, Appendix E). In the case of the EAP, more than 30% of white respondents were actively engaged, compared to less than 10% of all BIPOC respondents.

V. Barriers and Opportunities

1. Barriers to Clean Energy Program Participation

We categorize barriers to clean energy program participation in one of four categories: i) Physical Barriers, ii) Financial & Economic Barriers, iii) Knowledge, Perception, & Information Barriers, and iv) Program Design and Implementation Barriers. In the accompanying Story Map and Appendix B, Table 1, we further break down these barriers chronologically along the customer journey from first awareness, relevance, & interest, to eligibility & enrollment, to project scoping & contractor engagement, to installation & incentive payment, and lastly evaluation & quality control.

i. Physical Barriers

There are multiple physical barriers that were identified. Many residents have broadband/internet access issues, i.e. no internet in their homes or relying on their phones for internet access. This in turn impacts how they are able to access program applications and other services, as well as follow-up support from service providers. Additionally, energy improvement is not a top priority as a top home improvement issue for many residents, thus may not be addressed.

Residents also face the right infrastructure eligibility requirements needed to make energy upgrades, such as inoperable heating systems, leaky roofs, and other health and safety issues that need to be addressed prior to weatherization upgrades. Building stock in the Mid-Hudson Region is older and more expensive to upgrade on average. There are some health and safety issues that may not be known at the time of application that can halt an energy upgrade project, such as mold or insulation.

Additionally, improvements necessary to repair homes, reach energy affordability, and move off fossil fuels is beyond what one program can cover. Survey results showed that there are multiple health and safety (H&S) issues affecting both renters and homeowners (Appendix E, Figure 14). Notably, over a third of all respondents reported being affected by extreme heat, extreme cold, and electrical issues. The split between renters and homeowners among survey respondents is relatively even (Appendix E, Figure 15), but the distribution of these H&S issues is not. Twelve of the fifteen H&S issues analyzed in the survey were more common for renters than for homeowners (Figure 16, below). Notably, maintenance and energy-related H&S issues were more common among renters than homeowners. These maintenance issues include the presence of mold, broken heating or cooling systems, as well as problems with insulation. On the other hand, H&S issues related to architectural and structural failures (foundations, plumbing, chimneys) were more common among homeowners than renters.

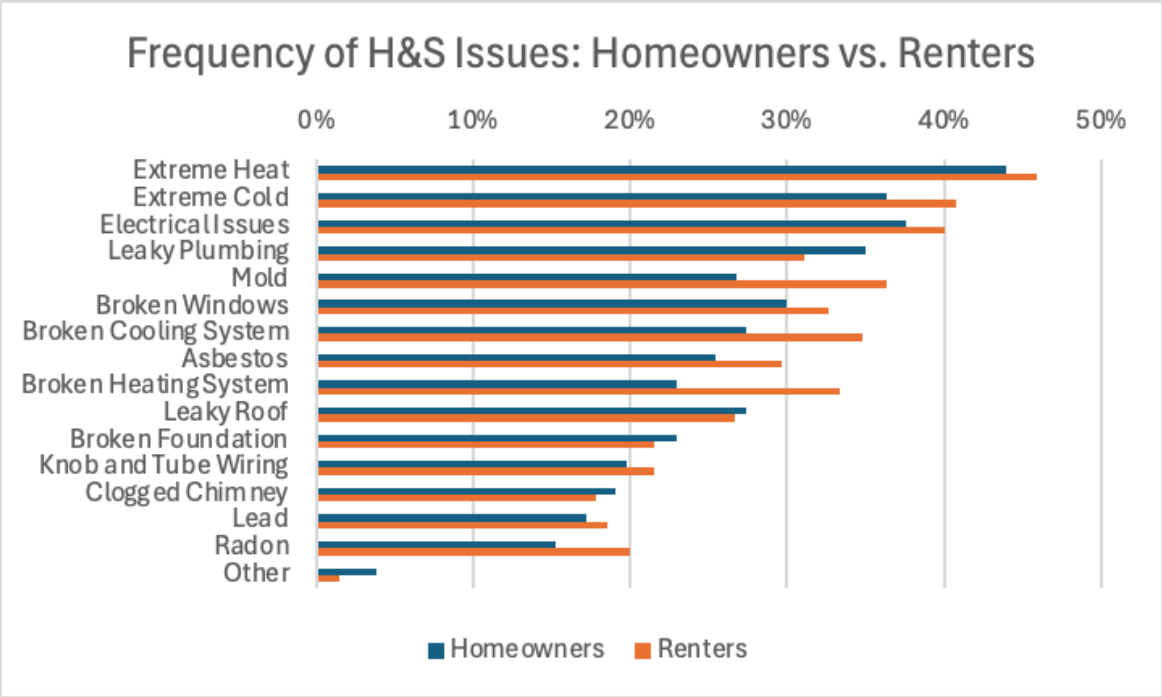

Figure 16. Frequency of Health and Safety Issues for Homeowners and Renters

Stakeholders also noted discrepancies between the physical needs of the building or unit and the project scoping and contractor capabilities. For example, contractor specialties and material preferences can vary and do not always line up with the customer's desired scope under what is eligible to be covered by the program and what is included in the scope of work. We heard repeatedly that customers felt their own choice in scope and materials was limited and largely out of their hands in a "take it or leave it" offer that could vary depending on which contractor was assigned to the project. Those inconsistencies from one contractor to the next, across a wide-range of potential measures, has created the potential for market confusion and frustration when reality fails to meet expectations.

ii. Financial & Economic Barriers

The DAC communities of the Mid-Hudson face various financial and economic barriers in order to access energy programs. They have competing financial priorities both amongst energy upgrades and external to energy, as well as lack of time to find, plan, and manage projects. Some LMO clients who have lower tax obligations cannot access the full amount of incentives. Many residents lack savings to cover out-of-pocket expenses or gap measures (asset-limited, income-constrained). If customer bill savings do not meet what was explained or expected, customer feels taken advantage of.

Residents of the Mid-Hudson largely depend on energy consumption for their heating and cooling needs, which has been impacted due to changes in weather patterns due to climate change. For example, some mentioned the need to plug in air conditioners in the summer months even though they did not need to do so historically. This is a large economic burden for disadvantaged communities. Some areas in the Mid-Hudson, like New Rochester to Eastchester, have areas that historically suffer from blackouts due to wind, and thus need infrastructure support to prevent this from occurring.

On the administrative and contractor end, we have found that applications are not always complete when other needs arise and that home repair programs are oftentimes under-funded, have long

wait lists, which can then defer enrollment in energy programs. Additionally, high market demand draws contractors away from LMI programs in favor of market-rate customers.

iii. Knowledge, Perspectives and Information Barriers

One of the main barriers that we consistently hear across groups is education about energy benefits available and customer support during the application process of any energy assistance or energy efficiency funding programs. Many people have a hard time getting the right information and understanding the information itself. Oftentimes it can be full of jargon or written in a complex manner, or there can be a language barrier when English is a second language. There is a frequent misconception that "this does not apply to me", such as renters or people in mobile homes. Landlord-tenant relationships can also be a barrier, whereby landlords may be combative or absent, and visa versa. Residents also have mismatched expectations from unscrupulous advertising promising conflating "government program" and "free." Additionally, there is conflicting market information about best solutions for lowering energy costs.

Enrollment is a major barrier to accessing energy programs. Out of the people who participated in an energy assistance program, 63% had a negative experience with the application process, citing that the process was very long, tedious and stressful. Some people noted that the program was so stressful, that they withdrew from it. There is also a service gap where contractors cannot effectively communicate in languages other than English, which creates opening for misunderstandings. Lack of awareness of clean energy technology and options are also a barrier. Many residential property owners don't know how to maneuver solar infrastructure programs. Multiple homeowners did not know what community solar is. There is a lot of suspicion around community solar because it sounds like Energy Service Companies, who have been fraudulent in the past. Many renters also think they do not qualify for any of the programs available and thus do not bother to pursue. Further, state and county programs can sometimes be at odds with one another, e.g. insulation being undone via one program to be eligible for another program.

Seventy-one percent of survey respondents who enrolled in or attempted to enroll in an energy assistance program also shared that they had a negative experience for similar reasons. Multiple people shared that they found the program stressful. Additionally, many people mentioned their distrust of contractors available and confusion around who to call. They feel overwhelmed by the long list of NYSERDA-approved providers and often want more information about the contractors, rather than simply their contact information, such as location, success rates, and range of cost. Additionally, Energy Advisors don't have access to real-time information after an application is approved. Often don't know when or if a project was completed without talking to customers.

iv. Program Design and Implementation Barriers

We found that several programs exist with similar services (e.g. EmPower+, WAP, HERR) that are confused for one another and not well-integrated. Incentive levels have not kept up with inflation or are not set high enough to move from aware to interested. Income eligibility thresholds do not take hardship/expenses into account, which is discouraging to customers when income is barely over the limit. LMI program project caps make larger, market-rate jobs more attractive to contractors than smaller, or more challenging projects in DACs. There is also a historical pattern of irregular, insufficient, and brief community engagement from past service providers has left customers confused and despondent. We also found reports of customers lured in with rebate amounts only to be told after installation, "you must now go apply for the rebate" is counter to program procedures. Process for investigating customer complaints is not transparent or provided upfront of installation. There is an administrative burden on contractors to execute LMI scope than market-rate jobs and special needs are not being relayed to all parties.

Lastly, in regards to evaluation and quality control, stakeholders report only a small sample size of all projects completed that receive quality assurance oversight and that finishing work (e.g. painting over bore holes in walls) was not covered by the program. This left those program participants, even with

successfully completed projects, feeling a lack of accountability, protections, and/or respect for their home.

2. Barriers to Accessing Clean Energy Careers

We categorize barriers to clean energy careers in one of four categories: i) Physical Barriers, ii) Financial & Economic Barriers, iii) Knowledge, Perception, & Information Barriers, and iv) Program Design and Implementation Barriers. In the accompanying Story Map and Appendix B, Table 2, we further break down these barriers depending on the labor market actor, either job seekers, training providers, educational institutions, funders & policy makers, and established contractors & employers. The interviewees described several barriers that trainees face in order to access or complete trainings. Several are well-known barriers, while others highlight new barriers.

i. Physical Barriers

Overall, interviewees highlighted the need for wrap-around services including transportation, technological needs, childcare access, mental health, and housing.

Sixty percent of interviewees mentioned that transportation is a barrier for trainees. Many possible trainees do not participate due to lack of commute ability, particularly those in the more rural or transportation disadvantaged parts of the Mid-Hudson region. Interviewees mentioned a mix of transportation challenges, including public transportation access and lack of access to a personal vehicle. Additionally, interviewees mentioned that some trainings require long-distance travel where traveling via plane would be necessary, adding to overall transportation costs in airfare, lodging, etc. Tech literacy is an issue - not only do people not necessarily have internet access or a device to access it, but interviewees reported that some participants do not know how to use such devices when they are provided. Interviewees mentioned other physical barriers to entry. All interviewees who provide training programs mentioned insufficient childcare availability for trainees. Notably, one interviewee shared that childcare was provided at their location, but it was discontinued due to lack of use for reasons that are still unknown. This program was offered directly after the COVID-19 pandemic and there may have been other unobserved factors impacting enrollment in the childcare service. Mental health and substance abuse issues were mentioned several times by interviewees as contributing factors to a person's ability to complete training programs. Eighty percent of interviewees who provide training programs mentioned homelessness as a separate but exacerbating barrier to participating in or finishing a training.

ii. Financial & Economic Barriers

Interviewees noted a lack of subsidies, stipends, and other financial support available for trainees. The cost of training varies and those that are free or have financial aid are likely to have fewer barriers to access.

iii. Knowledge, Perspectives, and Information Barriers

Thirty (30) percent of our interviewees mentioned issues with younger trainees' lack of professionalism, such as communication skills and general professionalism before, during, and post training that may impact their ability to obtain jobs post-training. Additionally, interviewees highlighted a need for more focus on job-ready training. For example, trainings that includes bundled security guard and OSHA clearance to enhance employability.

iv. Program Design and Implementation Barriers

We heard multiple times that there needs to be a change in existing curriculums to meet the clean energy transition. Some training providers are still teaching only gas furnaces and not heat pumps in their HVAC programs. Thus, trainees might be getting information about service technology that is becoming obsolete and not moving forward in green technology. The training structure is also currently a barrier. For

example, some programs require 2-4 years for HVAC certification, which is impractical for those working full-time. There is an opportunity to reduce coursework and focus on practical experience.

3. Opportunities

i. Education and assistance

There are multiple opportunities identified by the communities we reached. Importantly, there is an opportunity to build off of existing public education on clean energy opportunities available broadly, as well as via the programs provided by the state. Although the majority of people who have participated in an energy assistance program had a negative experience, some noted that they had an excellent experience and cited that the customer service they received helped. Providing more educators and connectors to various programs will likely increase participation rate and decrease the dropout rate.

Survey findings support the argument in favor of more specific targeting in marketing, outreach, and education activities. For example, renters may be more attracted to health and safety upgrades and energy efficiency programs to first address deferred maintenance, while targeting homeowners may be more attracted to programs offering larger, whole-home investments braided with multiple incentive programs. Distinct groupings between those who are unaware of these programs and those who are aware but disengaged (Figure 9, Appendix E) suggests that there is need to further differentiate messaging, outreach and education depending on whether the goal is to raise program awareness among the general population or increase participation from those who are already aware. The former may benefit from clear branding of the programs, incentive levels, and measures while the latter may benefit more from highlighting the services available to help them through the program and the benefits realized after the program is completed.

ii. Process

People suggested that clean energy programs be deployed universally but could have an "opt out" system, that way more people benefit without having to first become aware and go through a cumbersome application process. Some suggested that the business community (e.g. small business restaurants, small shops, Business Improvement District/Chamber of Commerce) offered potential if they were more deeply engaged, though in what capacity was unclear.

iii. Workforce

People highlighted several initiatives and strategies that are currently working in their communities. Organizations that named high training completion rates and job placement, also named having strong relationships with contractors, continuous funding support, trainings that provide multiple certifications, and free or low-cost programs. Some of these organizations and programs also provide wraparound services, such as day care and transportation support, two key barriers to participating and completing trainings. For example, an organization that works in partnership with the refrigeration industry to remove harmful chemicals provides free, two-day training summits that include networking opportunities with manufacturers. They highlighted strong contractor connections as a main success. Another organization that works tightly with NYSERDA and DAC communities has high training completion rates and the majority of graduates have a job post-training. Their collaboration with NYSERDA has been important in their success. Other local organizations provide free training and offer multiple certifications, including OSHA, and also have high completion and are placed with jobs.

There is a great opportunity for stronger industry partnerships, e.g. direct connections and partnerships between workforce training programs and contractors. There is a need for better forecasting and job availability to support training efforts: no one wants to train or be trained for jobs that do not materialize. Models like job apprenticeships that generate demand and connect with training programs are beneficial. Building relationships with unions in particular were mentioned several times by interviewees.

There is opportunity for the Regional Clean Energy Hubs to play a role in brokering these relationships between wrap-around service providers, training programs, job-seekers and employers. This could take the shape of presentations during workplace and training program orientations, conferences, and/or maintaining a clearinghouse for regional clean energy job opportunities.

The majority of interviewees shared that they would benefit from marketing campaigns and educational outreach that target youth, especially at vocational schools and community colleges. Expanding outreach to younger students through workshops and school programs can build interest in trades and clean energy careers. For example, New Rochelle High School has a partnership with Soulful Synergy where they created a green school advisory committee. Training programs could provide needs that are currently barriers, such as childcare, transportation support, and paid time off to attend training. There should also be more state support for marketing programs and providing tools to students.

There is an opportunity to increase racial diversity and female and nonbinary representation in trades and apprenticeship programs as the workforce is currently male dominated. Early promotion of trades to girls and increased efforts at BOCES programs could help address gender imbalances. Unions and trade schools are not working proactively to mitigate organizational culture elements that exacerbate female and nonbinary trainees' feelings of ostracization. Recruitment of employees from under-represented communities can have the co-benefit of helping reach new customers and overcoming language barriers.

VI. Next Steps

1. Recommendations

Based on our regional baseline characterization, building sector assessment, stakeholder engagement, and survey results, the Mid-Hudson Regional Clean Energy Hub has developed the following set of recommendations for our program and network of partners. We further develop recommendations that are outside of the contracted scope of work of the Hubs to be considered by NYSERDA, contractors participating in clean energy programs, and other organizations aligned with energy justice & the clean energy transition. We assign each recommendation with a priority level (critical, high, or normal) based on complexity, ease of implementation and estimated impact.

Recommendations for the Regional Clean Energy Hubs:

Priority	Recommendation
High	Segment outreach, messaging, and educational resources between "awareness building" and "awareness-to-action" strategies. For example, the Hub may build awareness for clean energy and energy affordability more broadly by better distinguishing rebate programs from tax credits (or the term "incentives" more broadly) to prevent homogenizing and disengagement based on familiarity with the tax process. We also believe Hubs should de-emphasize programmatic details in outreach activities while emphasizing Hub services, customer experience, and outcomes. Then, as individuals become more aware of programs and incentives through lead intake, the Hub may promote "enrolling" leads in a holistic, coaching program that walks clients through a more structured step-by-step program of energy efficiency to electrification to renewable energy. **Resources Needed:** Further Hub integration into existing NYSERDA-run Customer Relationship Management (CRM) platforms, contractor portals, and customer portals could enable live support from professional Energy Advisors to improve customer experience with customized educational resources in the same portals program participants would already use. Sophisticated marketing platforms would also allow for better segmentation based on recognized market characteristics.
Critical	Continue to strengthen relationships and outreach channels with organizations serving specific market segments: low-income; modest-income and Asset-Limited-Income-Constrained-and-Employed (ALICE); cultural groups, small-business; non-profits; landlords and property management groups. Leverage these partnerships and coalitions for awareness building campaigns allowing the Hub to focus on navigation services and aware-to-action activities. **Resources Needed:** Staff time and capacity for partner engagement is limited to the total capacity outlined in staffing plans and funding levels of the Regional Clean Energy Hubs program. Additional staff capacity through additional funding or restructuring, particularly that which may specialize in partnerships and stakeholder engagement, could help enable the breadth and depth of stakeholder work necessary to scale the Hub network.
	Strengthen relationships between trade associations, participating contractors, training programs, and other workforce development entities to address barriers to growing the clean

	energy labor market. Develop strategies to support layering services and subcontracting for more holistic projects that will get homes ready for energy upgrades and reduce time between projects. **Resources needed:** Additional workforce development capacity within the Hub may be necessary to expand services beyond the existing scope of work.
High	In the absence of more publicly available quality assurance data, the Hubs may be able to strengthen our evaluation role of services that exist within our scope of work to gain further insight into customer experience. Customer intake and exit surveys evaluating the services of the Hub, consumer confidence, program design, and customer experience with participating contractors. **No additional resources identified.**
Normal	Continue to build out educational materials focusing on hard-to-reach market segments including, landlord and property managers, underrepresented ethnicities, and job seekers from underserved communities. **No additional resources identified.**
Critical	Leverage existing funding, pilot project funding, and community campaign funding to support collective action networks (e.g. Mid-Hudson Regional Sustainability Coalition and the Regional Climate Action Roadmap) and mutual-aid networks. **Additional Resources:** Existing funding through the Hub budget, pilot project funds, and community campaign funds may be leveraged to directly support these networks, however, there remains a high administrative burden to re-distributing funds associated with a State contract. Collective fundraising and a third-party administrator may allow complementary organizations to pool funding for greater impact and allocate those funds more efficiently.
Normal	Increase capacity in delivering services via multiple languages prevalent in DACs. **Additional Resources:** Paid services offering live translation assistance could relieve staffing logistics but requires additional funding not currently allocated in program budgets.
Normal	Increase scale of workforce development activities like workplace and training program orientations, conferences, working groups, and/or further developing a clearinghouse for regional clean energy job opportunities. **Additional Resources:** Current workforce development activities under the Hub are limited by current staffing and funding levels but could be reallocated or increased in subsequent contract cycles.

For NYSERDA:

Priority	Recommendation
Critical	Our results support the conclusion that there is no substitute for in-person, live assistance for navigating clean energy programs like that which is offered by professional Energy Advisors in each Hub. Traditional marketing through phone, internet, and email based communication all have downsides for some portion of our region and stakeholders overwhelmingly agree that a trusted, third-party, helper grows confidence in making the investments and changes necessary to transform our energy system. Equipping the Hubs with the tools and knowledge necessary to grow awareness and convert interest to action is a worthwhile use of funds not represented elsewhere in the market. **Resources Needed:** As the Regional Clean Energy Hubs are still in their nascency, it is unclear what impact additional funding would have. However, more critical is perhaps consistency and surety to retain institutional knowledge over time.
High	We strongly encourage program design (ie. incentives) be adjusted to keep parity with market costs as to keep an intended target subsidy level with prevailing project costs (e.g. 50%). Measures-based incentive levels can quickly fall out-of-step with an intended subsidy target with changes in labor and material costs as exemplified during the COVID-19 pandemic. **Resources Needed:** No additional resources should be necessary based on existing project data obtained by NYSERDA project teams, however, industry data of material and labor costs outside NYSERDA programs would also help keep parity with industry trends.
High	Further integration between programs and braided funding models, i.e.increase health & safety funding allocations within the EmPower+ program to address gap measures to get home ready for energy upgrades and lower the administrative burden to contractors needing to subcontract out work not in their specialty. Despite multiple funding streams, stacking of incentives under LMI program remains difficult with several tranches and additional eligibility requirements. Increase inter-agency and inter-departmental collaboration between entities such as NYSERDA, OTDA, and NYSHCR to align program requirements, referrals, and pipelines. **Resources Needed:** Consolidated application for income-based assistance and related affordable housing & affordable energy through existing mechanisms like My Benefits NY or My Energy Portal.
Normal	Improve standardization of customer experience regardless of contractor assignment. Align quality assurance across programs (e.g. EmPower+, NYS Clean Heat, NY-SUN). Moreover, more post-installation quality assurance that is shared publicly could benefit program participants make more informed choices in contractor. **Resources Needed:** More transparent and up-to-date participating contractor lists across programs, including information like languages spoken, additional certifications, additional services offered outside of programs, preferred materials/model, number of completed EmPower projects projects, average quality assurance scores, and other programs that the firm participates in.

For Participating Contractors:

Priority	Recommendation
High	Increase capacity to subcontract health & safety gaps that impede clean energy upgrades. **Resources Needed:** NYSERDA must further reduce the administrative burden on more holistic projects that include health & safety measures to enable contractors with different specialties to work together on projects. Consider adding wrap around staffing in trades like carpentry, electrical work, etc.
Normal	Make navigation and technical assistance services of the Hub more widely available to customers to help troubleshoot issues that arise during a project as well as help customers consider their subsequent projects towards decarbonization. Work with Regional Clean Energy Hub to supply customers with Hub materials and make "warm handoff" for further assistance after project completion. **No additional resources identified.**
Critical	Work with the Hub to recruit and train individuals from under-represented and underserved communities, leveraging NYS funding opportunities for on-the-job training and job placement. Hubs can offer presentations to contractors during new-staff orientation, on-the-job training, and continuing education. **No additional resources identified.**
Normal	Increase capacity in delivering services via multiple languages prevalent in DACs. **Additional Resources:** Hubs do have some in-house capacity to work with customers where English is a second language that contractors can leverage to communicate more effectively with their customers. Additionally, paid services offering live translation assistance could relieve staffing logistics but comes at an additional expense.

For Other Organizations Aligned with Energy Justice & the Clean Energy Transition:

Priority	Recommendation
Critical	Avoid over-promising or embellishment of services provided under State and Federally funded clean energy programs. Inflating expectations can lead to negative customer experiences that they did not receive the maximum benefit possible. Instead, work with the Hub to promote the navigation and technical assistance services of the Energy Advisors and follow similar messaging to build brand awareness. **No additional resources necessary.**
Critical	Work with the Hub to streamline referrals between services that target LMI households and designated DACs. **Additional resources:** Additional staff capacity may be necessary where under-resourced to enable inter-agency coordination.
Critical	Work with the Hub prior to launching campaigns to align messaging and create pipelines for referrals and long-term engagement. **No additional resources identified.**
Critical	Work with the Hub to deploy pilot project and community campaigns funding. **Additional resources:** Matching funds and increasing marketing/outreach budgets would enable campaigns to scale.
Normal	Collective fundraising and a third-party administrator may allow complementary organizations to pool funding for greater impact and allocate those funds more efficiently. **Additional resources:** Identify funding partners and third-party administrator to amplify collective fundraising of unrestricted funds.
High	Continue to contribute data and feedback to update and improve upon the Regional Assessment and Barriers Analysis. Contribute findings and analyses of their own to complement the findings of this report. **Additional resources:** Household level data examining utility consumer behavior, risk factors, and energy program participation.
High	Organizations engaged in climate & energy advocacy and utility rate cases should continue to advocate for energy affordability policies to tame rising electricity prices that pose market barriers to the clean energy transition. **No additional resources identified.**

2. Implementation by the Mid-Hudson Regional Clean Energy Hub

Operationalizing the findings and recommendations of this report will consist of multiple strategies. First and foremost, the Regional Assessment and Barriers Analysis report and accompanying Story Map will be updated annually as new data, information, and stakeholder feedback is available. Second, the Hub will use the findings of this report to create an Equitable Outreach & Engagement Plan (expected January 2025) that will more specifically detail timelines and strategies to implement the above recommendations and will also be updated annually. Third, we assign the following target timelines to implementing recommendations based on the assigned priority level (critical, high, or normal) which is based on complexity, ease of implementation and estimated impact.

Critical Priority	Begin planning and implementing immediately, operationalize by CY 2025.
High Priority	Plan and implement by the conclusion of the current Regional Clean Energy Hubs contract/funding cycle (August 2026).
Normal Priority	As time and staff capacity allow under the current staffing plan with the intention of building Hub capacity in these areas for future contracts/funding cycles.

Where recommendations are made to entities outside of the Mid-Hudson Regional Clean Energy Hub, we encourage a similar timeline with the caveat that earnest and good-faith assistance will always be available at the time an organization is ready and willing to collaborate.

3. Questions for Further Inquiry

Over the course of this analysis, we encountered limitations to fully investigating our research questions and have noted several questions for further inquiry. Future iterations of this report will seek to refine, update, and delve deeper into several areas of inquiry.

In our primary goal of understanding social determinants to energy program participation we found available data sets to be limiting due to privacy concerns in publishing household-level data, discrepancies in program data to our internally tracked records, and mis-alignment with geospatial data along the 2010 census tract designations used in the NYS Climate Justice Working Group's Disadvantaged Communities map and the updated 2020 census tract designations, making comparisons between data sets unfeasible. Given that the unit of analysis for program participation is at the household level, we will continue to seek out data sets with this level of granularity and build upon our survey results with more precise survey instruments targeted to regions where survey participation was scant. Additionally, we have a desire to seek out more industry data on material and labor prices over time that affect project economics and program participants ability to invest in clean energy upgrades.

We also posit new research questions based on our findings that we will seek to incorporate into future analyses:

1. What is the effectiveness of marketing programs by brand/name versus measures and outcomes versus marketing broader themes of energy affordability, energy sovereignty, or energy resilience.
2. Our analysis identified a subsection of survey respondents who indicated they would be unable/unwilling to participate in energy programs without subsidies reaching 90-100% of program costs. Further analysis of this specific market segment is needed to better understand their needs and expectations.

3. What other groupings (ie. market segments) can we define outside of program eligibility classifications that share common characteristics around energy perceptions, geography, barriers, and identity that would allow for more targeted outreach campaigns?
4. What impacts will changing State and Federal policy agendas have on energy programs? For example, what interactions will Energy Affordability Guarantee policies have with clean energy programs? What impact would rollbacks to the Inflation Reduction Act have on the market?

Appendices

Appendix A: Literature Review, Bibliographies

Literature Review

Abstract

This paper examines different barriers and social determinants to participating in energy efficiency and clean energy programs through a review of academic literature and industry reports. Academic literature identifies several cultural and social barriers including: misinformation, lack of awareness, lack of trust, limited financing options, to support the most affected group and to address energy injustice. In this context, this review also focuses on how racial inequity and institutionalized discrimination historically and continuously perpetuate the cycle of poverty and place racial minority and low-income community at a disproportionate rate of experiencing high energy burdens. Understanding the social drivers of high energy burdens among minority groups and the social determinants to their participation can enhance energy efficiency programs, weatherization programs, and institutions to more equitably address this issue. Additionally, this literature view also summarize multiple strategies suggested by the literature to address each of the stated barriers.

1. Introduction

Energy has increasingly become an important social and public health issue (Hernández, 2016). When a household's cost of utility takes up a large proportion of household's income, it creates financial burden which manifests and translates into other problems including poorer overall health (Drehobl & Ross, 2016), homelessness (Hernández, 2016), and unsafe living environment (Watts-Zagha, 2011). This section will define what energy cost burdens are, what causes high energy burdens, the effects of high energy burdens, how low-income, minority communities are being disproportionately affected**,** and will also introduce several types of programs that address this issue and the benefits that these programs offer.

1.1 Energy cost burden and energy insecurity

Energy cost burden and energy insecurity are two closely related phenomena, but they are not necessarily the same. Drehobl and Ross (2016) also refers to this phenomenon in terms of high energy expenditure per square foot. Other authors also prefer this definition, as energy intensity, when addressing inequality in energy efficiency among different households (Bednar, Reames, Keoleian, 2017). Energy intensity can be calculated by taking the annual energy consumption of a building and dividing it by its total gross floor area. Forrester and Reames (2020) also pointed out that energy use intensity reflects the inequality existed due to inefficient housing and appliances. Energy insecurity, on the other hand, refers to household's struggle or inability to pay their energy bills (Hernández, 2016). Energy burden is calculated as the percentage of total utility energy spending over gross household income (Drehobl & Ross, 2016). Many researchers have attempted to define what an affordable energy level is. Some researchers found that 10% of the household income to be the threshold for unaffordable energy cost, or energy burden (Hernández & Bird, 2010). Fisher, Sheehan, and Colton (2013) disagree, suggesting 6% of

household income, which derives from the assumption that 30% of income can go into housing-related cost and energy cost would take up to 20% of housing cost. The Applied Public Policy Research Institute for Study and Evaluation suggested 11%, driven by 50% of household income as housing cost and 22% of that can go into energy and utility. However, this energy burden ratio only describes the financial struggle of energy cost burden, without taking into account other contributing factors like housing conditions or energy behavior (Hernández, 2016).

1.2 Causes and effects of high energy burden

There are many causes leading to high energy cost burden. Drehobl and Ross (2016) categorized these causes into four main drivers: Physical, Economic, Policy, and Behavioral. Physical cause refers to any physical characteristics of the building, for example, inefficient HVAC systems, inefficient lighting or other appliances, or weather conditions that increase the need for heating and cooling. Economic causes include financial hardship as a result of persistent low-income and income inequality or the lack of financial security for unforeseeable events such as health issues or unemployment. Accessibility to energy programs and the limitation of policy assisting low-income communities act as a policy driver to high energy burden, before even the upfront costs are considered. The last driver that Drehobl and Ross (2016) mentioned is behavioral, which refers to the limited knowledge and the lack of action toward available energy programs and energy conservation measures, or the high level of energy usage due to age or disability.

Energy burden and energy insecurity are ongoing issues and can manifest to worsen themselves due to numerous factors. Kontokosta, Reina, and Bonczak (2019) found rent burden to be one of the contributors to energy insecurity. From 2000 to 2010, housing rental had largely outpaced household income growth. Adding to this point, Hernández and Bird (2010) mentioned that even with affordable housing assistance programs for low-income households, rent and energy costs still exceed 30% of their income and remain a significant burden. Continuous increase in energy cost along with increases in income inequality poses a threat to increase household energy burden in future years. From 2004 to 2014, average electricity price in the U.S jumped from $0.09/ kWh to $0.125/kWh, a 39% increase, while average adjusted income increases 0.9% during the period, from $29,900 to $30,180 (Drehobl & Ross, 2016).

High energy burden can have many effects on human health and wellbeing. When individuals start cutting back on energy use below a level that sustains a healthy, comfortable lifestyle, they'll experience mental and physical health problems due to thermal discomfort, inadequate lighting, unsafe housing conditions, and financial stress (Drehobl & Ross, 2016). More specifically, multiple studies show that improper heating or cooling in the building can increase asthma, respiratory diseases, heart disease, arthritis, and rheumatism (Heyman, 2011; Hernández & Bird, 2010; Wright 2004). Reduced lighting or heating usage below the comfort level can also affect household productivity, hindering children's ability to study or do homework, driving down their academic performance (Drehobl & Ross, 2016).

Energy cost burden can also have cumulative effects beyond one household, which contribute to societal problems such as homelessness and the perpetuation of the cycle of poverty. When difficulty to pay

becomes inability to pay, households are at risk of utility disconnection. Watts-Zagha (2011) found that 5.5% of low-income customers got disconnected due to their inability to make payments, 6% of which did not reconnect within the year and some of them started using hazardous methods of lighting and heating in their home. Research from Vick and Norton also found that utility disconnection to be one of the leading causes to homelessness (Vick & Norton 2008). Additionally, utility was not considered a priority compared to housing or food; therefore, the tradeoff often includes not paying utility bills in order to obtain other necessities (Hernández, 2016). Many customers who struggle or delay paying their bills can potentially increase the bill for all customers because the cost of"covering arrearages, bill payment accommodations, and shutoffs" that utility companies incurred are distributed and charged to all customers (Drehobl & Ross, 2016). This, in turn, leads to an even greater burden to those who are already affected, creating more hardship for them to escape poverty. Additionally, the accumulation of energy debt also limits household access to energy, restricts their ability to move to a different home, and causes fear of shut-off or service disruption (Hernández, 2016).

1.3 How low-income and minority communities are disproportionately affected

Low-income households are the most vulnerable group to high energy cost burden. Carliner (2013) found that households with less than $15,000 in annual income expended, on average, 21% of their income on utility bills. Low-income adults often settle for inefficient, poorly maintained apartments and houses simply because those are the only affordable options for their income (Baer & Williamson, 1988). These inefficient buildings contribute to the higher energy expenditure facing low-income households to maintain the basic level of comfort, even without accounting for any behavioral driver (Kontokosta, Reina, & Bonczak, 2019). Drehobl and Ross (2016) found that median energy burdens of low-income households were more than tripled that of higher income households, with 7.2% and 2.3%, respectively. High energy burden in low-income households also correlates with energy insecurity experienced by adults in these households. Almost 50% of adults in low-income households indicated that they have difficulty keeping up with utility bill payments at some point (Treadway, 2019). There are many government-run low-income housing assistance programs to address unaffordable housing, Reina and Kontokosta (2017) found that these subsidized households are less efficient than comparable unsubsidized units.

People of color and marginalized communities are also adversely affected. Inefficient homes account for 42% and 68% of excess energy burden among African-American and Latino households, respectively (Drehobl & Ross, 2016). Additionally, Black and Hispanic households are also disproportionately suffering from poverty. According to the U.S Census, the poverty rates in Black and Hispanic Americans in 2017 are 20.8% and 17.6%, respectively, significantly higher than 10.1% in White or non-Hispanic (US Census Bureau, 2020).

1.4 Impacts of racial inequity on energy justice

Higher energy cost burden experienced by minority households points toward racial injustice in the U.S housing market (Bednar, Reames, & Keoleian, 2017). According to U.S census data, there are more White low-income households than Black's, 24,945 thousand compared to 8,884 thousand (US Census Bureau, 2020). However, White population in America is nearly 6 times larger than Black population (US Census Bureau, 2020), thus, leading to Black Americans being disproportionately in poverty. Thus, to ensure justice when addressing energy burden, it is crucial that program organizers and

policymakers also address racial inequity and understand how minority and underserved communities can have significantly less access to these programs just because of their race.

Kontokosta, Reina, and Bonczak (2019) raised concern about America's history of discrimination through housing policies and housing practices that took away access to better housing, access to neighborhoods, and the opportunity to create and accumulate generational wealth of minority households. Segregation is the process of discriminating in real estate and banking, primarily toward Black Americans, and can be achieved using different institutionalized means during the New Deal, such as redlining, deed restriction, restrictive covenant (Massey, 2020). By 1977, discrimination became illegal and thus moderated Black segregation; however, the declines remained uneven and segregation still exists, even at an extreme level in certain metropolitan areas (Massey, 2020). Not only do these policies and discrimination devices lead to a racial wealth gap, but it also contributes to income inequality and perpetuates persistent poverty as well. In fact, these devices can manifest and result in further exploitation of minority groups. For example, the lack of access to financial institutions and banking services creates the existence of growing alternative financial services in minority or low-income neighborhoods, which are typically more expensive than mainstream banking, thus further marginalizing these oppressed communities (Faber, 2019).

Racial segregation also intertwines with class segregation. Minority communities and low-income communities are often zoned in certain neighborhoods which creates areas with concentrated poverty, thus subtracting these groups from access to public resources, safe living conditions, etc (Massey, 2020). Gentrification also poses another threat to these communities. High housing costs along with emotional burdens, driven from gentrification, in low-income and minority neighborhoods not only contribute to homelessness but it also drives people to live in low-quality, inefficient housing (Rosell, 2019), where energy and utility cost can affect them as a burden.

1.5 Programs that address high energy burden

Drehobl and Ross (2016), in their report, discussed 3 types of programs for addressing high energy burden: Bill assistance, Weatherization, and Energy efficiency. Bill assistance programs provide financial support to help households with their utility bill. Weatherization programs provide assistance with home repairs that have a long-term effect with reducing energy bills. Energy efficiency programs, on the other hand, aim to upgrade to “non-structural” household items such as appliances, faucets, and showerheads (Lewis, Hernández, and Geronimus, 2019).

Despite having these programs available, low-income households still remain a difficult group to target with many limitations and social determinants to entry (Drehobl and Ross, 2016) that this thesis is looking to discuss. Lewis, Hernández, and Geronimus (2019) stressed that energy efficiency and weatherization programs are long-term and more equitable approaches to energy justice, as they directly address the gap of home household energy efficiency in low-income and minority households. Bill assistance program, on the other hand, is more of a temporary approach. Berger (2015) also pointed out several limitations of energy efficiency programs and weatherization programs such as not reaching the expected energy saving potential, which were caused by not being able to target and recruit the highest usage households, health and safety regulation to install cost effective measures, and “inappropriate application of weatherization technique”.

1.6 Benefits of participating in energy programs

On an individual level, there are many benefits to participating in these programs. One key benefit that these programs aim to deliver is lowering utility bills, which reduces financial burden and allows households to achieve greater levels of comfort by minimizing energy waste (Drehobl & Ross, 2016). According to the U.S. Department of Energy (2009), annual household's gas consumption can be reduced up to 32% and save over $350 a year in energy just from weatherization. Utility energy efficiency programs focus on cost-effective energy-saving measures. Additionally, it will also increase the lifetime of household appliances and increase the value of property (Cluett & Amann, 2015). On the supplier side, these programs help them manage their demand side, reduce cost of excess energy generation and operation expenses (Drehobl & Ross, 2016). Thus, with lower demand and energy consumption, the environment will benefit from decreased pollution which is an important driver to better public health in the communities (Baatz, 2015). Moreover, on a community level, lifting the energy cost burden can also mean one fewer barrier to breaking the cycle of poverty for many households.

High energy burden and energy insecurity has become an increasingly more urgent and concerning issue that manifested into societal and public health which dampen community wellbeing. Energy cost burden and energy insecurity also reflect how America's history of racism and discrimination policies, which still exist to some extent, has impacted marginalized communities, proven by how they are disproportionately in poverty and affected by high energy cost burden. Knowing the cost and effects of high energy burden, many programs and policies are working toward addressing this issue. However, there are many limitations to what these programs can do, driven by social determinants of participation. This paper looks to discuss these social determinants as well several strategies to more equitably address energy justice.

2. Social and cultural barriers to participation in energy programs

Although high energy burden can have detrimental effects on individuals and society in many ways, public awareness and participation in energy efficiency or energy conservation measures remain low. Allcott and Mullainathan (2010) found that many households and businesses fail to adopt available energy-saving measures or existing technologies that consume less energy. This phenomenon is also referred to as the energy efficiency gap. Jaffe and Stavins (1994) explain this low rate of energy adoption through economic factors such as costs, future paid-off, discount rates, etc. However, recent research by Allcott and Mullainathan (2010), while acknowledging those factors, also suggested that behavior is likely to be the barrier in this case. Harper and Snowden (2017) further discussed that psychological, social factors as well as external, noneconomic factors like imperfect information, institutional barriers, etc. also contribute to energy spending behavior.

Allcott and Greenstone (2017) argue many energy programs could not achieve their full potential because they're too focused on energy use as a problem (heuristic judgment), rather than empirical factors such as behavior. There are many behavioral and psychological drivers of energy consumption, as

introduced earlier in this paper. Drehobl and Ross (2016) discussed how income can be a significant driver of energy-related behavior. Consumers with higher household income tend to consume more energy as they usually possess more appliances. However, Rao and Ummel (2017) also pointed out several critical non-income drivers of energy consumptions related to appliance ownership such as "built environment quality, household size, automobile ownership, appliance characteristics, education level, gender dynamics, and household practices". Furthermore, Pelenur and Cruickshank (2012) found that the upfront cost of energy efficiency investment might not be as significant of a barrier for low-income families, but other factors might just be equally important. As this paper looks to focus on energy intensity (or energy expenditure per square footage), which evidently simply by what is not invisible about energy demonstrates the injustice behind energy burden, it is imperative to also examine some of these non-income drivers.

2.1 Misperceptions and the 'optics' of energy programs

Hards (2013) found in her study that status and stigma, driven by social norms, can be an important determinant of energy practices and consumption. Her study not only reiterates Sovacool's (2009a) suggestion that energy itself is invisible in modern days, but also points out that energy choices such as energy suppliers can be invisible as well (Hards, 2013). Purchasing appliances or practicing energy measures can be a means for people to display their social or wealth status (Hards, 2013). Conversely, there may be social stigmas associated with participating in energy efficiency programs. One stigma that Sovacool (2009a) and Hards (2013) pointed out is how certain energy efficiency measures and devices such as evaporative coolers, weatherization techniques, and heat pumps can be seen as "low-class" or trashy. Hitchings and Day (2011) also noted a stigma where people are reluctant to practice good home heating habits in Midlands because they do not want to look poor or stingy. Hards (2013) also found a stigma associated with cleanliness, where in certain locations it might be unsanitary to have poorly heated homes because of mold or in other locations where it might be socially unacceptable to be sweaty due to lack of air conditioning. Tying back to the social status mentioned earlier, these stigmas can potentially cause people to refrain from energy efficiency measures as they try to protect or achieve certain social or wealth status.

Due to information deficits, households' energy decisions and behaviors are also likely to be driven by biases, misperceptions, or other psychological factors that affect human rationality. For example, because lighting is more visible, people tend to perceive that it consumes more energy while undermining the energy consumption of water heaters, which consume more energy but are less visible (Sovacool, 2009a; Lacy, Stern, & Aronson, 1986). Allcott and Mullainathan (2010) found that people usually refrain from taking actions that compromise their immediate convenience, even though it has clear, proven long-term benefits. These behavior-driven decisions are discussed in the context of heuristic biases, where any behavior driven by heuristic, over time, can form habits, or an immediate response that influences human perception (Wood and Neal, 2009). For example, Sovacool (2008, 2009b) pointed out how getting used to abundant electricity resources caused many Americans to value "comfort, control, and freedom" more than "sustainability or frugality". Lee, Kang, Song, and Kang (2020) also agree and further

highlighted that information deficits play an important role as well because consumers form their perceptions based on habits and immediate resolve.

With that being said, most researchers seem to acknowledge the stated psychological, social, and information deficit as drivers of energy behavior and as a determinant of energy efficiency decisions (Lacy, Stern, & Aronson, 1986; Weber, 1997; Sovacool, 2009a; Pelenur & Cruickshank, 2012; Hards, 2013; Trotta, 2018). However, while Davis and Krishnamurti (2013) did not explicitly disagree, their study found that positive psychological motivations to participate in energy efficiency programs (such as "to care more about the environment, be more energy friendly than others, and save money in general") are inconsistent in predicting energy behavior. Similarly, Allcott and Greenstone (2017) also did not find information perfection and behavioral failures to be a significant driver of participation in energy efficiency. Although these barriers and psychological factors are widely discussed in the literatures, more studies and experiments might be needed to further examine the significance and impact of these factors, as Hards (2013) refers to these insights and discussions as an "initial exploration" and of a "little-understood aspect of domestic energy use". In other words, most researchers only touched the surface and acknowledged these issues, with very few experiments exploring the root causes, the significance of impact, how it manifests into other issues, and recommendations to overcome these issues of information.

2.2 Lack of awareness, access to information

Another driver that the literature acknowledges has an effect on awareness and public behavior toward energy conservation is "information provision" also referred to as "imperfect information." Imperfect information refers to the lack of information availability or accessibility to information. Allcott and Greenstone (2017) found that imperfect information contributes to the lack of participation in energy efficiency. It also includes any imperfections in the quality and accuracy of the information itself, which is crucial when households' decisions and behaviors are shaped by that information. Within this context, Davis and Metcalf (2014) acknowledge that information plays an important role and, at the same time points out that most information provided is too "coarse" for consumers to make the right energy efficiency choices. While most researchers seem to agree on this matter, there are still not many papers addressing how to improve information provision as well as equity in access to information among different demographic and social groups. However, within the context of racial justice, wealth, and accessibility gap, communities of color, especially Black and Hispanic are likely to receive less access to information.

The lack of energy visibility can also lead to a lack of awareness. Sovacool (2009b) pointed out that advancement in energy production and how it is used has led to a lack of visibility, awareness, and public understanding of energy. Particularly, they mentioned how energy generators were built far away from the cities, for safety and production efficiency reasons. Not being able to see these energy plants can easily create misperceptions and a lack of energy awareness. As Pasqualetti (2000) said, an "out-of-state, out-of-mind pattern" can lead the public to undermine the environmental costs of energy. Lacy, Stern, and Aronson (1986) wrote in their book that energy nowadays has become invisible, the only visible aspect of it is the bill; thus, even with increased awareness, people might still refrain from taking action. Sovacool

(2009a) also demonstrated several examples supporting the idea of how the invisibility of energy can affect human decisions and behavior. One example being that it is reported to be easier for contractors to sell visible energy-efficient home features, such as solar collectors, than invisible features, such as insulation or passive solar design despite those being the more cost-effective measures.

The issue also lies not only in the awareness and access to information but also in the quality of the information itself. There are many literatures that discuss misinformation and misperceptions of energy, which can influence individual decision-making processes when it comes to energy-related actions as well general energy-use behaviors. Information on the label of home appliances that is required by law, is an example. In many cases, these labels provide vastly inaccurate information because they mainly display prices and usage, which can vary significantly (Davis & Metcalf, 2014). Research done by Lacy, Stern, and Aronson (1986), also shows that the billing system also plays a role in misleading energy users since the bill usually combines charges for multiple energy usages including, appliances, lighting, heating, cooling, and water heating. As a result, most energy users can not figure out which appliances or systems in their household consume more energy and, thus, are unable to make appropriate energy decisions (Kempton, 1988). Although it has been decades since Lacy, Stern, Aronson, and Kempton brought up this issue, lack of information accuracy, vividness, and specificity remains a barrier affecting households energy behavior and decision (Harper & Snowden, 2017).

Lack of visibility, access to information, and the accuracy of the information itself create a gap in awareness and public perception of energy. Accenture's report, "Understanding Consumer Preferences in Energy Efficiency" (2010), also acknowledges this gap of what consumers think about energy versus their actual knowledge. Sovacool (2009a) brought up several examples of how a lot of Americans believe they are entitled to "cheap and abundant" electricity, while not really understanding where that energy comes nor the cost to supply it. This assumption was caused by 200 years of cheap fuels, industrial growth from vast natural resources. He also pointed to the gap between electricity production versus how society perceives it as a driver for misperception. Most people acknowledge electricity at the point of consumption and perceive it as something "clean and abundant", while not having a clue of the "dirty" part generating that electricity on the manufacturer end (Sovacool, 2009a).

2.3 Trust

Imperfect information, lack of awareness, and misperception are intertwined in a cycle. As mentioned in the last section, perfect information can cause a lack of awareness and misperception. That gap in awareness and perception then shaped consumer behavior, and habits, which in turn influenced the way that they seek or accept information. This section seeks to examine how consumers react to the information they receive based on the level of trust they have in energy efficiency programs, government authority, or utility companies.

Limited trustworthy information or doubts about energy efficiency companies or contractors can be a strong barrier to participation (Stern, 2007; Pelenur & Cruickshank, 2012). A research conducted in China and the Netherlands by Liu, Bouman, Perlaviciute, and Steg (2020) examined the impact of two dimensions of trust: competence-based (trust in the ability to deliver on a promise) and integrity-based

(trust in the morality of the organizer). They found that trust has a great impact on the public's perception and acceptance toward energy-related projects with integrity-based trust tend to have a stronger influence. Another experiment from Ireland also found that trust is a "key determinant" for households' attitudes toward energy efficiency labels (Schuitema, Aravena, & Denny, 2020). Insights from their study could be applicable to the U.S. as Reames (2016) also acknowledged that distrust is a major barrier to the adoption of technologies and energy efficiency, while categorizing distrust into: 1) distrust toward government, and 2) distrust toward others. He also emphasized that distrust, as a social barrier recognized in marginalized and underprivileged communities, is critical and requires special attention to address. Other researchers also point to distrust toward financial institutions in the process of financing for energy efficiency upgrades (Leventis, Kramer, & Schwartz, 2017), which this paper will take a closer look at in the next section focusing on financing options as a barrier.

A survey of 615 residents in Vermont in 2012 found that distrust in the saving potential of energy efficiency participation was the most important driver of all (Wood, 2013). Tying back to the issue regarding information provision that this paper discussed, it is understandable how this distrust might exist. Stigma and biases associated with energy behavior are hard to overcome, thus, it takes convincing information and facts in order for one to unlearn these false perceptions and start building better energy habits. However, the information, specifically related to the saving potential of energy efficiency, is limited and imperfect due to the fact that there are so many factors affecting the level of saving potential of energy efficiency measures such as types of building, age, and other building factors (Wood, 2013). Sovacool (2009b) also brought up how there are certain flaws in saving expectations of energy efficiency, which creates false hope and unrealistic expectations. This, in turn, could be a contributing factor to mistrust toward energy efficiency as well.

2.4 Limited financing option

Aside from trust, Forrester and Reames (2020) found the high upfront cost of energy efficiency upgrades as well as the limited financing options to be the primary barrier to participation. Their research compares the "financing coverage gap" in energy efficiency to that of healthcare insurance, where some households make just above the threshold to be ineligible for certain financial incentives toward energy efficiency upgrades, while not making enough to afford those themselves. Other researchers (Cowan & Daim, 2013; Reames, Reiner, & Stacey, 2018) also agree that high initial costs along with information deficits are the most common causes of low participation in energy efficiency.

In the context of inequality in energy justice, unaffordable upfront cost persists greatly to low-income households. Many low and moderate-income households cannot afford to cover the cost of failed household appliances, good financing can help them to take immediate action and equip their home with more energy-efficient appliances, which will not only save them money in the long run but also improve their standard of living and overall health (Leventis, Kramer, & Schwartz, 2017). However, income inequality can be a barrier in access to these financing options. For instance, Forrester and Reames (2020) found that credit score and income have different dynamics when it comes to loan approval between low-income and high-income households. Their research found that higher-income households had significantly higher chances of getting a loan with lower FICO scores compared to those with lower

income but higher FICO scores. Not only are these lending practices unfair, they also put these communities at risk of debt burden.

Leventis, Kramer, and Schwartz (2017) also acknowledged several other financing barriers such as: awareness, transaction costs, confidence and trust, and the split incentives. Awareness barrier of financing refers to the lack of knowledge of all the financing options offered. Households might also be inexperienced with taking financing options or do not realize that they are qualified. Transaction costs refer to the hassle and other fees within the loan application process that disincentivize borrowers to proceed. Confidence and trust, which Sovacool (2009b) refers to as false hopes and unrealistic saving expectations, in the context of financing means that households will be responsible for these loans even if they don't realize the expected savings or any savings at all. Lastly, split-incentive is an issue that was widely discussed by many researchers (Bird & Hernández, 2012; Kontokosta, Reina, & Bonczak, 2019; Brown, Sorrell, & Kivimaa, 2019), which refers to the dilemma where landlords do not have financial incentives to invest in energy efficiency upgrades for units of which tenants are responsible for paying utility.

Of the papers reviewed, most researchers seem to agree that addressing issues within energy efficiency financing can boost participation in energy efficiency and retrofit investment (Brown, Sorrell, & Kivimaa, 2019; Rezessy, & Bertoldi, 2010; Freehling & Stickles, 2016). On the other hand, other researchers suggest that there are too many barriers (Kangas, Lazarevic, & Kivimaa, 2018) that are outside the scope of what financing solutions can address to uptake energy efficiency and retrofit investment (Wilson, Crane, & Chryssochoidis, 2015). Thus, this literature review hopes to conclude with a variety of strategies that program organizers, state authorities, and policymakers can implement to increase participation in energy efficiency, especially within minority and low-income households

3. Conclusion

While behavior, and psychological are important studies, it is crucial to acknowledge that institutional barriers reflected through structural racism, classism, etc. have a significant influence as well from a macro perspective. That is proven by how the energy burden is laid disproportionately on low-income and marginalized communities. From a micro perspective, there are individual stigmas, behavior, trust, and financing limitations that exist and manifest in different ways, which act as barriers impeding the uptake of energy efficiency participation. Millions of low-income households in America do not have access to "affordable, reliable, and efficient" energy (Reames, 2016) because of said injustices coming from institutionalized discrimination, which is why an energy justice perspective is crucial to look at when addressing these barriers.

3.1 Challenges facing energy efficiency programs and the gap in structure and policy

Energy efficiency programs have a strong potential to reduce household energy costs and have had significant accomplishments in addressing energy inefficiency. A study from the U.S. Department of Energy across 48 states found that applying cost-effective energy efficiency practices such as insulation and using energy-efficient appliances can cut down household energy consumption by 13% to 31% (U.S. Department of Energy, 2018). Looking beyond the household level, although the U.S. overall energy consumption increased over the past few decades, energy intensity, which better illustrates energy

efficiency, has decreased 50% since 1980 (Nadel, Elliott, & Langer, 2015). This translates into $800 billion saved to consumers and businesses just from energy efficiency improvements (Nadel, Elliott, & Langer, 2015). Lower energy intensity greatly benefits the entire population and the economy; however, it does not address a gap in energy intensity faced by minority and low-income households. Drehobl and Ross 2016 pointed out how these programs are still facing recruiting participation from low-income and minority families. Not only does this gap limit these programs' full potential, but it also acts as a barrier for marginalized communities, who are being affected disproportionately by this issue, to receive the assistance they need. Allcott and Greenstone (2017) also found that these programs have "significant potential" but are in need of restructuring in policies to achieve it.

Berger (2015) also brought up the limitation of not being able to target the highest usage households. However, in the context of high energy burden and energy justice, energy usage should be normalized in terms of energy expenditure per footage. As higher-income households might incur higher energy expenditure due to having more appliances, while when examining energy usage per square footage, lower-income households tend to spend more due to housing inefficiency (Drehobl & Ross, 2016; Bednar, Reames, & Keolian, 2017). Thus, although high energy usage households are a good potential target, high energy intensity households should be the main focus since it connects directly to the justice behind energy burden. Moreover, households under the scope of high energy intensity also need the most assistance.

The literature points to the fact that energy justice is often neglected or not properly addressed when energy policies and energy programs are looking to address high energy burdens. Even for those that discuss energy efficiency, the main focus is usually on participation in these retrofit measures and not on procedural justice, the lack of representation from the target audience in the process by which these programs were designed and policies were created, and the political aspect of scheme design (Gillard, Snell, & Bevan, 2017). Hoicka, Parker and Andrey (2014), in their study, also found that procedural justice in which these programs are designed along with other factors such as information provision, and financial incentives had influences on individual's reaction and decision to participate in these programs. Thus, if programs and energy incentives are not achieving the desired participation rate, the scheme design can be changed to reach a different outcome.

3.1 Strategies to improve energy efficiency participation in minority and low-income households

Fung (2006) suggests that a shift of decision-making power from elites and powerful entities to citizens along with thorough scrutiny and pressure exerted from the public on policymakers, would not only improve participation coming from these underrepresented communities but also address inequity and justice by leveling out the power hierarchy. On a smaller scale, local organizers can also apply the same principle when designing or leading programs to achieve similar goals.

Many researchers also point toward addressing the visibility of energy as a resolution. Sovacool (2009a) and Hards (2013) explain how invisibility has caused misperception and a lack of energy awareness. As a result, having energy visible and acknowledged by the public could potentially drive people to make better energy decisions, which include participating in energy efficiency. Burgess and Nye (2008) and Darby (2006) highlighted the use of transparent energy monitoring systems as a means to "re-materialize" energy counter to the fact that it has been too distant from consumer's vision.

Within the context of energy visibility, Bailey, Bailenson, Flora, Armel, Voelker, and Reeves (2014) also conducted an experiment using virtual technology to deliver a vivid message and visualization of energy use to study participants and found that it made a positive impact on their energy consumption behavior and environmental awareness. However, participants' behaviors were only measured once in their study, thus, the long-term impact of this method is still unknown. Additionally, the age range of participants in this study was also limited to 18-25, older adults might react differently to the experiment. Similarly, Hargreaves, Nye, & Burgess (2010) also conducted a similar experiment with smart energy monitors and found positive impacts on householders' behavior. Boomsma, Goodhew, Goodhew, and Pahl (2016) also acknowledged the potential of these interventions while pointing out that there are still areas for improvement. Sovacool (2014) also brought up an important question of which of these visual interventions has the most effective influence on household behaviors.

Since high upfront investment cost is one of the primary barriers, providing better financing mechanisms, as Brown, Sorrell, and Kivimaa (2019) referred to, is an important consideration. They suggested that improving financing alone might not be enough to drive the demand for energy efficiency; however, it opens a lot of doors and acts as an enabler to a broader strategy. Forrester and Reames (2020) suggest that green banks and other programs with low interest rates have been proven to increase access to energy efficiency. Brown, Sorrel, and Kivimaa (2019) and Leventis, Kramer, and Schwartz (2017), on the other hand, provide 3 different suggestions: Lower "cost of capital" to retrofit investment through public finance, simplify the "customer journey" by shortening the loan or other financing application process, and lastly, to promote non-financial incentives such as health or comfort due to the fact that savings potential alone can be misleading and cause further distrust.

Social marketing is also an effective way of reaching low-income or minority households. Caldwell, Vaughn, Harrod, and Harrod (2019) conducted an experiment by offering households education sessions prior to an energy audit, led by energy educators to discuss no-cost and low-cost energy conservation measures that they can implement at home. The result found that families who received the sessions implemented and practiced these measures more than those who did not receive the visit. This finding aligns with Craig (2016) suggestions of how higher awareness of energy efficiency would result in higher participation in them. Other researchers also point towards similar "in-person" and "education campaigns", which seem to be fairly effective (Drehobl, Chikumbo, & Tanabe, 2018; Simms and Casentini, 2018; Craig, 2016). Not only increase participation, but more education has the potential to correct some of the stated misperceptions about energy and also help destigmatize energy efficiency as well.

In the context of social marketing, Caldwell, Vaughn, Harrod, and Harrod (2019) also incorporated several important "social marketing and psychological concepts" that are stressed by the literature. The first is cultivating relationships, which includes building a strong and supportive relationship between households and educators. Next comes modeling specific behavior and clearly communicating information to make it easier to implement energy conservation changes. Educators also need to be flexible and capable of customizing action plans that address individual households' needs, which might differ from case to case. Sign commitments are proven to effectively increase follow-through action (Baca-Motes, Brown, Gneezy, Keenan, & Nelson, 2013) and are highly encouraged. Lastly, implementing social norms by showing households' commitment or feedback from their neighbors on

energy efficiency so they can compare and contrast. This has been proven to motivate households to take action and commit to saving energy accordingly (Farrow, Grolleau, & Ibanez 2017). Additionally, Keilty (2018) also suggests staying engaged, communicating, and recording customer experience to be used as "lessons" in order to improve future implementation.

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Appendix B: Story Map Tool and Data Dictionary

URL: https://storymaps.arcgis.com/stories/36d89cc0de62437d88d1eef8b35d22b5

This interactive Story Map accompanies a written report to NYSERDA and is intended as an interactive, transparent method for sharing findings and inviting public participation before, during, and after the creation of an Equitable Engagement Plan for the Mid-Hudson Regional Clean Energy Hub.

Table 1. Barriers to Clean Energy Participation

Customer Journey -->	Awareness, Relevance, & Interest	Eligibility & Enrollment	Project Scoping & Contractor Engagement	Installation & Incentive Payment	Evaluation & Quality Control
Physical Barriers	- Broadband/Internet access deficits. - Energy not as highly prioritized as other home improvement issues.	- Broadband issue also extends into difficulty enrolling in program via online application. - Technology gap can make providing follow-up support challenging, slower. - Gap measures like a leaky roof, inoperable heating systems, or health & safety issue must be addressed first.	- Contractor specialties and material preferences range; do not always line up with customer's desired scope. - Customer choice in scope and materials is limited, largely out of their hands. - Improvements necessary to repair home, reach energy affordability, and move off fossil fuels is beyond what one program can cover. - Building stock in the Mid-Hudson Region is older & more expensive to upgrade on average.	- Health & safety measures unknown at the time of application can halt a project in its tracks (e.g. mold), even left in worse condition (e.g. insulation removed).	- Quality Assurance checks of completed projects is of a small sample size of all projects. - Finishing work (e.g. painting over bore hole in walls) not included in program.

Customer Journey -->	Awareness, Relevance, & Interest	Eligibility & Enrollment	Project Scoping & Contractor Engagement	Installation & Incentive Payment	Evaluation & Quality Control
Financial & Economic Barriers	- Competing financial priorities both amongst energy upgrades and external to energy. - Lack of time to find, plan, and manage projects. - Lower tax obligation means LMI clients can not access the full amount of incentives.	- Applications started are not always finished when other needs arise. - Home repair programs are under-funded, have long wait-lists, which defers enrollment in energy programs.	- High market demand draws contractors away from LMI programs in favor of market-rate customers.	- Lack of savings to cover out-of-pocket expenses or gap measures (asset-limited, income-constrained).	- If customer bill savings do not meet what was explained or expected, customer feels taken advantage of.

Customer Journey -->	Awareness, Relevance, & Interest	Eligibility & Enrollment	Project Scoping & Contractor Engagement	Installation & Incentive Payment	Evaluation & Quality Control
Knowledge, Perception, and Information Barriers	- Frequent misconception that "this does not apply to me" (e.g. renters or mobile homes). - Landlord-tenant relationship is combative or absent. - Trust must be present in all players. One weak link will undermine the rest. - Mismatched expectations from unscrupulous advertising promising conflating "government program" and "free." - Conflicting market information about best solutions for lowering energy costs. - Language barrier when English is a second language begins at awareness but can	- Translation assistance from the Hub is increasing but gaps remain. - Administrative burden to complete application and provide documentation perceived as high. - High administrative burden to putting multiple programs together in correct order, creates "revolving door" to receiving services. - Difficulty navigating shifting program rules and procedures.	- Service gaps exist where contractors cannot effectively communicate in languages other than English. Creates opening for misunderstandings. - Split-incentive between landlord and occupant frequently pushes customer into lower tier of service, if at all.	- Energy Advisors don't have access real-time information after application is approved. Often don't know when or if a project was completed without talking to customer.	- Awareness of 3-year re-eligibility for EmPower+ is relatively low. - Customer experience word of mouth is a powerful influencer of referring/deterring others.

Customer Journey -->	Awareness, Relevance, & Interest	Eligibility & Enrollment	Project Scoping & Contractor Engagement	Installation & Incentive Payment	Evaluation & Quality Control
	persist throughout the program.				
Program Design and Implementation Barriers	- Several programs exist with similar services (e.g. EmPower+, WAP, HERR) that are confused for one another and not well-integrated. - Incentive levels have not kept up with inflation or are not set high enough to move from aware to interested. - Historical pattern of irregular, insufficient, and brief community engagement from past service providers has left customers confused and despondent.	- Income eligibility thresholds do not take hardship/expenses into account. Discouraging to customers when income is barely over the limit.	- LMI program project caps make larger, market-rate jobs more attractive to contractors than smaller, or more challenging projects in DACs. - Administrative burden on contractor to execute LMI scope than market-rate jobs. - Special needs not being relayed to all parties.	- Reports of customers lured in with rebate amounts only to be told after installation, "you must now go apply for the rebate" is counter to program procedures. - Health & safety allowance within EmPower+ budget set too low to cover most common reasons for deferral (roof leak, mold). - EmPower+ total incentive amount is uniform, not dependent on reaching energy affordability threshold or total potential cost savings.	- Process for investigating customer complaints is not transparent or provided upfront of installation. - Long-term energy and emissions savings are not independently verified, are assumed based on modeled savings. - Quality Assurance oversight only applies to installation and does not ask about performance or customer service throughout program.

Table 2. Barriers to Accessing Clean Energy Careers

Market Actors -->	Job Seekers	Training Providers	Educational Institutions	Funders & Policy Makers	Established Contractors & Employers
Physical Barriers	- Lack of reliable personal or public transportation. Public transit routes not widespread enough to get to far away job sites. - Fewer opportunities for disabled & differently abled persons unable to fill manual labor jobs - No accelerated heat pump training location in region. Closest is in Saratoga Springs. - Youngest entries to workforce are entering with less work experience than previous generations - Tech literacy and access - Childcare availability during trainings, general deficits in childcare in the region. - Mental health instability, including substance abuse - Individuals facing unstable housing situations must sometimes relocate unexpectedly, exacerbates travel barrier	- Training facilities located far from DACs - Target audiences are spread out, difficult to aggregate - Few BPI qualified instructors to lead trainings	- Course catalogs are difficult to navigate, not paired to same reading level as target audience		

Financial & Economic Barriers	- Cost of tools - Lack of savings to change career paths, unable to forego paycheck to participate in unpaid trainings - Significantly higher pay for same jobs in major markets outside our region (NYC) pulls local talent away	- Traditional federal funding sources restricted to union-backed apprenticeships. New funding is only just arriving. - Intensive short-run trainings require paid time off that target audiences don't have or cannot afford.	- Academic calendar classes takes longer to receive certifications. - Tightening academic budgets are restricting/eliminating non-credit learning opportunities. - Training equipment and facilities require high upfront costs - Declining enrollment rates, rising tuitions	- Climate action funding must face difficult trade-offs about funding mitigation, adaptation, or workforce development. Funding all three, limits impact in any one area. - Escalating costs to recover from climate impacts a drain on local & overall economy. - Time investment to apply for incentive programs a sunk cost; disadvantages smaller companies and non-profits who cannot afford upfront payment and long reimbursement waits.	- High start-up costs and insurance requirements for new firms to enter the field.

Knowledge, Perception, & Information Barriers	- Certain jobs can carry racial stereotypes - Job promotion around clean energy trends towards collegiate reading level, lots of jargon. Leads to assumption that all jobs require college degree. - Lack of professionalism in younger generation leading to lose training or employment opportunities - Lack of job-ready training, such as including certifications like OSHA to be more employable	- Programs advertised on small scale relative to “big name” job search platforms. - Training programs & outreach for them frequently only offered in English - Training program versus higher education track seen as dichotomous choice, not integrated.		- Accessing and understanding funding requirements can be challenging. What is "publicly available" versus "publicly accessible." - Partisan opposition to clean energy - "Greenwashing" of jobs takes advantage of vague "green job" definition	- Language fluencies necessary for recruitment, onboarding, training, and ongoing management of employees from diverse backgrounds

Program Design & Implementation Barriers	- Access into homes can preclude criminal rehabilitation programs. - Longer enrollment periods for publicly subsidized positions and OTJ training than for other similarly-paying jobs outside clean energy	- Hard to fill training courses results in fewer offerings annually results in courses being harder to fill, negative feedback loop. - Requirements of job training funding can limit integration with wrap-around services via admin burden. - Publicly funded clean energy jobs well short of market-rate lowers long-term retention of employee that was trained. - Not well-integrated with higher ed pathways. - Refrigerant management certifications not integrated with heat pump certifications	- "Education gap" between what is taught and industry valued skills. - Not well integrated with training programs.		- Risk-aversion to on-the-job training. Entry-level jobs requiring in field experience creates catch-22: experience needed to get the job must be learned by having the job.

Table 3. Data Dictionary and Sources

Data Layer	Description	Source
Mid-Hudson Disadvantaged Communities (DACs)	Census tracts designated by the Climate Justice Working Group as Disadvantaged Communities, based on 45 indicators used to identify 35% of New York State as DACs.	NYSERDA Disadvantaged Communities Dataset
Percent Non-English Speaking	Percent population who speak English less than 'well'	NYS Heat Vulnerability Index Data
Number of Housing Units w/ Rent Over 30% Income	Number of households who pay 30 percent or more of their household income on housing (such as rent or mortgage expenses)	NYSERDA Tableau - Buildings
Percentage Renter-Occupied	Percentage of housing units that are renter-occupied rather than owner-occupied	NYSERDA Tableau - Buildings
Housing Units	Number of housing units per census tract. Housing unit is defined here as: a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy)	NYSERDA Tableau - Buildings
Homes Built Before 1960	Percentage of homes that were built before 1960	NYSERDA Disadvantaged Communities Dataset
Percentage Owner-Occupied	Percentage of housing units that are owner-occupied rather than renter-occupied	NYSERDA Tableau - Buildings
Average Annual Energy Cost	Annual energy cost ($)	DOE-LEAD Mid-Hudson
Median Energy Burden	Median household energy costs over median household income	DOE-LEAD Mid-Hudson
NYSERDA Funding Dollars	Funding of NYSERDA projects measured in dollars	NYSERDA Tableau - Programs
Leveraged Funds	Customer contributed funds put towards projects measured in dollars	NYSERDA Tableau - Programs
Annual Heat Savings (MMBtu)	Estimated annual heat savings measured in equal value to one-million British thermal unit (BTUs) attributable to NYSERDA projects	NYSERDA Tableau - Programs

Data Layer	Description	Source
Annual Electricity Savings (MWh)	Estimated annual energy efficiency savings (measured in megawatt hours) attributable to NYSERDA projects	NYSERDA Tableau - Programs
Annual Customer Energy Bill Savings ($)	Estimated annual participant energy bill savings (in dollars) attributable to NYSERDA projects	NYSERDA Tableau - Programs
Total CO2 Emissions Reduction (Metric Tons)	Estimated lifetime CO2 emissions reduction measured in metric tons attributable to NYSERDA projects	NYSERDA Tableau - Programs
Unemployment Rate	Percent population (18-64 years) unemployed	NYS Heat Vulnerability Index Data
Labor Rate	Percentage of 20-64 years olds in the workforce/employed	NYSERDA Tableau - Demographics
Population	Population of a given census tract	NYSERDA Disadvantaged Communities Dataset
College Rate	Percentage of population with a college degree	NYSERDA Tableau - Demographics
Public Transit Use	Percentage of population that utilizes public transit	NYSERDA Tableau - Demographics
Broadband Rate	Percentage of population with access broadband internet	NYSERDA Tableau - Demographics

Appendix C: Community Engagement

Mid-Hudson Energy Hub Advisory Committee Members

Advisory Committee		
First Name	**Last Name**	**County**
Wilfredo	Morel	Dutchess
Brianna	Rodriguez	Orange/Ulster
Sheri	Reid	Dutchess
Gautam	Sethi	Dutchess/Ulster
Paul	Presendieu	Westchester
Norah	Mosquea	Westchester
Carla	Castillo	Orange/All
Emily	Mauro	Ulster

In-person Public Meeting Flyers

In-person Public Meeting Agenda

Time	Agenda Item + Notes
4:00 pm	CBI and Cornell staff arrive early to set-up
6:00 pm	Arrive, get settled, help yourself to dinner
6:15 pm	Welcome, introductions, agenda review ● Welcome (Cornell) ● Agenda review (CBI) ● Introductions (CBI) ○ Depending on number of people - round robin intros or hand raising to show who is in the room
6:30 pm	Cornell presentation: What can the Mid-Hudson Regional Clean Energy Hub do for you? ● (20 min) Presentation: Project overview, what is the RABA, what we know so far, purpose of community input and "ground truthing" ○ New title: what can the hub do for you? ● $550k or $30k for each county to help raise awareness for these programs? Pilot projects could be physical things. What can this do for your community? Share examples. ● (10 min) Q&A
7:00 pm	Discussion on access and barriers, solutions creations, community asset/community building ● Small groups recommended, then sharing back. Discussion questions: ● What motivated you to be here today? ● What changes have worked well for you or your community? ● What concerns do you have as you're exploring these changes? How can we help? ● Have you considered career or job opportunities in clean energy - why or why not?
7:30 pm	Survey ● Share information about the survey ● Have laptops and paper surveys ready to distribute
8:00 pm	Adjourn

Appendix D: Survey Tool

Welcome!

We at the Mid-Hudson Regional Clean Energy Hub are seeking **to better understand how to make clean energy* upgrades and clean energy jobs more accessible for New York State residents.** Thank you for taking the time to fill out this survey, and help us in this effort! In this survey, we ask questions about your household, home, energy costs, and experiences with energy programs. We very much appreciate you taking the time to fill out the survey. **The first 250 respondents will receive a $20 gift card (must provide email or phone number to be eligible).** This survey will take 20-30 minutes to complete.

The Mid-Hudson Regional Clean Energy Hub is a program funded by the New York State Energy Research and Development Authority that provides no-cost energy advising from a team of trusted and knowledgeable community-based organizations.

This survey is for individuals living in Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster or Westchester County. If you participate, your name and personal information will be kept confidential and will not be shared with anyone outside of our team or on any published documents. You have the right to skip any question and/or finish the survey at any point.

To access this survey in Español, Kreyòl Ayisyen, Português, عربي ,עברית, 简体中文, access the survey online.

***What is clean energy?**
For the purposes of this survey we define clean energy as energy produced and consumed with no pollution or emissions. Examples of clean energy technologies include wind turbines, solar photovoltaic panels, air source heat pumps, geothermal, and hydroelectric turbines.
Questions?

Contact Collin Adkins, co-director for the Mid-Hudson Regional Clean Energy Hub:
845.677.8223 x.113 or cda37@cornell.edu

Consent for Survey

I have read and understood all information in the Project Description. I agree to participate in this survey. I understand that I have the right to skip any question and/or and end the survey at any point.

1. Respondent's name:

2. I am a resident of Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster or Westchester County:
    a. Yes

b. No

3. Signature:

4. Date:

5. Email or phone number
   Why are we asking this? If you are one of the first 250 respondents you will receive a gift card. We need an email or phone number to contact you to share the gift card.

Part 1 – About Your home

This section asks questions about your home and exposure to extreme weather conditions.

1. What type of home do you live in?
   a. Single family home not attached to other buildings
   b. Single family home that shares a wall with another building
   c. Condo or Co-op
   d. Apartment in a 2-4 unit building
   e. Apartment in a 5+ unit building
   f. Mobile Home
   g. Other

2. Do you own or rent your home?
   a. Own
   b. Rent
   c. Other

   If other, please describe:

3. How long have you lived in your current home (years and months)?

4. Do you or members of your household experience symptoms from extreme heat or extreme cold?
   Symptoms from extreme heat include dizziness, fatigue, headaches, low blood pressure. Symptoms from extreme cold include shivers, dizziness, nausea, rapid heart rate.
   a. Yes, symptoms from extreme heat
   b. Yes, symptoms from extreme cold
   c. Both
   d. Neither or Unsure

5. Are you aware of any of the following issues in your home?

Why are we asking this? Certain health and safety issues can prevent energy efficiency work from occurring. We want to better understand how common each of these issues are in our region.

	Yes	**No**	**Not sure**
Asbestos or vermiculite			
Knob & tube wiring			
Leaky or broken roof			
Radon			
Lead			
Mold, or unresolved water damage			
Missing, inoperable, or broken heating system			
Missing, inoperable, or broken cooling system			
Broken windows			
Electrical issues			
Leaking plumbing			
Cracked or eroding foundation			
Damaged or clogged chimney			
Other			

5a. If you selected "other" above, please describe.

Part 2 – About Your Energy Usage

This section asks about your energy habits, bills, and experiences. It may be helpful to look at a recent energy bill for reference.

1. Who pays the electric bill for your household?
    a. I do

b. Another member of my household
c. Landlord
d. Other

2. Who pays the heating bill for your household?
    a. I do
    b. Another member of my household
    c. Landlord
    d. Other

3. On average, what would you consider to be an "affordable" or "reasonable" monthly cost of all energy needs in your home (electricity, home heating, cooling, etc.)?

4. Using your recent bills or your best estimate, how much does your household spend on household energy use (electricity, home heating, cooling, etc.) a month on average?

5. Is your electric bill on a budget billing plan?

A budget billing plan–also called levelized billing plan–means you are charged the same amount every month. The amount you pay each month is calculated based on your energy use history by your electric utility.

    a. Yes
    b. No
    c. I'm not sure

6. In the last 12 months, for how many months did you seek financial help to pay your energy bills?
    a. 6 or more months
    b. 3-6 months
    c. 1-2 months
    d. Never
    e. Don't know

7. In the last 12 months, for how many months were you been unable to pay your energy bill in order to pay for other necessary expenses (food, telephone, rent, medical expenses, etc.)?

Why are we asking this? We are interested in better understanding the duration of energy hardship.

    a. 6 or more months
    b. 3-6 months
    c. 1-2 months
    d. Never
    e. Don't know

8. In the past year, has your household received any of the following forms of energy assistance? Circle all that apply.

a. Bill assistance or fuel delivery through the Home Energy Assistance Program (HEAP)
b. Bill assistance through your utility's Energy Affordability Program (EAP)
c. Bill assistance or fuel delivery from a friend or family member
d. Mutual aid funds like church groups or GoFundMe
e. Energy efficiency upgrades through EmPower+ (a program of NYSERDA, installed by participating contractors)
f. Energy efficiency upgrades through the Weatherization Assistance Program (a program of NYSHCR, administered by county Community Action agencies)
g. A financial rebate for installing heat pumps or heat pump water heaters (NYS Clean Heat)
h. A financial rebate for installing solar photovoltaic panels (NY-SUN)
i. NYS or Federal tax credit for energy upgrades
j. I have not received any form of energy assistance in the past year.
k. Other: _____

9. For any energy assistance program you were interested in or received, please describe:

9a. Your experience during the application process, including if you began an application for a program but did not complete enrollment?

9b. Your experience during the program, including if you withdrew from the program?

9c. Your experience after the program?

9d. Any other comments to share?

10. Before today, were you already aware of any of the following programs? Select all that apply.

	Never heard of it	Sounds familiar	Heard of it	Applied but did not receive	Applied and received
The Home Energy Assistance Program (HEAP)					
My utility's Energy Affordability Program (EAP)					
EmPower+ (a program of NYSERDA, installed by participating contractors)					
The Weatherization Assistance Program (a program of NYSHCR,					

administered by county Community Action agencies)					
Financial rebates for installing heat pumps or heat pump water heaters (NYS Clean Heat)					
Financial rebates for installing solar photovoltaic panels (NY-SUN)					
Tax credits for energy upgrades					

11. What concerns, if any, do you have about receiving any of the energy assistance programs listed above (Question #10)?

12. Fill in the blank: In order to afford a switch to clean energy, I would expect New York State programs to pay for _____% of the total cost (installation & materials).

13. Who/what/where would you go to first with concerns about affording your energy bills?

Part 3 – Please share whether you agree or disagree with the following statements
Skip those that do not apply to you

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. 1."I watch my energy use closely."					
15. "I trust that contractors that participate in energy assistance programs will do a good job."					
16. "I trust that clean energy programs will deliver on their promises."					
17. "I would feel more confident in pursuing energy assistance programs if a non-profit were available to help me."					

18. “I am concerned about the impact that burning fossil fuels, like gas or oil, has on my community, the environment, and/or the climate.”					
19. “Switching to cleaner sources of energy, like solar or heat pumps, also saves money.”					
20. “Home energy programs do not apply to me"					
21. “I do not have a good relationship with my landlord or my landlord is mostly absent and unresponsive.”					
22. “I find the information given to me about home energy programs difficult to understand.”					

Part 4 – About You

Here we will ask questions about you and your household to better understand the reach of our survey.

23. Location – Which town and county do you live in?

Why are we asking this? Comparing survey results to other data sets will allow the Hub to focus outreach efforts and allocate resources to help address barriers identified in this survey. Location data will be approximated and is never shared.

24. How old are you?
    a. 18-20
    b. 21-30
    c. 31-50
    d. 51-70
    e. 70+
    f. Prefer not to answer

25. What is your gender identity? Circle all that apply
    a. Man
    b. Woman
    c. Non-binary
    d. Genderqueer
    e. Transgender
    f. Cisgender

g. Agender
h. Prefer not to answer
i. Other

26. How do you identify your ethnicity or cultural background? Check all that apply
    a. Asian
    b. Black or African-American or African origin
    c. Native American / First Nation / Indigenous / Alaskan Native
    d. Native Hawaiian or other Pacific Islander
    e. Hispanic or Latino/Latinx origin
    f. White or European American
    g. Unknown
    h. Prefer not to answer
    i. Other

27. What languages do you speak most at home?

28. Including yourself, what is the total household size of all permanent residents including children but not those just visiting, away in the military or at college?

Do not include anyone who is just visiting, away in the military or at college.

29. What is your combined household income?

Why are we asking this? – Survey responses may be filtered by eligibility for certain energy assistance programs based on household income. We will also use this information to help you enroll in energy assistance programs if you indicated that you would like to be connected with a member of our team. Reminder: responses to this survey are kept anonymous and confidential.

30. Where do you get your news and information?

Why are we asking this? We'd like to understand where to share resources in a convenient and accessible way and also understand where people might be getting incorrect information.

31. Please rank your opinion of the following information sources in order from most trustworthy (1) to least trustworthy (7):

_____Social media
_____Friends/family/neighbors

_____Search engines (e.g. google)
_____Advanced language models (e.g. ChatGPT)
_____Printed/digital newspaper
_____Television news network
_____Radio

32. Are you interested in talking to a member of our team about participating in energy assistance programs?

Yes
No
Maybe

Are you interested in participating in a focus group conversation about any of the topics listed below? Focus group conversations will likely be 2-hour sessions, either in person or zoom. Participants will be compensated for their time via a gift card.

	Yes	No	Maybe
Clean energy workforce development			
NYS energy programs			
Community benefits and opportunities from clean energy			

If yes to the above, what times are you generally available? Circle all that apply

i. Any time
ii. Weekday morning
iii. Weekday afternoon
iv. Weekday evenings
v. Weekends
vi. Don't know
vii. Other: _____

Do you want to be added to a contact list or newsletter to learn more about clean energy and assistance programs in the Mid-Hudson Region?

viii. Yes
ix. No
x. Not sure

Please share any other comments, questions, or concerns you have about accessing clean energy in the state of New York.

Thank you!

You will receive a $20 gift card via email if you are one of the first 250 respondents to this survey. We would greatly appreciate it if you share this survey with your friends, family, and network living in Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester counties.

End of survey

Appendix E: Survey Data Tables and Figures

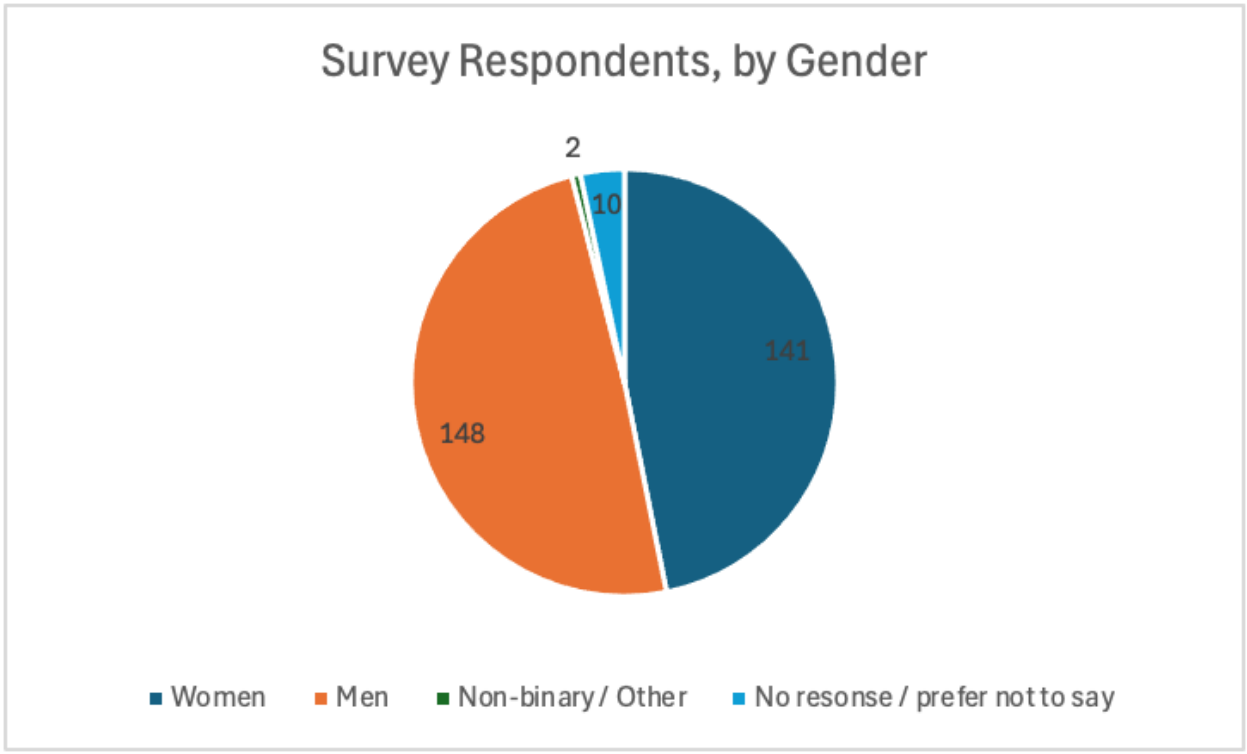


Figure 2. Survey respondents, by gender.

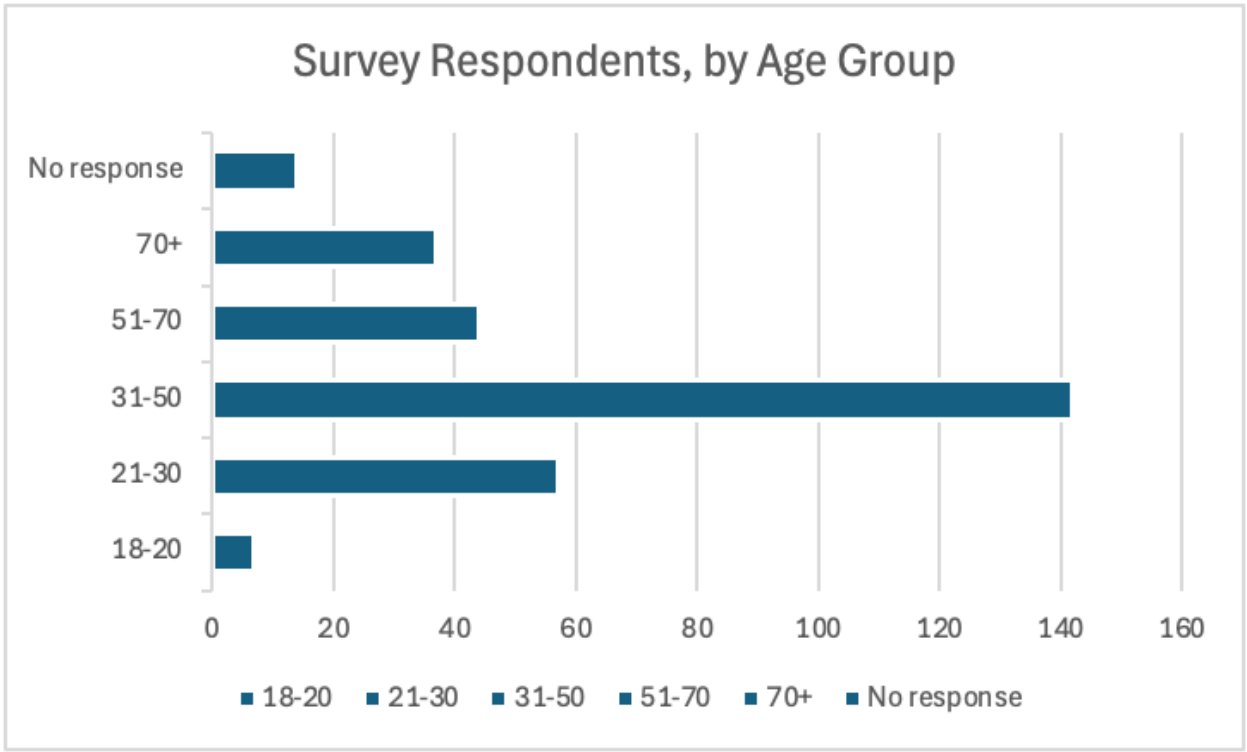


Figure 3. Survey respondents, by age group.

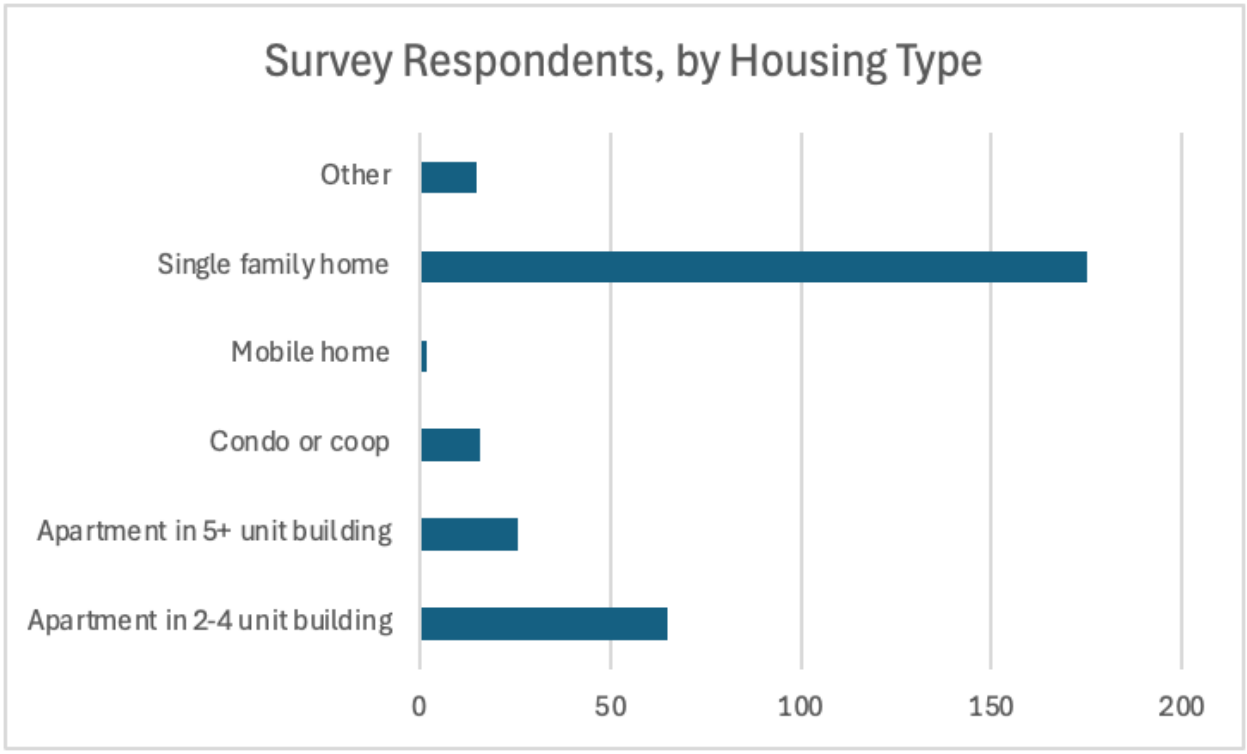


Figure 4. Survey respondents, by housing type.

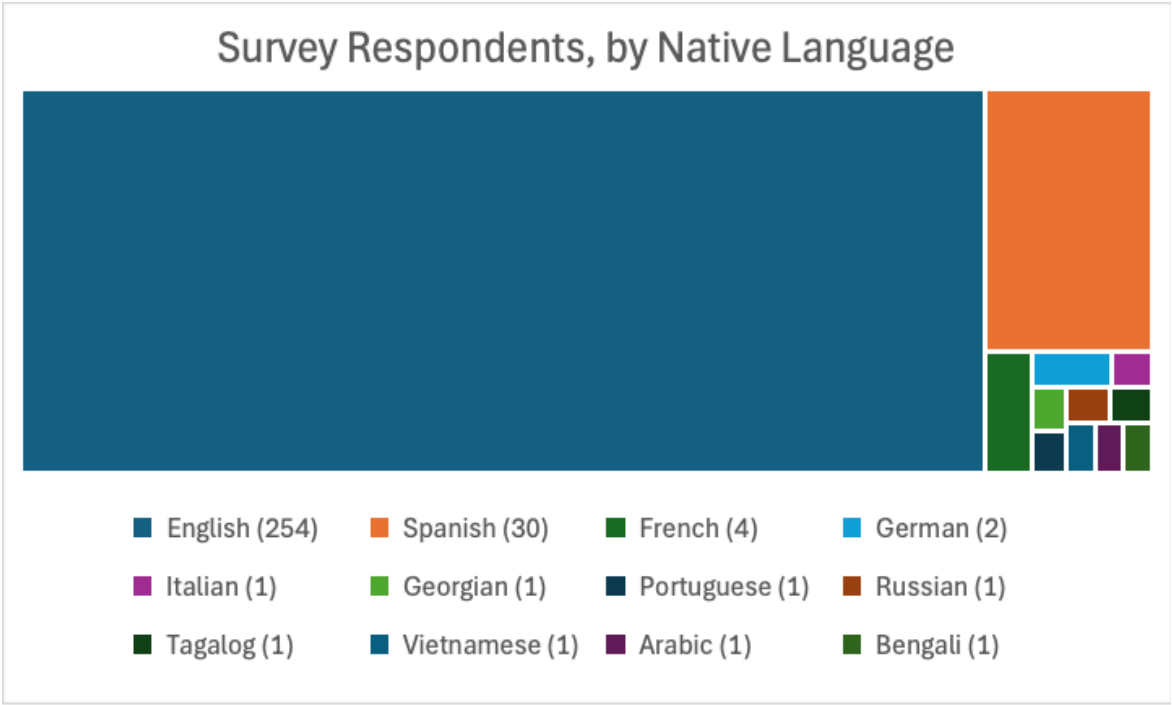


Figure 5. Survey respondents, by native language.

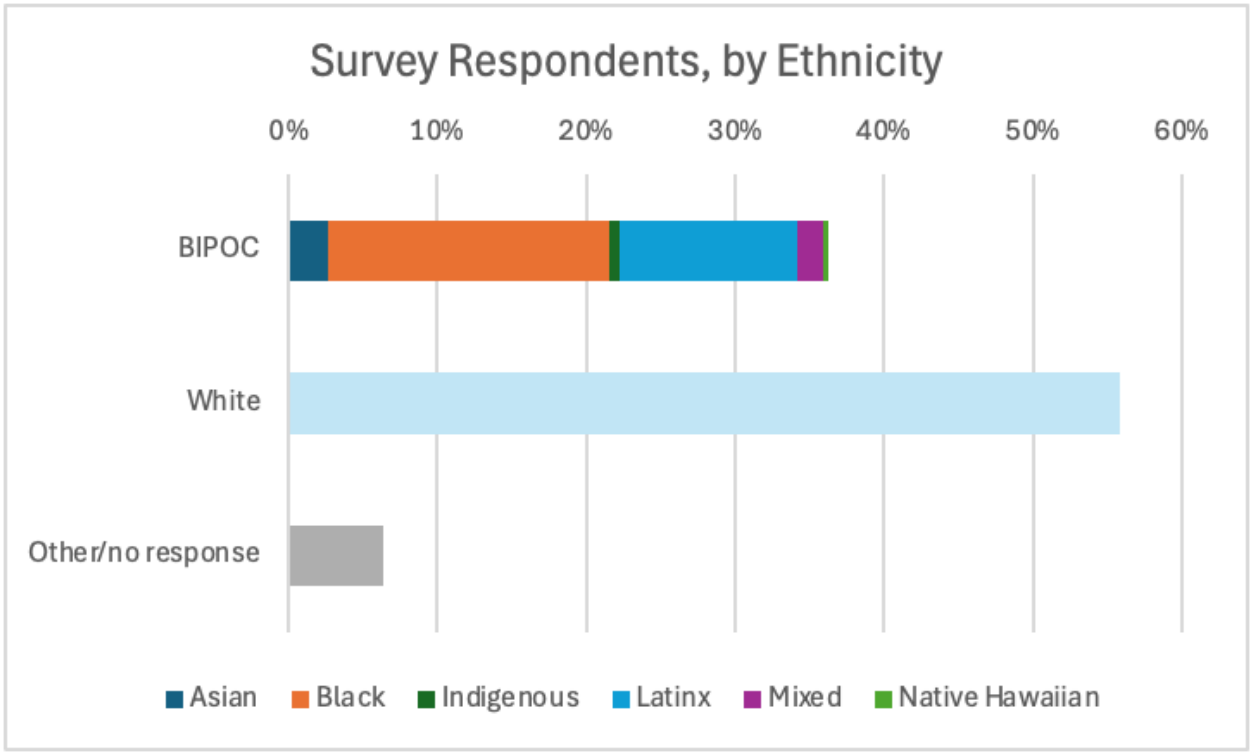


Figure 6. Survey respondents, by ethnicity

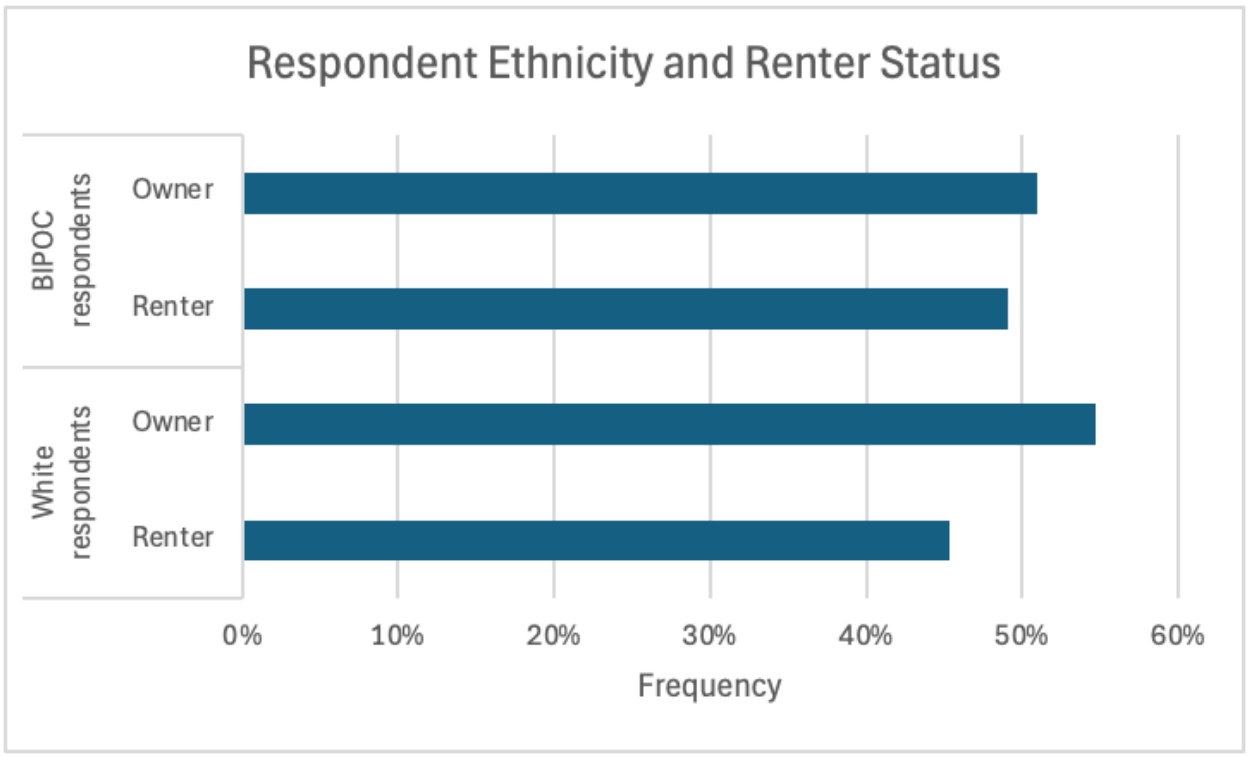
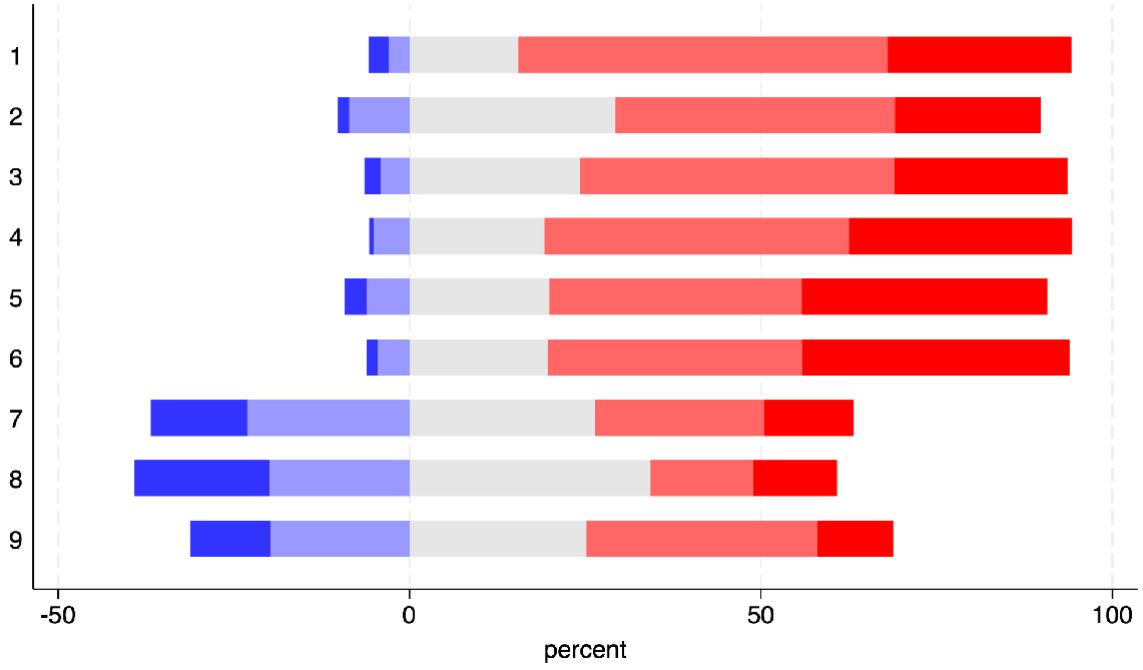


Figure 7. Respondent ethnicity and renter status



1. “I watch my energy use closely.”
2. “I trust that contractors that participate in energy assistance programs will do a good job.”
3. “I trust that clean energy programs will deliver on their promises.”
4. “I would feel more confident in pursuing energy assistance programs if a non-profit were available to help me.”
5. “I am concerned about the impact that burning fossil fuels, like gas or oil, has on my community, the environment, and/or the climate.”
6. “Switching to cleaner sources of energy, like solar or heat pumps, also saves money.”
7. “Home energy programs do not apply to me"
8. “I do not have a good relationship with my landlord or my landlord is mostly absent and unresponsive.”
9. “I find the information given to me about home energy programs difficult to understand.”

Figure 8. Agreement (red), neutrality (gray), and disagreement (blue) with the following statements:

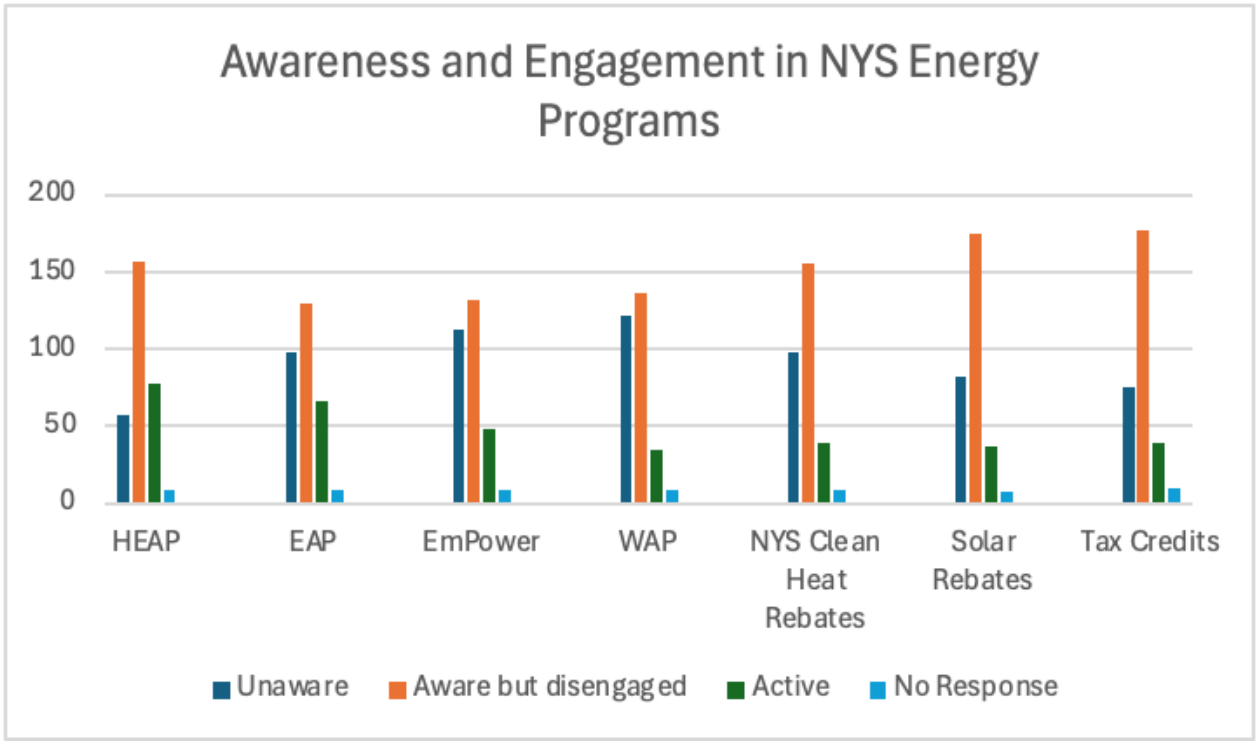


Figure 9. Awareness and engagement with NYS energy programs

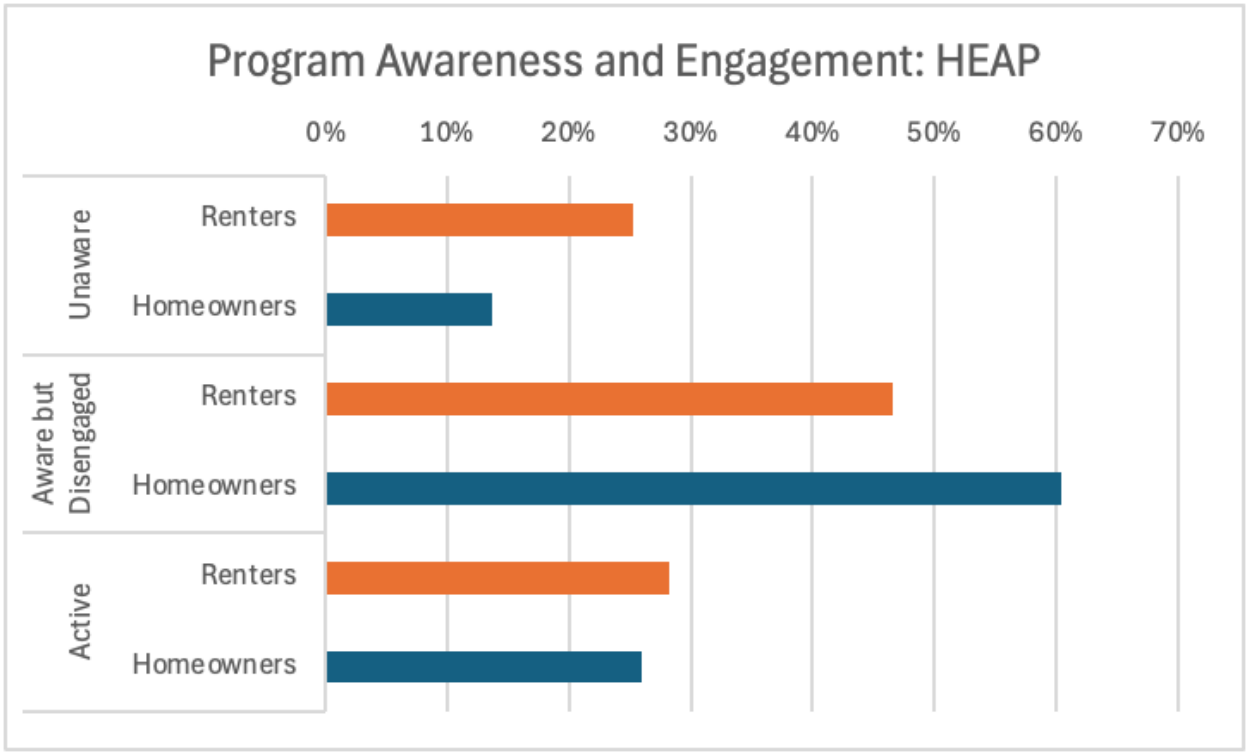


Figure 10. Program Awareness and Engagement by Rent/Own status: HEAP

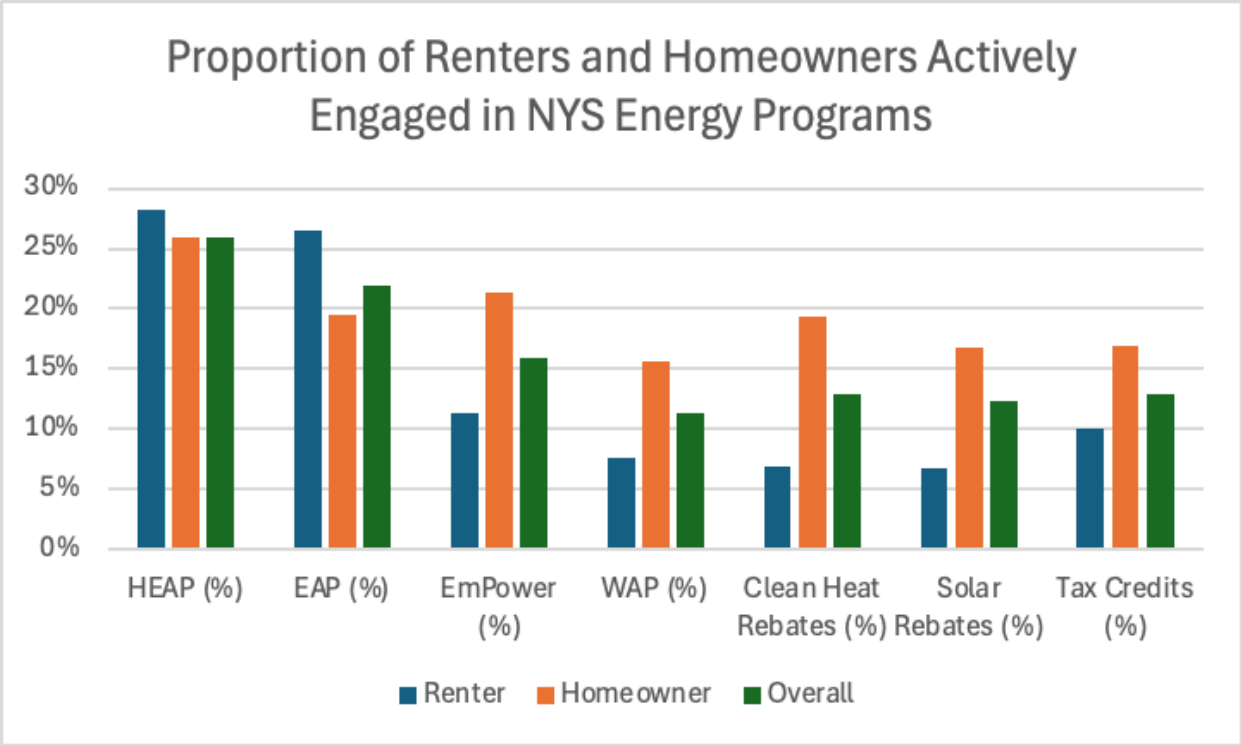


Figure 11. Proportion of Renters and Homeowners Actively Engaged in NYS Energy Programs

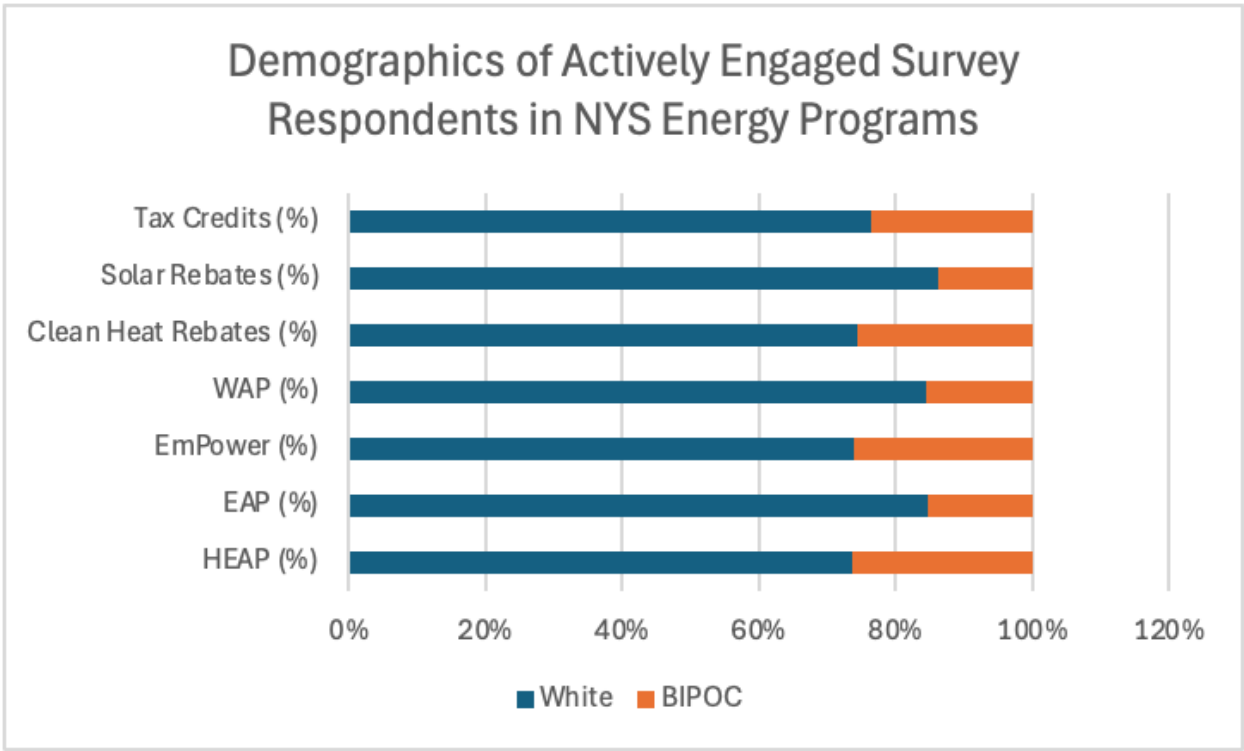


Figure 12. Demographics of Survey Respondents Actively Engaged in NYS Energy Programs

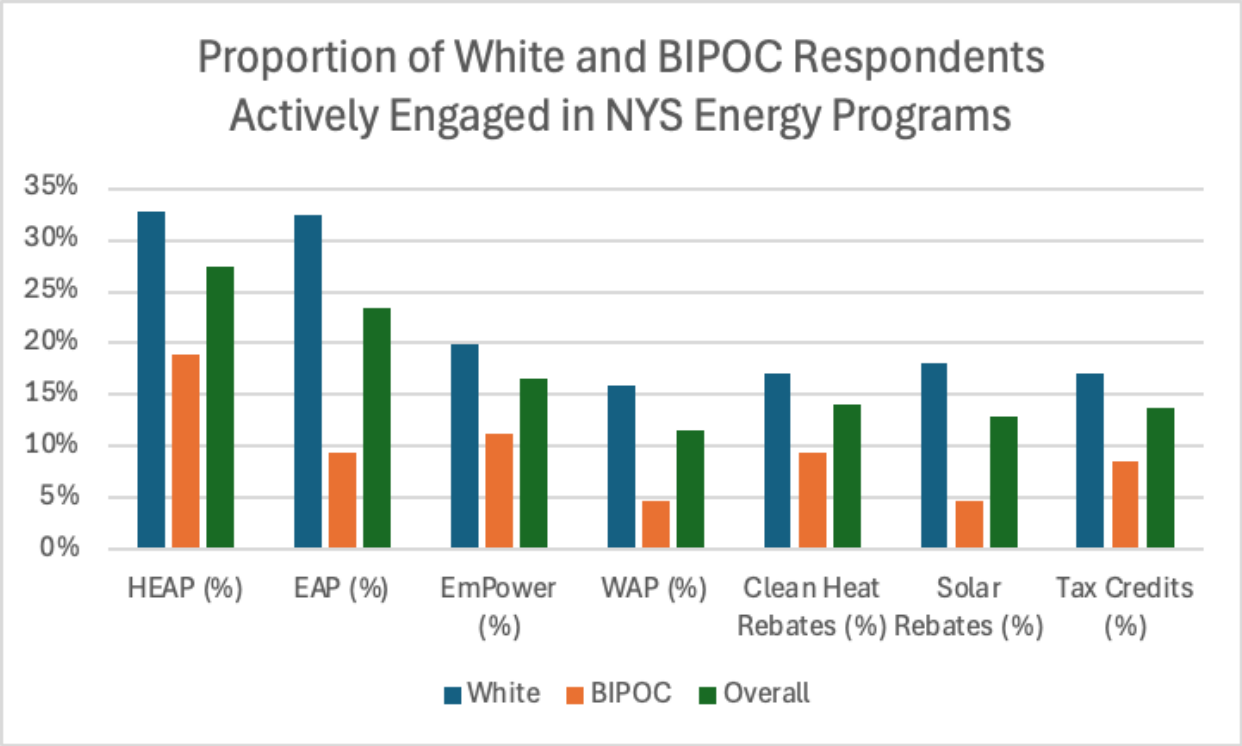


Figure 13. Proportion of White and BIPOC Respondents Actively Engaged in NYS Energy Programs

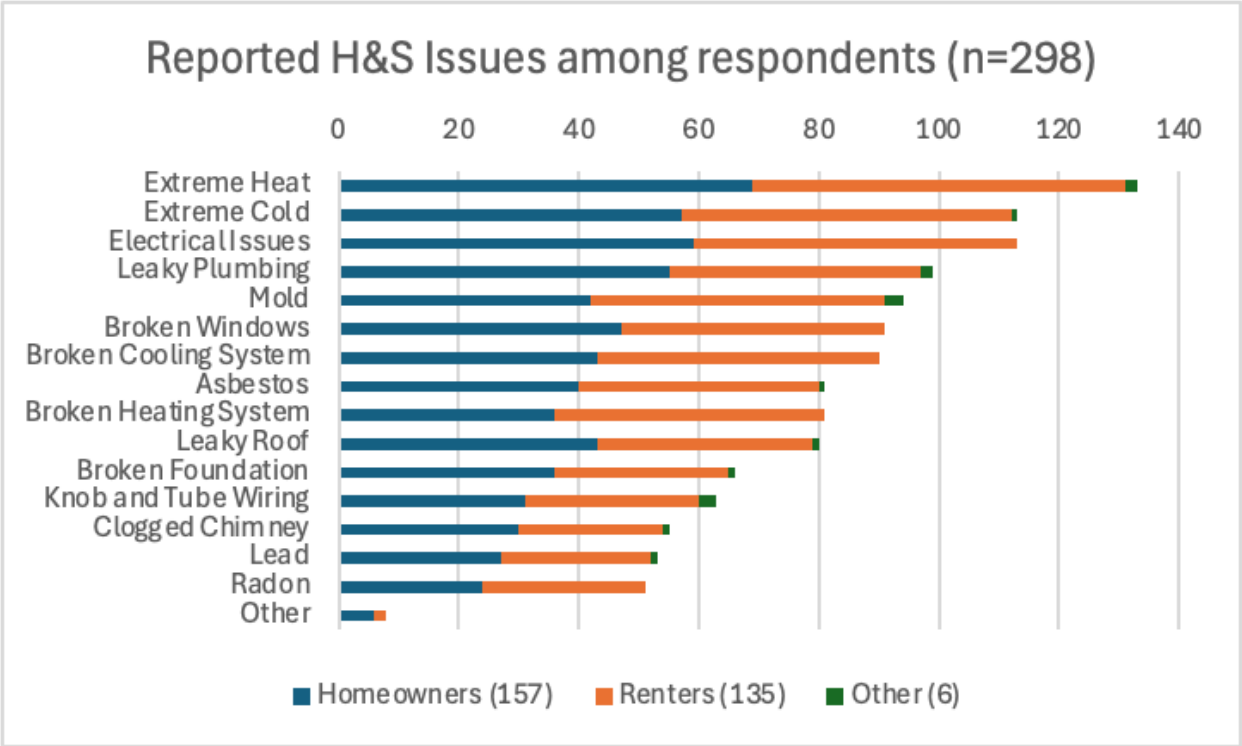


Figure 14. Reported H&S issues among survey respondents

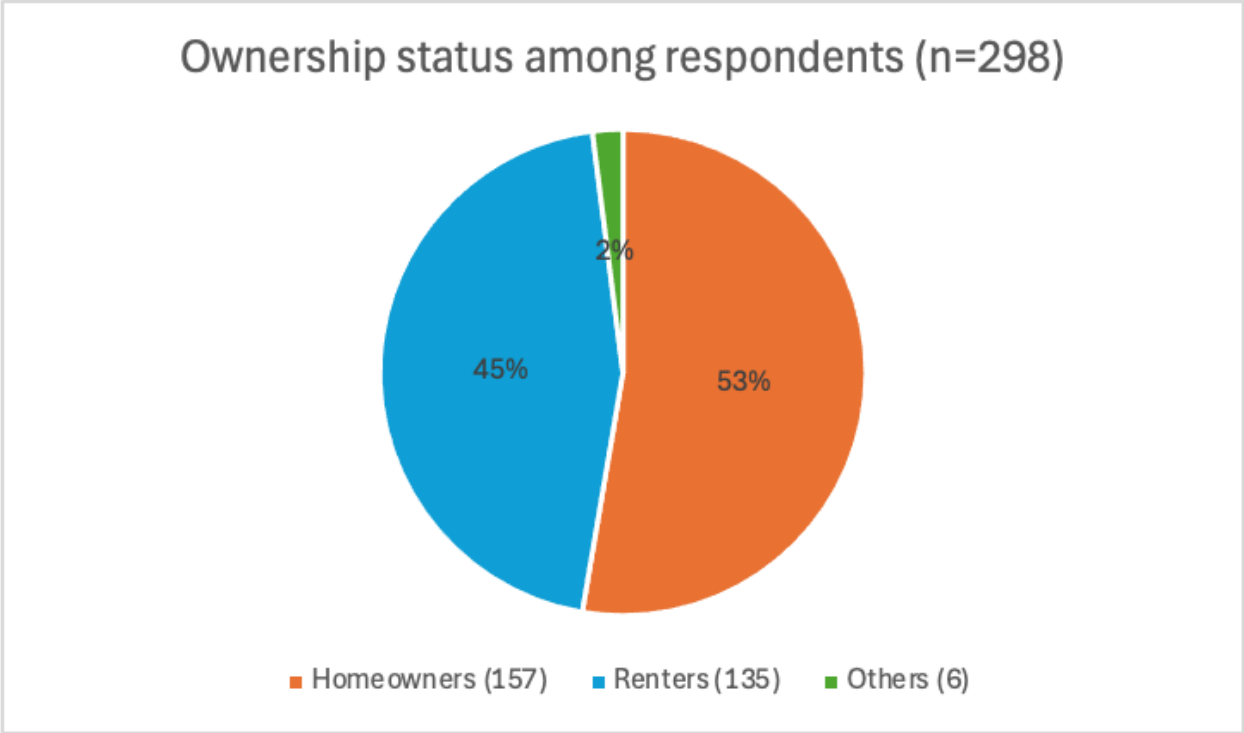


Figure 15. Ownership status among survey respondents

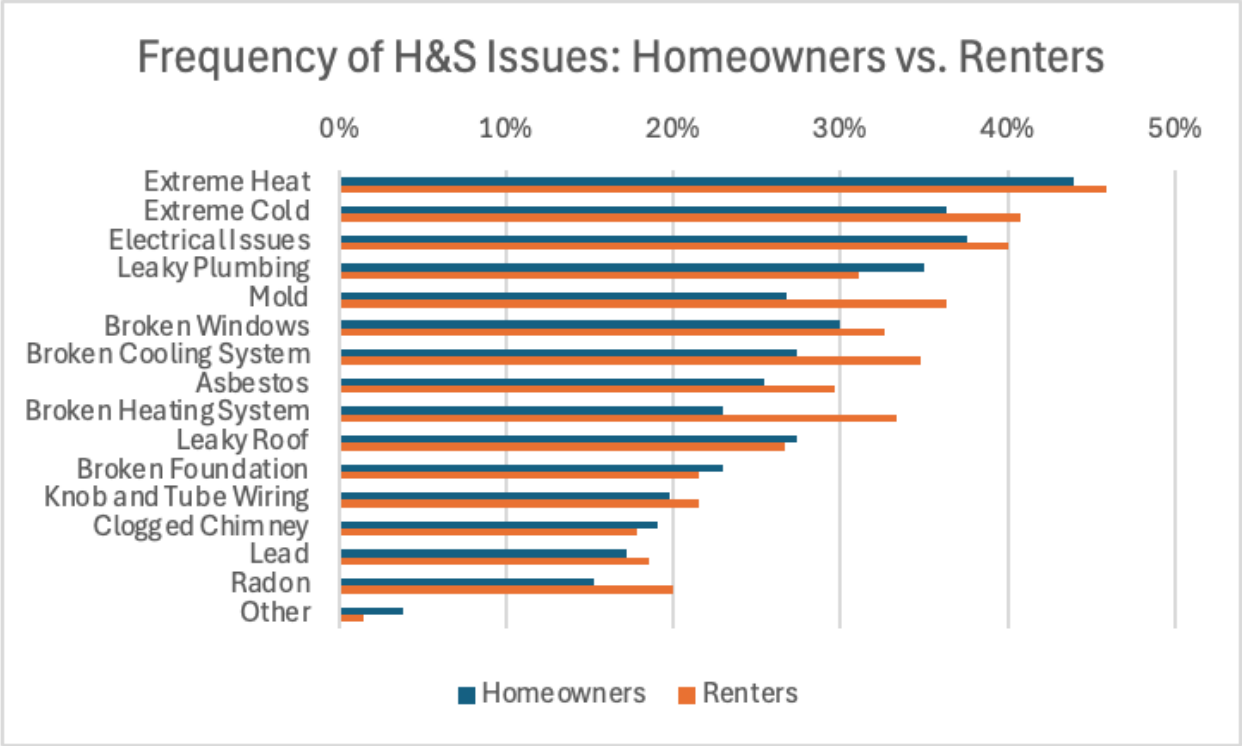


Figure 16. Frequency of H&S issues between homeowners and renters

	EmPower+	Multifamily Building Solutions Providers	NYS Clean Heat	NY-SUN
Dutchess	18	**58**	267	183
Orange	23	57	247	187
Putnam	*15*	56	167	179
Rockland	23	57	*152*	185
Sullivan	*15*	*55*	161	*167*
Ulster	20	*55*	248	177
Westchester	**25**	56	**316**	**207**

 # fewest participating contractors available

 # most participating contractors available

Table 1: Participating Contractors by Program

	Completed Clean Heating and Cooling	In-Progress Clean Heating and Cooling	Completed Community Solar	In-Progress Community Solar	Completed Electric Vehicles	In-Progress Electric Vehicles	Totals
Dutchess County	3	5	4	1	5	3	**21**
Orange County	5	1	3	2	5	1	**17**
Putnam County	3	0	3	0	2	0	**8**
Rockland County	1	1	3	1	1	1	**8**
Sullivan County	0	1	1	0	0	1	**3**
Ulster County	7	0	7	3	7	0	**24**
Westchester County	26	4	17	7	14	2	**70**

Table 2: Clean Energy Communities Program, Community Campaigns by County

Probit regression — Number of obs = 105; LR chi2(15) = 24.74; Prob > chi2 = 0.0536; Log likelihood = -49.510607; Pseudo R2 = 0.1999

EmPower_applied	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
Ethnicity						
Latinx	-.2973185	.7855629	-0.38	0.705	-1.836994	1.242356
White	.0524923	.4428623	0.12	0.906	-.8155018	.9204864
other	0	(empty)				
BIPOC	0	(omitted)				
Subsidy	.0221432	.0091514	2.42	0.016	.0042068	.0400795
concern_env						
Disagree	0	(empty)				
Neutral	-1.458143	.9463802	-1.54	0.123	-3.313014	.3967283
Agree	-.4974533	.9215492	-0.54	0.589	-2.303657	1.30875
Strongly agree	-.8024749	.886941	-0.90	0.366	-2.540847	.9358976
Age	.0025353	.013866	0.18	0.855	-.0246416	.0297121
single_fam	-.1524477	.3726816	-0.41	0.682	-.8828903	.5779948
apartment	0	(omitted)				
condo	0	(omitted)				
other_hometype	0	(omitted)				
Gender						
Woman	-.4037663	.3295336	-1.23	0.220	-1.04964	.2421076
Lang_english	-1.000958	.8530293	-1.17	0.241	-2.672864	.6709491
Own	.4150929	.408854	1.02	0.310	-.3862462	1.216432
Budget_billing						
Yes	.2377072	.3513007	0.68	0.499	-.4508294	.9262439
Not sure	0	(empty)				
Barriers	1.041942	.5871366	1.77	0.076	-.108825	2.192708
annual_income	1.22e-06	3.03e-06	0.40	0.688	-4.72e-06	7.16e-06
energy_insecurity	.2335967	.3379064	0.69	0.489	-.4286878	.8958811
_cons	-1.416279	1.489245	-0.95	0.342	-4.335145	1.502588

Table 3: Probit regression results testing correlation between socio-economic factors and decision to apply or not apply for EmPower+. (n = 105 know of Empower; 52 people applied for EmPower)

Appendix F: Workforce Interview Questions

- Introduce yourself, your role, and your organization/program
- What communities (geographic, demographic -age/race/ethnicity/abilities/education) do you cuRrently work with?
- What services do you provide in the clean energy labor market? What do they cost or are they paid?
    - Do you receive funding support for this group (state, federal, foundation, etc)?
- What are you finding as successes vs challenges as a training provider (or associated field)?
- What are you hearing from your job seekers on how they are able to complete the training and find work post training?
    - Why do you think they are dropping out?
- Are there any more relevant barriers that you can name? Are there characteristics specific to your audiences/constituents(?) that you are seeing as barriers, i.e. transportation, day-care?
- How do you target these communities? What are your outreach strategies?
    - Are you meeting your outreach goals?
    - What has worked/not worked?
    - What methods would you like to explore?

- What are you hearing from contractors, companies and employers?
    - What is your experience working with them? Are they willing to work with you? Are they responsive?
- Where do you see some “low hanging fruits” that you think would make a big difference? What about in the next 3-5 years that could be implemented to improve training and the number of people receiving training/job opportunities?
    - What do you think could be improved that perhaps you don’t have funding/time/personnel to do right now?
- How can the Mid Hudson Hub help support you in reaching some of these goals?
    - Bring this to attention to NYSERDA
    - Connecting people who come to the hub with resources/materials
    - What do you wish we could do to support you? What would be ideal?
    - What kind of support do you need to increase the number of people taking advantage of these opportunities? From the state of NY in particular?
- Do you have any other ideas, comments, suggestions?

Mohawk Valley Regional Assessment & Barrier Analysis

INFORMATION ON BARRIERS & OPPORTUNITIES TO INFORM THE DELIVERY OF SERVICES TO FULTON, HERKIMER, MONTGOMERY, ONEIDA, OTSEGO & SCHOHARIE COUNTIES

Executive Summary

The Mohawk Valley Clean Energy Hub serves Fulton, Herkimer, Montgomery, Oneida, Otsego & Schoharie counties. The Mohawk Valley Regional Clean Energy Hub, Cornell Cooperative Extension Oneida County & their partners developed a regional barriers & opportunity analysis to assist NYSERDA in implementing clean energy initiatives. The focus of this analysis is on the disadvantaged communities within the 6-county Mohawk Valley region with the objective of advancing New York's clean energy economy

United States Census, NYSERDA & various regional agencies provided data for this report. Stakeholder engagement was also essential for gathering data on the needs, barriers & opportunities in furthering New York's green energy economy. With a combination of data analysis and stakeholder engagement, this report is meant to identify the barriers & inequities in marginalized communities that are detrimental to furthering New York State's clean energy goals. The Mohawk Valley Regional Barriers & Opportunity Analysis includes a baseline analysis of the region's sociodemographic, energy use and a directory of community assets that can be used to develop and implement programs & incentives to further New York's green energy landscape

Executive Summary

Roughly 23% of individuals in the Mohawk Valley reside in Disadvantaged Communities, with the majority of those residing in Oneida & Montgomery counties. 23% of that population is college educated and earning an average of $54,000.00, annually. Roughly 12% of DAC households speak a language other than English, with the majority of non-English households existing in Oneida & Montgomery counties. Less than 2% of DAC households report owning an electric vehicle, and less than 1% use public transportation, yet residents face a commute time of 20-30 minutes, on average. Forty-eight percent (48%) of DAC housing is occupied by renters, while 74% of the non-DAC housing stock consists of owner-occupied single-family dwellings. A small portion of the housing stock in the Mohawk Valley region is large 5+ multi-unit dwellings.

The housing stock in the DAC areas is very old; 48% of homes were built before 1939. Coupled with decades of deferred maintenance, many homes are in need of substantial repair and weatherization services before a utility overhaul or conversion would be cost effective. 40% of the disadvantaged population who are renting spend over 35% of their income on housing costs; renters are tapped out and landlords can't fully absorb the cost of overhauling utilities without passing that cost on to their renters. Furthermore, there is a lack of coordination between organizations providing programs & services related to moving toward using less energy overall and using clean energy as well. Privacy concerns, paperwork and other documentation requirements, time constraints, and changing priorities at all levels of government are challenging the effective implementation of programs and incentives for renters and owners alike.

Executive Summary

Quantitative data provided via the Hub was used to build a regional snapshot of the housing stock size, age, occupancy, housing cost, and the primary source of fuel used. Qualitative data was gathered from in-person events held by the Hub and a region-wide survey directed towards homeowners and renters. A stakeholders' conference was held in late June and qualitative data was gathered on many potential opportunities and recommendations.

In review of the regional data with a focus on the disadvantaged communities, some of our key recommendations are:

- Expanding grant eligibility to higher income levels
- 2-3 case managers assigned to the Regional Hub to assist homeowners, landlords, and renters with paperwork more efficiently and effectively
- A separate website dedicated to combatting misinformation and providing accurate information
- Professional education for real estate agents
- Annual public information postcards to residents with zip code specific programs and incentives available
- Incentives for contractors and employment providers
- Hub led coalition of community partners with regular meetings to share information, updates, and improve the delivery of services

Buildings and Sector Assessment

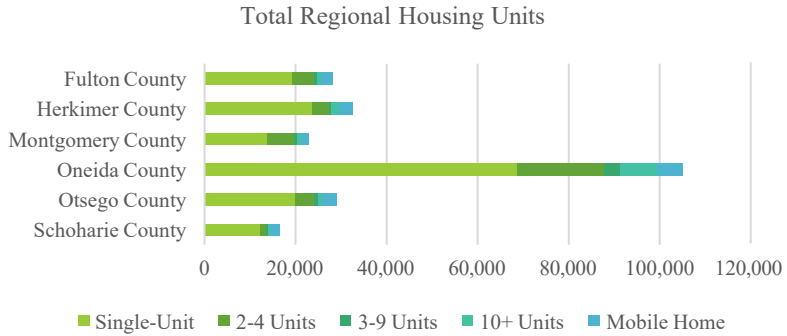
The Mohawk Valley is comprised of an aging housing stock, with 36% of all housing units being built prior to 1940. The DAC areas within the region have a higher concentration of older housing units with 48% built prior to 1940

DAC areas in the region have double the rate of renters occupying housing units, with 48% of units occupied by renters vs. 23% in Non-DAC areas

Both homeowners and renters heat primarily with Natural Gas throughout the region with a higher proportion of those using gas over electric within the DAC areas despite multiple DAC areas having a local electric co-op with lower electric rates

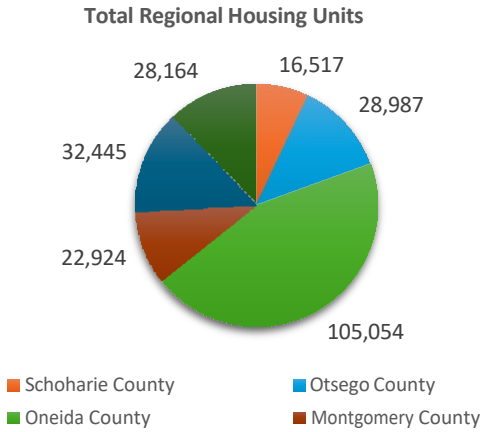
74% of housing units located in Non-DAC areas are single family or single unit while 51% of all housing units located in DAC areas are multi-family, with the majority being 2-4 units and mobile homes

Census Area	Total Housing Units	Occupied Units	Vacant Units	Owner Occupied	Renter Occupied	Total Single Family	Multi-family 2-4 Units	Multi-family 5-9 Units	Multi-family 10+ Units	Mobile Homes
DAC	61,180	51,784	9,396	27,042	24,742	29,709	20,395	2,550	6,557	1,969
Non-DAC	172,911	140,722	32,189	108,548	32,174	127,844	18,804	3,989	6,250	15,971
Regional Total	234,091	192,506	41,585	135,590	56,916	157,553	39,199	6,539	12,807	17,940



- Oneida County has the largest number of housing units in the region with the majority (75%) outside of DAC tracts being single-family, owner-occupied units, while the DAC area is 60% renter occupied housing units

- DAC areas are evenly occupied with homeowners and renters at 52% and 48% respectively
- DACs within Oneida and Otsego Counties have the lowest rates of owner-occupied housing units at 39% each.
- Non-DAC areas are predominately single-family owner-occupied homes at 66% of the housing stock and a 76% occupancy rate

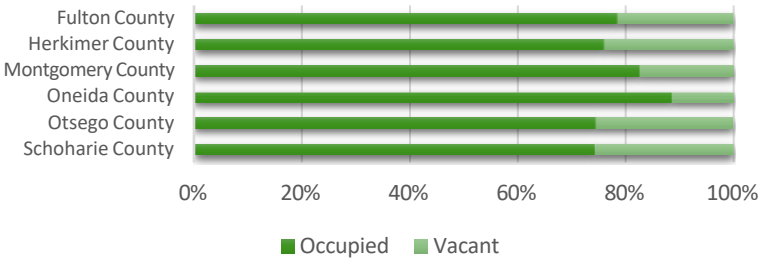


Building Typologies and Housing Stock

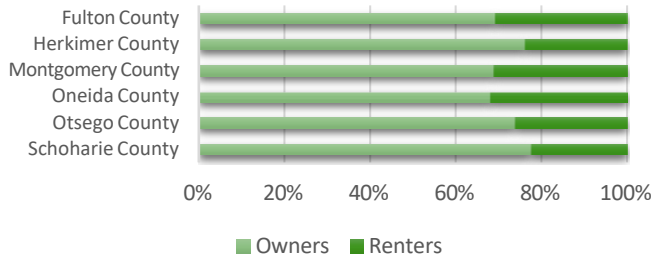
- Regional Summary of Housing Units, Occupancy, and Size Typology (See Appendix A & B for data sets)

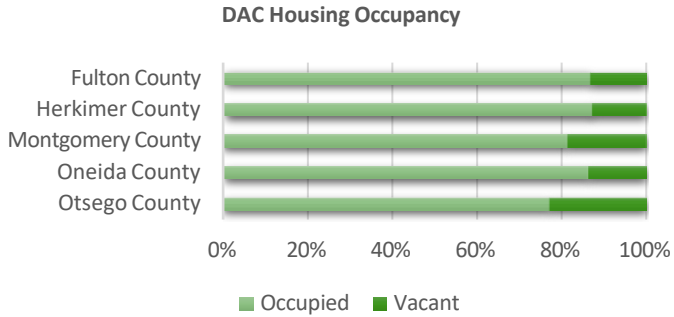
Regional Housing Occupancy

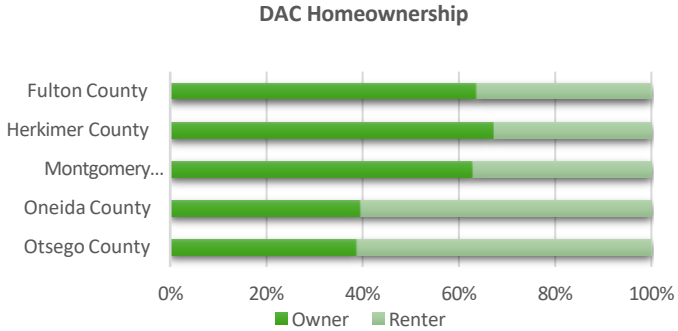
Regional Housing Occupancy and Homeownership



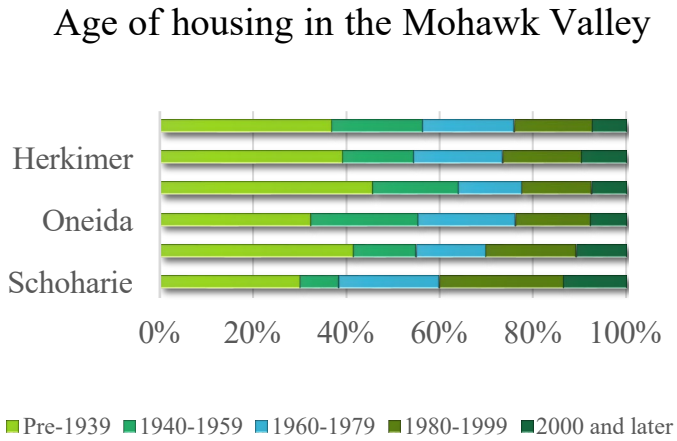
Regional DAC Housing Occupancy and Homeownership



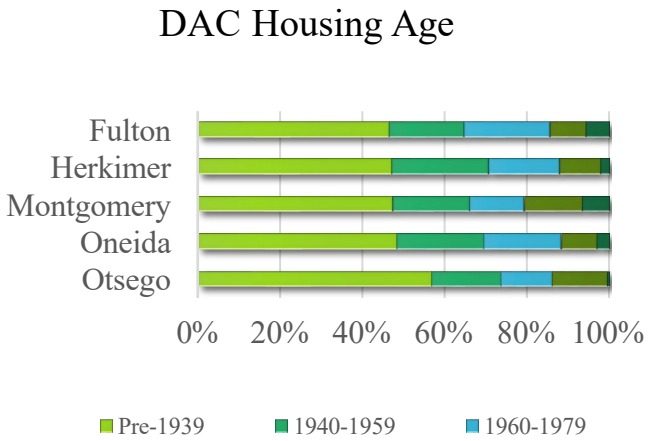




Age of Regional and DAC Housing Stock



- 36% of all housing in the Mohawk Valley was built prior to 1940
- Montgomery, Otsego, and Herkimer Counties have the largest concentrations of pre-1940's homes, the majority of which are Single-Family and 2-4 Unit Multi-family



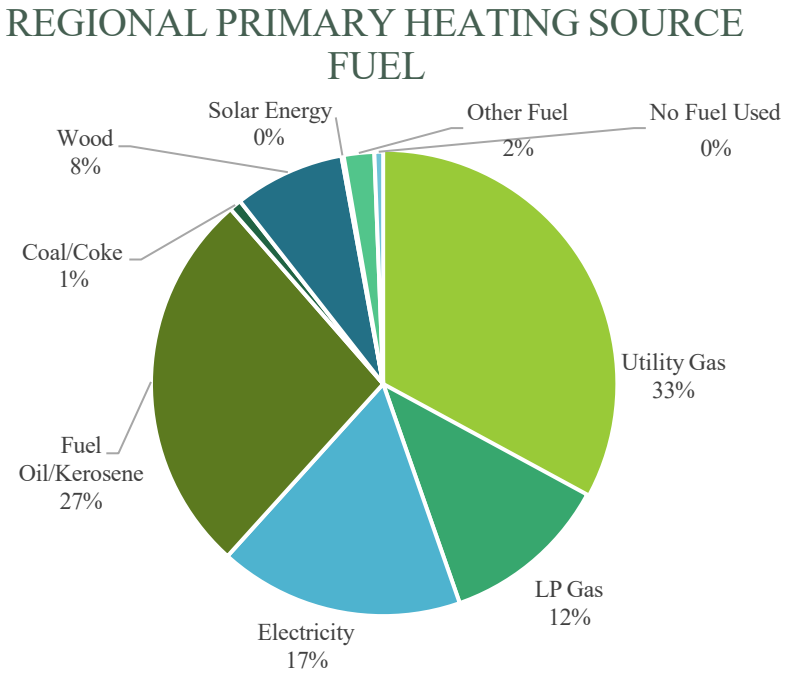
- Over 40% of all housing in the DACs of each county was built prior to 1940 with a combined regional proportion of 48%
- 4% of homes within DACs in the region were built post-2000

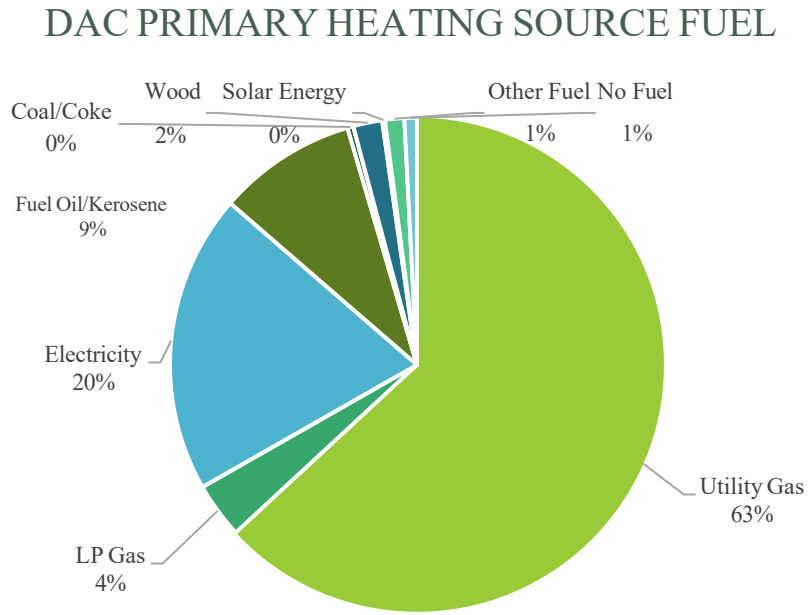
Regional Primary Heating Source Fuel

Primary Heating Source	Fulton County Total	Fulton County DACs	Herkimer County Total	Herkimer County DACs	Montgomery County Totals	Montgomery C	Oneida County	Oneida County	Otsego County Totals	Otsego County DAC	Schoharie County	Regional DAC Totals	Regional Totals
Total Occupied Housing Units	22,103	4,297	24,664	3,128	18,918	,823	92,944	924	22,305	1428	12,283	43,600	19 217
Utility Gas		2,918	10,752	1,819	8,775	,329	53,807	719	4,583	733	828	27,518	5 960
Bottled, Tank, or LP Gas	2,833	165	2,164	42	1,409	735	6,452	624	78	21	2,005	587	18 539
Electricity	2,310	883			2,146	,728	14,312	524	86	483	2,056	547	20 911
Fuel Oil, Kerosene,	5,767	116	5,728	249	768	,831	13,378	617	77	155	5,323	968	42 441
Coal or Coke	172	12	304	0	87	123	349	33	09	0	113	168	1 334
Wood	1,755	64	1,857	22	25	670	2,845	73	70	0	1,693	829	12 145
Solar Energy	43	0	61	0	55	55	23	23	34	0	22	78	238
Other Fuel	493	95	535	36	463	272	1,260	130	83	16	223	549	3 357
No Fuel Used	185	44	62	31	90				85	20	22	356	960

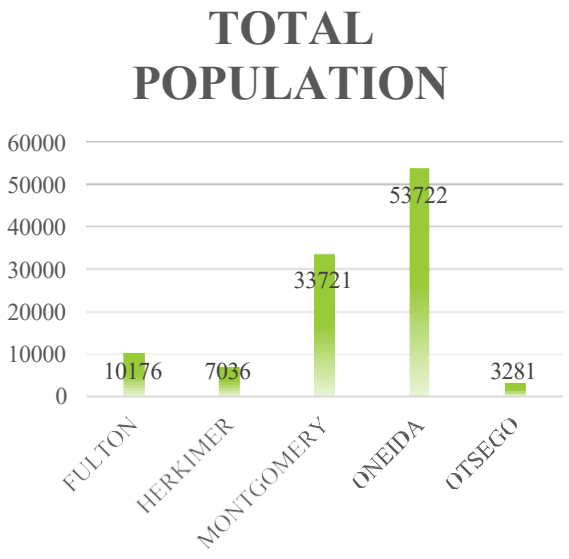
- Utility Gas usage far outweighs other utility fuel sources in the Mohawk Valley, with Fuel Oil as the second highest use
- Fuel Oil usage is highest in owner occupied homes in the Non-DAC areas of all six counties
- Renters within DAC areas predominately heat with Utility Gas; Otsego County has the only DAC with more electric customers than gas

Primary Heating Fuel Source Regional and DAC Total

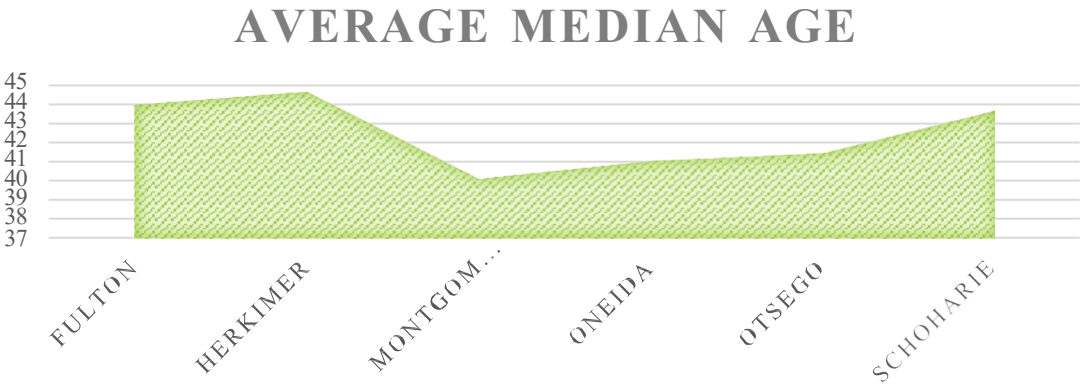




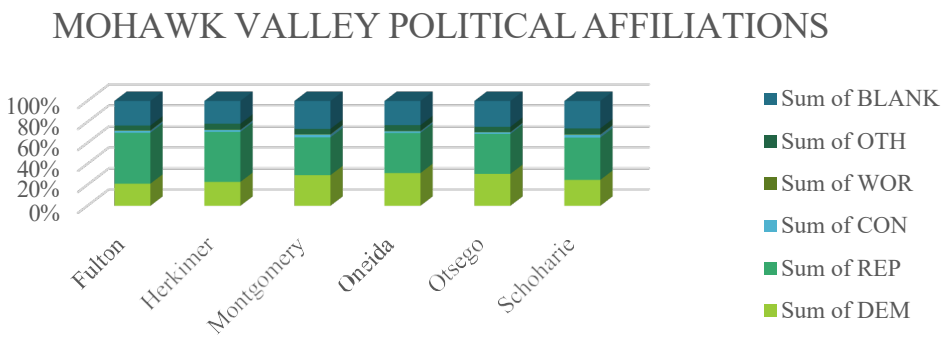
Baseline Regional Sociodemographic

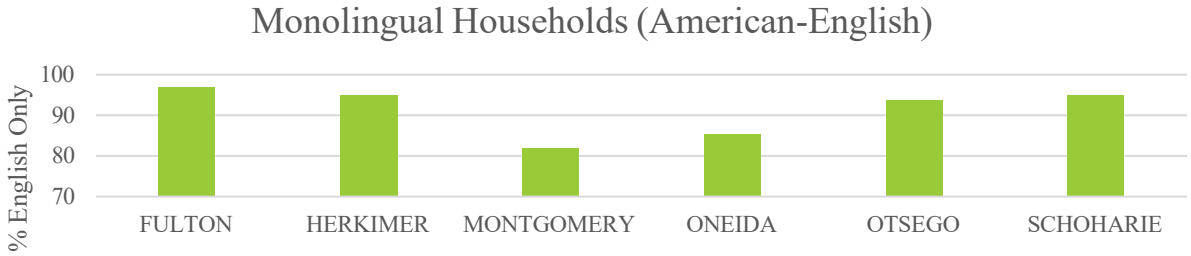


There are 467,553 people in the Mohawk Valley region with a median age of 42 years old. Politically, the republican party is slightly more popular (41% republican vs. 28% democratic), however nearly a quarter of the population has no political affiliation (Blank, 24%.) Roughly 23% of individuals in the Mohawk Valley reside in Disadvantaged Communities, with the majority of those residing in Oneida & Montgomery counties. 23% of that population is college educated and earning an average of $54,000.00, annually. Roughly 12% of DAC households speak a language other than English, with most non-English households existing in Oneida & Montgomery counties. Less than 2% of DAC households report owning an electric vehicle, and less than 1% use public transportation, yet residents face a commute time of 20-30 minutes, on average. 48% of the DAC population is comprised of renters, while 76% of the total population occupy their own single-family dwelling.



Baseline Regional Sociodemographic





Baseline Regional Sociodemographic (DAC Only)

23% of Mohawk Valley resides in Disadvantaged Communities.

23% college educated.

$54,000.00 average yearly earnings.

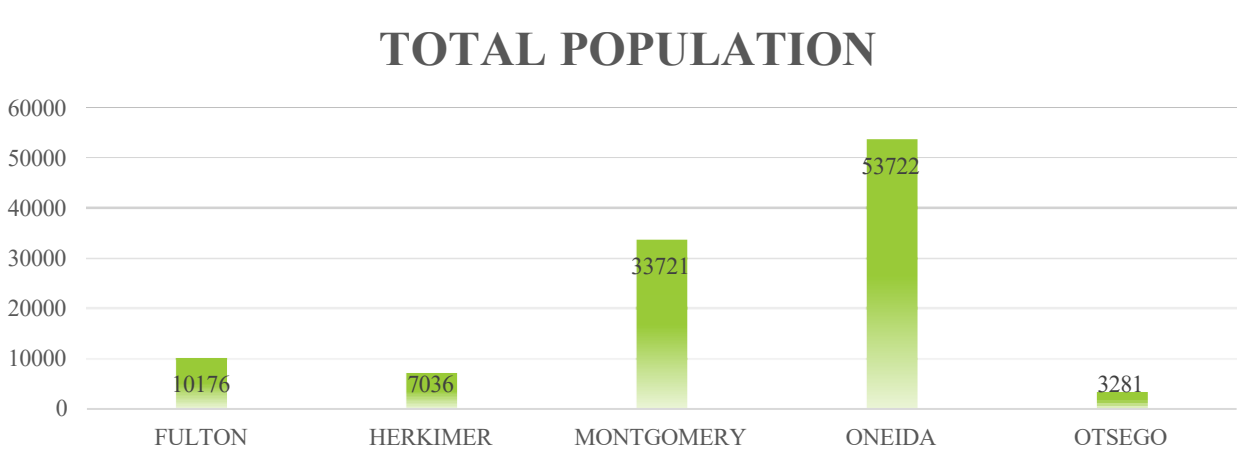
12% Non-English Households.

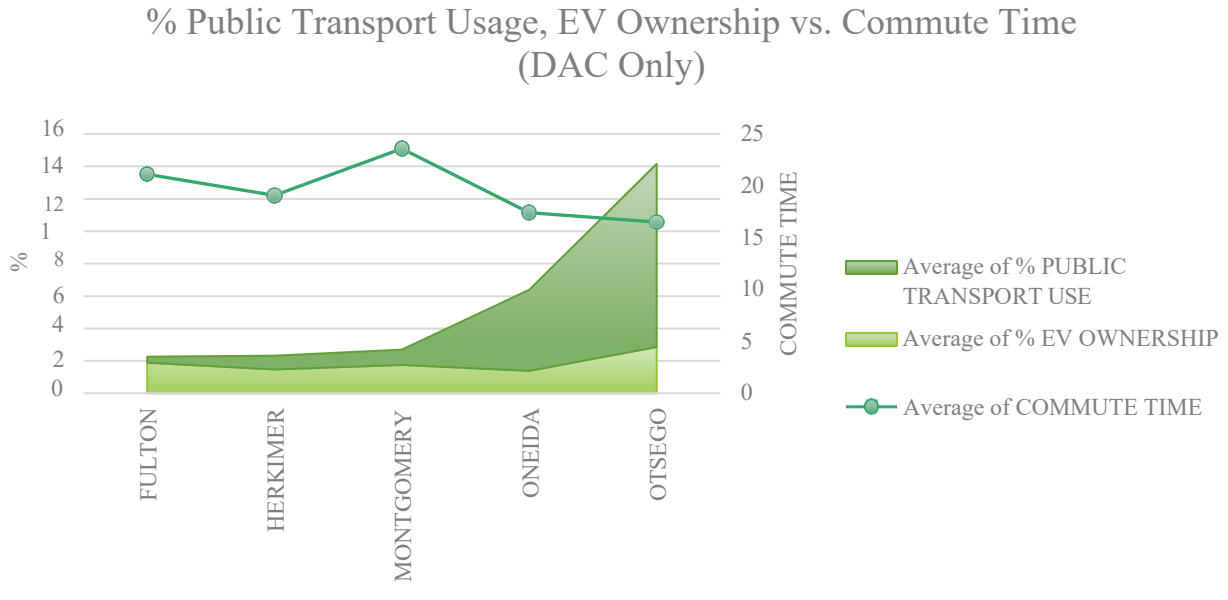
<2% own an electric vehicle.

<1% use public transportation.

20-30 minutes average commute time.

48% renter occupied.





Regional Clean Energy Workforce

- 171k workers were employed by clean energy businesses across New York State; a 3.5% increase over previous year. The third largest year-over-year increase since 2015.
- All clean energy sectors grew between 2021 and 2022; a full recovery since 2020, across all sectors except for building decarbonization and energy efficiency.
- 60% growth for clean and alternative transportation 2016-2022; 13,517 clean and alternative transportation jobs in 2022. By technology sector, clean and alternative transportation showed the greatest percentage increase in intensity-adjusted employment (21%) between 2021 and 2022
- Building decarbonization and energy efficiency accounted for about 74% of all clean energy employment in New York in 2022 and for 36% of all job growth between 2021 and 2022.

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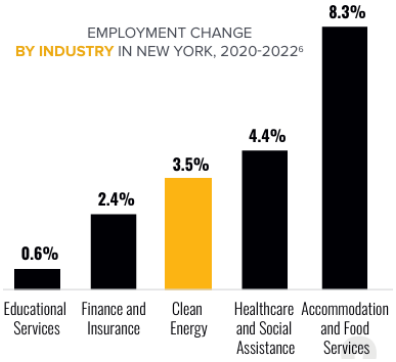
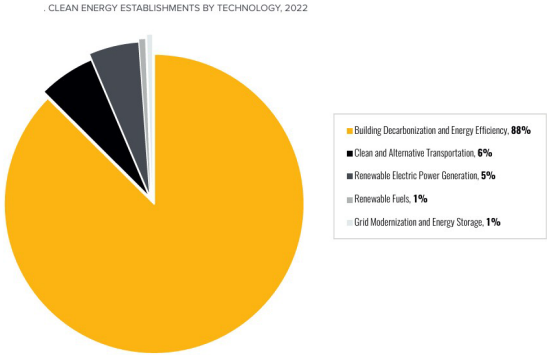
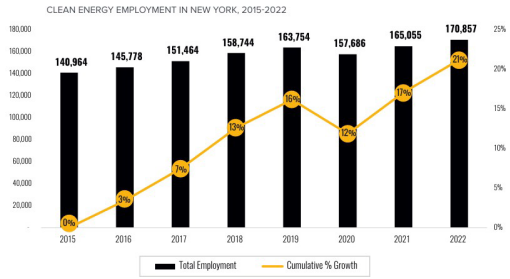
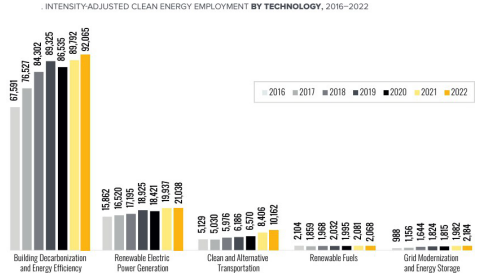








Regional Partners

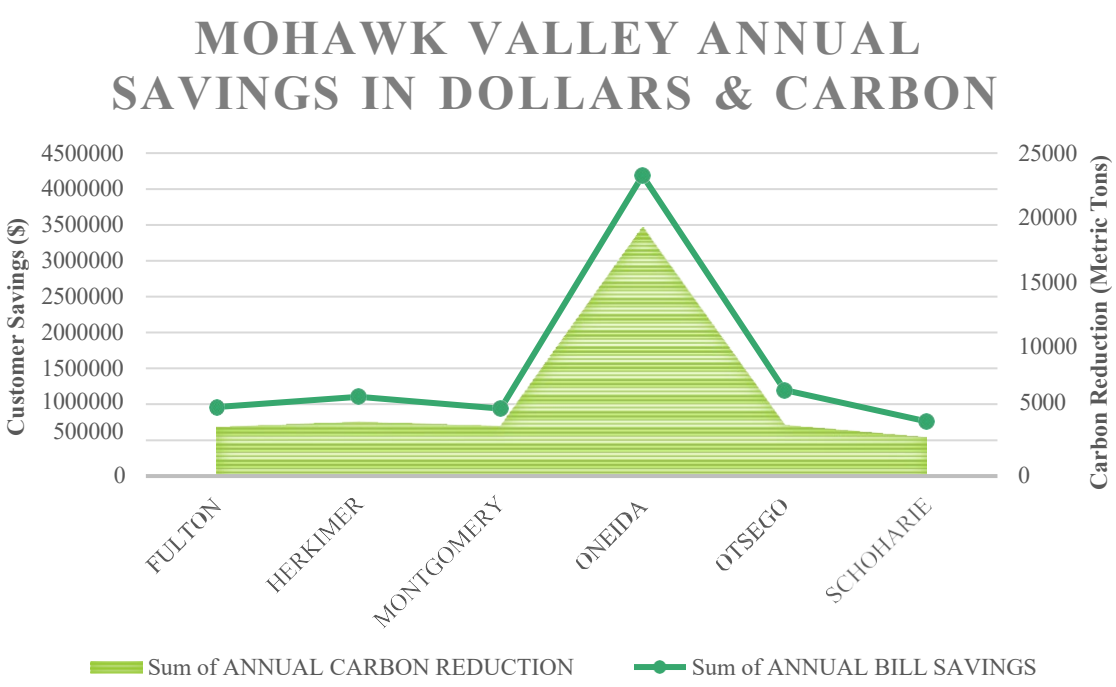
- Weatherization Assistance Program
  - Fulmont Community Action Agency, Inc.
  - Mohawk Valley Community Action Agency, Inc.
    - Rural Preservation Program
  - Schoharie County Community Action Program, Inc.
  - Opportunities for Otsego, Inc.
  - Harisi Energy LLC
  - HALCO Energy
- Municipal Energy Providers
  - Richmondville Power & Light
  - Village of Frankfort Electric Department
  - Village of Ilion Electric Department
  - Mohawk Municipal Commission
  - Municipal Commission of Boonville
  - Sherrill Power and Light
  - Oneida-Madison Electric Cooperative
  - National Grid
  - Otsego Electric Cooperative, Inc.
- Heating & Cooling Installation
  - Patrick Heating Inc.
  - Fred F Collis & Sons
  - Country Suburban Heating & Air Conditioning
  - Allied Heating & Air Conditioning
  - Mid-City Heating & Cooling
  - Krenichyn's Plumbing & Heating
  - Isaac Heating & Air Conditioning, Inc.
  - McLagan Home Performance Services
  - Green Guys Mechanical
  - Interstate Heating Inc.
- Insulation Installation & Air Sealing
  - Energy Service Technologies LLC
  - Environmental Contracting, LLC
  - Euro & American Contracting
  - USA Insulation of Syracuse
  - PRO Home Improvement of CNY
  - Simply Home Performance
  - Stalmer & Sun
  - Standard Insulating Co.
  - Superior Insulation Company
  - AB Insulation
  - IMI Home, LLC
- Mohawk Valley Energy Smart Choices
- NYSERDA
- HUD
- Lead Free Mohawk Valley
- Community Foundation
- Madison-Oneida BOCES
- Department of Social Services
- Mohawk Valley Edge
- Mohawk Valley Economic Development District, Inc.
- Mohawk Valley Community College

Regional Assets

- EmPower+
- Independent Energy Efficiency Program
- NY-SUN Program
- Community Solar
- OEC Clean Heat Program
- MVCC College in the Workplace Program
- MVCC Center for Corporate & Community Education
- OM BOCES Center for Business & Industry
- NY Main Street Program
- Build Cleaner Communities Competition

Baseline of Regional Clean Energy Programs

- Charge NY
- Charge Ready NY 2.0
- Charging Station Programs
- Comfort Home Program
- Drive Clean Rebate
- EmPower+
- Energy Storage Program
- NYS Clean Heat
- Home Energy Efficiency Programs
- Income Eligible Programs for Residents and Property Owners
- Large-scale Thermal
- Multifamily Buildings Programs
- Multifamily Buildings Low-Carbon Pathways Program
- Multifamily Financing Program
- New Construction
- Predevelopment Lending Program
- Residential Energy Assessment
- Residential Financing Programs
- Small Business Financing Program
- NY-SUN
- Workforce Training—Building Operations & Maintenance



Stakeholder and Community Engagement

- Community outreach is accomplished through various in-person community outreach and tabling events held by the HUB staff within the region and continues through partnerships with community organizations, various workgroups, and activities
- The HUB created and released a community survey tool that was advertised through social media and other relevant platforms to try to generate community feedback and get a sense of what was needed in the community
  - Though the responses from the region were not many, most were from neighboring regions, there was still a lot of useful data captured. There were slightly more homeowners that responded than renters. Most of the zip codes for respondents were located within DAC tracts and were primarily seeking ways to weatherize their homes and save money on utility bills. Most of the surveys indicate that the homeowner or renter was aware of some weatherization programs and tax credit programs, but most have not applied. Many respondents answered that while their income was above the threshold for assistance, they still faced trouble with utility bills and most answered that they are unable to make energy efficient upgrades on their own due to financial reasons.
- The HUB organized a conference for key stakeholders in the region in late June of 2024. There was a variety of providers at the table from weatherization and utility contractors to a representative from a realtor's association and a utility provider
  - Feedback from the stakeholder conference will be included in section pertaining barriers and opportunities of this report

Barriers to Clean Energy Adoption Across the Mohawk Valley Region and Disadvantaged Communities

- The aged housing stock coupled with decades of deferred maintenance have left many homes in need of substantial repair and weatherization services before utility overhaul would be cost effective. Roofing repair, wiring issues, needed electric service upgrades, lead based paint, asbestos, and major air drafts are the most frequent issues encountered with homeowners, renters, and landlords throughout the entire region
- Disadvantaged communities across the Mohawk Valley have a large proportion of renters (48% of all DAC housing occupants). 40% of those people renting in the Mohawk Valley spend over 35% of their income on their housing costs. Landlord engagement is essential in these communities. Renters are already tapped out and landlords can't fully absorb the cost of switching utilities over without passing that cost on to the renter
- Paperwork and understanding grant and energy assistance rebates and programs continue to perplex area residents. Many have cited increased frustration with changing priorities, eligibility, funding availability, and a sense of stability and trust with energy assistance programs which has exacerbated the lack of governmental trust with many people
- Service providers have noted that clients find it difficult to complete the entire process and they lose many households in the early stages due to the time required to complete everything. Providers are also stretched thin, and they are not able to spend the appropriate amount of time with each applicant
- Historic views towards government initiatives and programs have not always been favorable in this region. This includes a general hesitation to overhaul utilities to be entirely reliant upon electricity. Natural gas is still the cheaper option in most cases for residents to heat their homes and they do not have the financial resources to upgrade to appropriately sized heat pumps. There is also rural population that holds value in burning wood, it has been a way of life for many generations and continues to be part of the local economy

Barriers to Clean Energy Adoption Across the Mohawk Valley Region and Disadvantaged Communities

- Service providers and agencies often find it difficult to keep up with and navigate system level changes from both the state and federal government. We also feel that pay rates for employees that are working as pseudo case managers assisting applicants is below par. Many of these workers are well below the income guidelines to qualify for assistance, which should not be for the knowledge and skill required for the field
- Privacy is a major concern for area residents when filling out paperwork and many do not want to disclose income and other personal financial information.
- Current utility bills, especially those for lower income households (who spend a large portion of their income on basic housing and utilities), are a cost burden to residents most do not have the financial breathing room to cover the cost of upgrades before the end of life of their current utilities
- The loss of industry in the area has left major holes throughout communities in the region. This region flourished during industrialization but with that came widespread pollution and eventual job scarcity and a loss of a way of life for many communities.
- There is much diversity in pockets of the regions, especially Oneida and Montgomery Counties where large populations do not have English as a primary language. Current translation services do not meet the need. Some providers have begun incorporating AI as a bridge, but the system has not kept up with the diversity experienced in some disadvantaged communities
- Alternative energy providers such as solar, wind, and geothermal can be difficult to locate and with the few providers that do cover the region, the cost and wait times deter many from pursuing

Recommendations and Opportunities

In consideration of the regional landscape and barriers faced in the transition to clean energy, we recommend the following:

- Expanding financial assistance and grant funding availability to higher income levels than current thresholds. Clear guidelines that have a multi-year consistency and are equitable across the region.
- Better publishing of efficiency upgrade programs, especially rebate availability. Direct mailers to targeted zip codes/census tracts and targeted social media advertisement are two routes to accomplish this.
- 2-3 case managers assigned to the Regional Hub exclusively to assist homeowners, landlords, and renters with paperwork more efficiently and effectively
- Hub led coalition of community partners with regular meetings to share information, updates, and improve the delivery of services
- Annual public information postcards to residents with zip code specific programs and incentives available
- Targeting specific groups of low-income consumers can amplify the intended benefits of programs if the programs do not exclude other low-income consumers.
- Limited financial resources restrict their ability to invest in energy-saving technology that would save them money in the long run.
- Offers that clearly demonstrate how low-income consumers will save money.
- Acknowledge and address financial hurdles faced by low-income consumers.
- Offer on-bill financing, put the up-front cost on the energy provider and allowing the low-income consumer to pay back the cost gradually on their bill, and other creative ways to finance or share up-front investments.
- Increase coordination between partners to streamline the enrollment process.
- Address the gap in low-income programs with supplemental “fuel fund” programs.

Recommendations and Opportunities

- Communicate in ways that get the attention of low-income consumers; be prepared to refer them to outside information sources that they may be more likely to trust.
- Communication via social media is essential; Low Income consumers utilize Facebook as a 1-stop for news, information and entertainment.
- Engage partnerships with Internet Service Providers; Low-income consumers consider Internet access a "must-have" like energy sources.
- Develop a website dedicated to combatting misinformation about the clean energy sector
- Professional education for real estate agents
- Training programs for new heat pump owners
- Incentives for contractors and employment providers
- Block-oriented mentorship programs that implement "block ambassadors" for outreach and training
- Paying applicants for their time. Many residents must take time off work, or they make the choice between learning energy programs or spending time with their family
- Providing application services during off times, i.e. after work
- Expanding grant eligibility to higher income levels

Next Steps

Coalition Development

Schedule regular meetings in person or via Zoom with Regional Partners:

Department of Social Services
Mohawk Valley Housing & Homeless Coalition
Mohawk Valley Association of Realtors
Workforce Development
Child Care Council of Cornell Cooperative Extension
Neighborhood Center
Otsego County Conservation Association
National Grid
Fred F. Collis & Sons
Standard Heating Cooling Insulating
Community Action agencies
Opportunities for Otsego, Inc.
NYS HCR
NYSERDA
Otsego Electrical Cooperative, Inc.

Increase Presence IRL & Online

Schedule more tabling events.

Increase Media and Social Media engagement.

Develop a website that can provide information about all resources.

Provide education for real estate professionals.

Informative Mailers in an accessible vernacular.

Target DAC zip codes for mailers.

Include information about available incentives.

Utilize simple and direct language.

North Country
CLEAN ENERGY HUB

North Country Clean Energy Hub
Regional Assessment & Barriers Analysis October 2024

NEW YORK STATE

Regional Clean Energy Hub
Partnering Organization

North Country
CLEAN ENERGY HUB

New York State is embarking on a transition to an inclusive, clean energy powered economy. All residents, businesses, and communities across the state will have access to new opportunities to benefit from this transition including clean energy careers, home improvements, and rebates for businesses and personal transportation.

To help New Yorkers access and navigate these opportunities, New York State Energy Research & Development Authority (NYSERDA) created 12 Regional Clean Energy Hubs across the state.

The North Country Clean Energy Hub is a team of organizations working to help residents in our region lower energy costs, make their homes more comfortable and safe, and access good jobs. Our team helps residents of Clinton, Essex, Franklin, Hamilton, Jefferson, Lewis, and St. Lawrence Counties navigate and access clean energy opportunities.

Learn more and connect with us:
www.northcountrycleanenergyhub.org

This report was prepared by:

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Thank you to the NC Hub staff and advisory committee, as well as respondents to our surveys, interviews, roundtables, and other outreach, for their support in assembling this report.

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Frequently Used Acronyms

NC Hub: North Country Clean Energy Hub
RABA: Regional Assessment & Barriers Analysis *(This report.)*
NYSERDA: New York State Energy Research and Development Authority (*The NC Hubs' funding agency.)*
DAC: Disadvantaged community *(NYS designated census tracts required to receive priority in NC Hub initiatives.)*
LMI: Low- to moderate-income *(Households with incomes at or below the higher of 80% of the area median income, or state median income. All LMI households are included in DAC criteria.)*

Hub Team

The North Country Clean Energy Hub is a team of partners including:

- Adirondack North Country Association (ANCA)
- Cornell Cooperative Extension of Jefferson County (CCE Jefferson)
- Cornell Cooperative Extension of St. Lawrence County (CCE St. Lawrence)
- SUNY Canton

ANCA
Growing The New Economy

Cornell Cooperative Extension
Jefferson County

Cornell Cooperative Extension
St. Lawrence County

SUNY Canton College of Technology

NEW YORK STATE | Regional Clean Energy Hub
Partnering Organization

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Executive Summary: Purpose & Methods

This regional assessment and barriers analysis (RABA) is a tool to inform the direction of the North Country Clean Energy Hub (NC Hub). Through the RABA, we will provide an evidence-based snapshot of the clean energy transition in the North Country, highlighting region-specific observations, barriers, opportunities, and recommendations for transitioning to clean energy. Recommendations contained in the RABA aim to aid outreach, funding, and programs to ensure all North Country residents are included in this transition, especially residents of designated disadvantaged communities (DAC) and low- to moderate-income (LMI) residents in all communities. A list of references and resources used can be found in Appendix A.

The RABA and the observations, barriers, opportunities, and recommendations contained within will be updated as the program progresses and regional conditions change.

Community Engagement

The NC Hub team focused on these research questions as we developed this assessment:

1. What do North Country residents need to make their homes healthier, more affordable, and more comfortable?
2. What motivates North Country residents to consider home efficiency and electrification upgrades?
3. What prevents the North Country workforce from meeting the existing demand for residential efficiency and energy upgrades?
4. How do these questions also apply to our region's economic heart: small business owners and nonprofit leaders?

In preparing this assessment, the NC Hub team identified four key audiences to engage, with a focus on differentiating responses between individuals in and/or serving three population segments: 1) disadvantaged communities, 2) low- to moderate-income, and 3) market rate.

Residents

Contractors

Small Business Owners

Community Stakeholders

Backed up by data and reports cited throughout the assessment, we engaged our four target groups using several different methods designed to reduce barriers to participation while gaining a better understanding of our geographically large, rural region. Methods include:

Roundtables

Presentations

Conversations & Interviews

Surveys

Executive Summary: Key Findings

Observations *(Throughout):* Key observations are identified in each section of this report. One of the most recurrent observations is the challenge posed by the North Country's vast size and rural character, composed of about 23% of New York State's land area, but containing just over 2% of its population. This unique landscape shapes nearly all of the significant barriers, opportunities, and recommendations contained in this report.

Barriers *(pg. 21-24)*: Barriers to an equitable transition to clean energy in the North Country are many. Some of the most frequently identified include:

- Challenges presented by DAC criteria implementation, and a need for LMI households outside of designated DACs to be meaningfully included in programs.
- A critically small number of contractors available to complete home repairs and energy upgrades, participate in NYSERDA programs, and build the region's clean energy workforce.
- Limited access to the wraparound services needed to grow the region's clean energy workforce and participate in home repairs and upgrades, especially childcare and transportation.
- Additional structural challenges including a lack of flexible funding, long program wait times, strict eligibility requirements, and others which are especially acute for DAC and LMI residents and those seeking to serve them.
- Programs are not designed to meet the rate and scale of change needed to meet the goals in the NYS Climate Act.

Opportunities (pg. 24): Based on our assessment of observations and barriers, we have identified the following key opportunities within the NC Hub scope of work and current capacity:

- Residents express positive attitudes toward the comfort, safety, and affordability benefits of clean energy projects.
- Interest in electrification, clean energy, and heat pumps is growing in many parts of the region.
- Small businesses and nonprofits benefit from a strong network of local support services and express an almost universal interest in energy efficiency improvements.
- Contractors are experiencing significant demand from all market segments thanks to a region-wide need to improve our aging housing stock.
- There is strong interest in growing clean energy workforce development in all segments.
- The Hub is developing the capacity to administer funding to address identified barriers

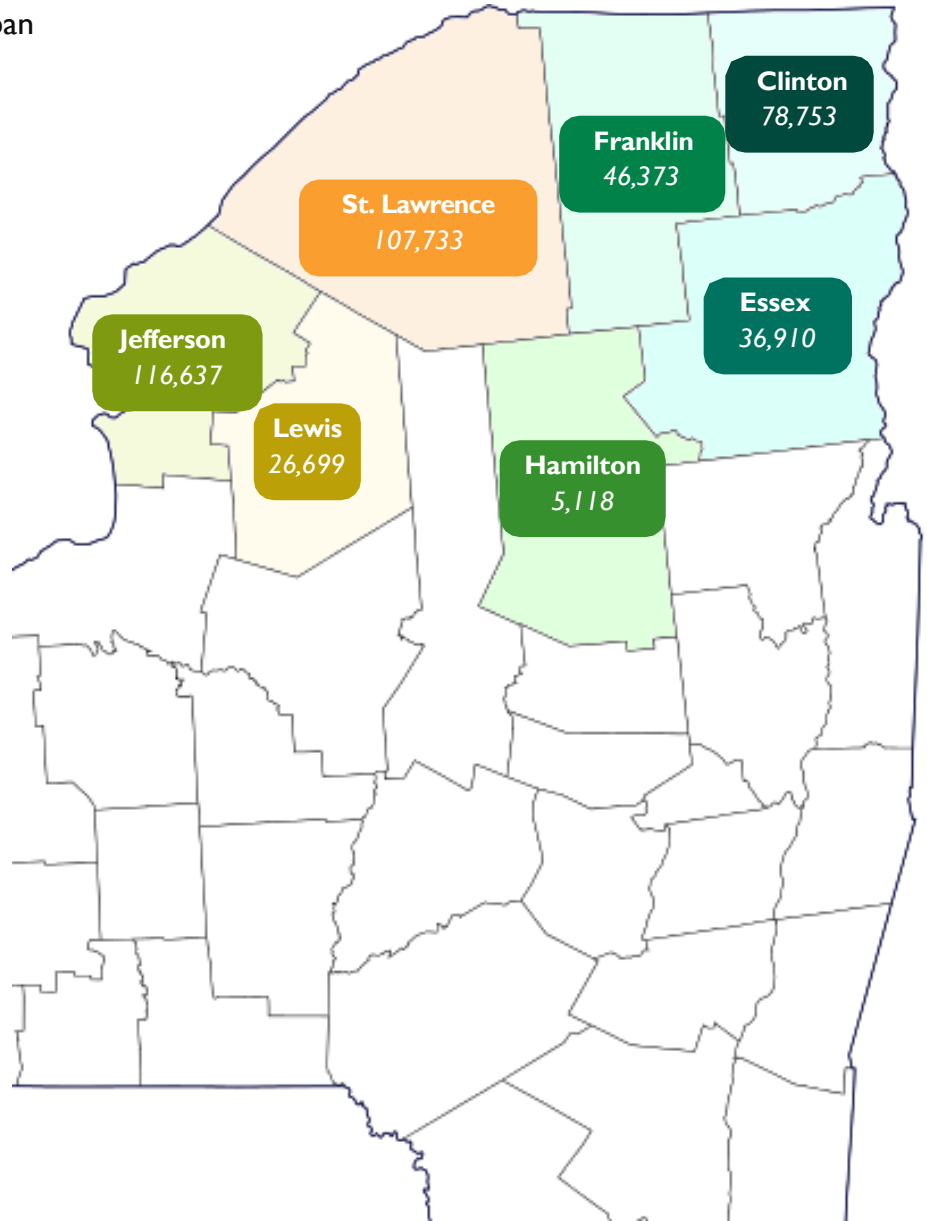
Recommendations *(pg. 25-27)*: We have identified five key recommendation groups to guide our work. We will work to:

1. Improve North Country access to NYSERDA programs, especially Empower+.
2. Focus program messaging on the comfort, affordability, and safety aspects of clean energy projects.
3. Support workforce development across the region's K-16 landscape, and utilize funding to support energy efficiency contractors.
4. Deploy funding to support LMI households in completing critical home repairs and heating system upgrades.

Regional Information

The NC Hub serves a region made up of the current and ancestral lands of the Haudenoshaunee. The NC Hub's region includes 7 rural counties in which approximately 2.2% of New York State's population lives across about 23% of its land area. Most people live in or near small hamlets or villages connected by state or county roads. Much of the region sits in the Adirondack Park, including all of Essex and Hamilton Counties. Residents rely on resources based in urban centers just outside the region, including Syracuse, Utica, and the Capital Region. *(See Appendix B for data set.)*

North Country Region
Total Population: 418,223
Aged 16 and over: 345,481



Key Observations

(See charts on page 6.)

- The percentage of the North Country's population approaching or at retirement age outpaces New York State's average, while the percent of young people entering the working age lags New York State's average, placing significant strain on the region's workforce.
- LMI individuals and others with similar barriers to residential and workforce programs live in every community in the region, and must benefit from services and programs.
- High-potential populations for engagement include retirees with construction and clean energy expertise, college students and recent graduates, and Fort Drum soldiers and families.
- Significant numbers of high-unemployment, low-labor participation populations reside in the region and require responsive programs and wraparound supports for inclusion in the clean energy transition, including individuals who have less than an associate's degree, have at least one disability, have young children, and/or have been incarcerated.
- Additional barriers are faced by BIPOC residents of the region, including St. Regis-Mohawk tribal members. These barriers are compounded for those who are also members of the previously noted high-unemployment, low-labor participation populations.

Regional Information

Summary of Population & Employment (Aged 16 or older)

			Unemployment Rate
Individuals below poverty level			22.1%
Individuals with disabilities			11.4%
16-24 years old			10.4%
25-54 years old			4.8%
55-74 years old			2.5%
75+ years old			1%

Educational Attainment (Aged 25-64)

			Unemployment Rate
Less than high school graduate			5.6%
High school graduate (incl. equivalency)			5.5%
Some college or associate's degree			3.7%
Bachelor's degree or higher			3.1%

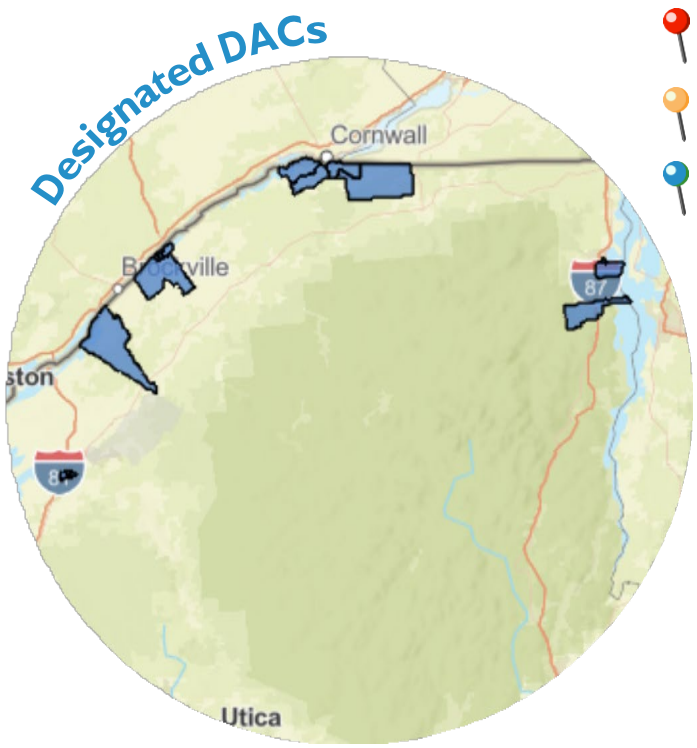
Race and Hispanic or Latino Origin (Aged 16 or older)*

			Unemployment Rate
White			5%
Black or African American			8%
American Indian and Alaska Native			8%
Asian			0%
Native Hawaiian and Other Pacific Islander			0%
Other race			6%
Two or more races			15%
Hispanic or Latino origin (of any race)			6%

*2020 American Community Survey race data only available for Essex, Franklin, Hamilton, and Lewis Counties. We would anticipate slightly higher percentages of non-white populations if Clinton, Jefferson, and St. Lawrence Counties were included, but not significantly different labor market participation data.

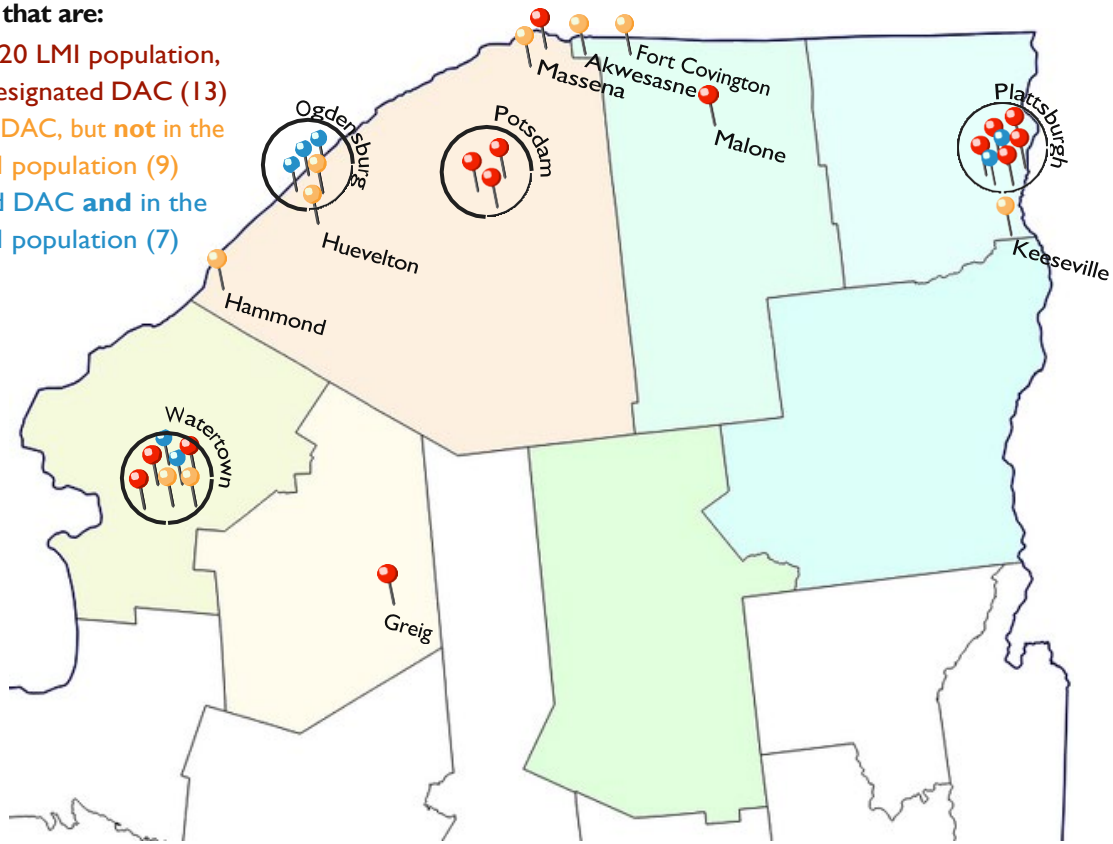
Regional Information - Disadvantaged Communities

The NYS Climate Act stipulates that 35% of benefits from climate investments are channeled to designated **disadvantaged community (DAC) census tracts**. In 2023, the NYS Climate Justice Working Group formally adopted criteria using more than 40 indicators to designate DAC census tracts. All low-income (LMI) households (those with incomes at or below the higher of 80% of the area median income or state median income) located outside of designated DAC tracts are also included in the DAC criteria. The implementation of the DAC criteria has critical implications for North Country entities accessing clean energy opportunities. *(See Appendix C for data set.)*



Census Tracts that are:

- In the top 20 LMI population, but **not** Designated DAC (13)
- Designated DAC, but **not** in the top 20 LMI population (9)
- Designated DAC **and** in the top 20 LMI population (7)



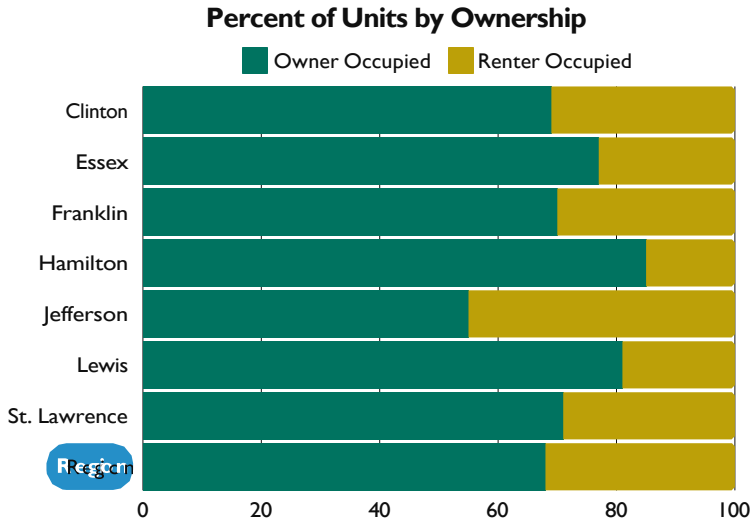
Key Observations

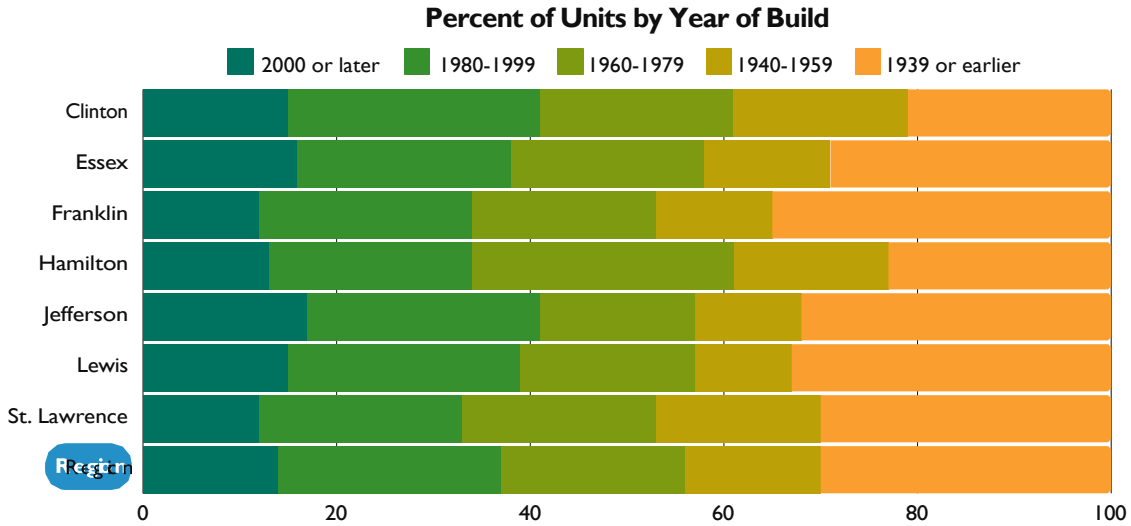
- With only 16 designated DAC tracts in the North Country, the vast majority of the region's census tracts are not designated DAC.
- Over four times more LMI households live outside of DAC tracts than in DAC tracts.
- Under the current implementation of the criteria, the DAC designations do not capture the extent of rural poverty in the North Country and make it difficult for rural communities to access benefits tied to DAC designation. Low-income households located outside of DAC tracts must be eligible to participate in all programs, opportunities, and policies that allocate resources to DACs.

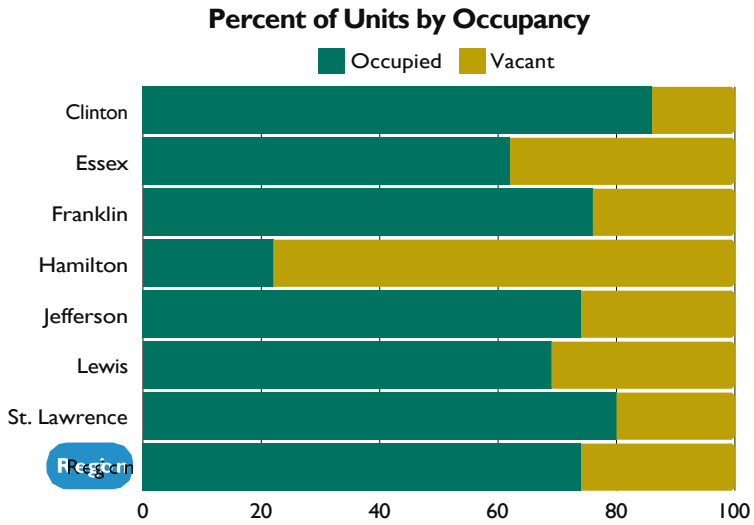
Building Typologies - State of North Country Housing

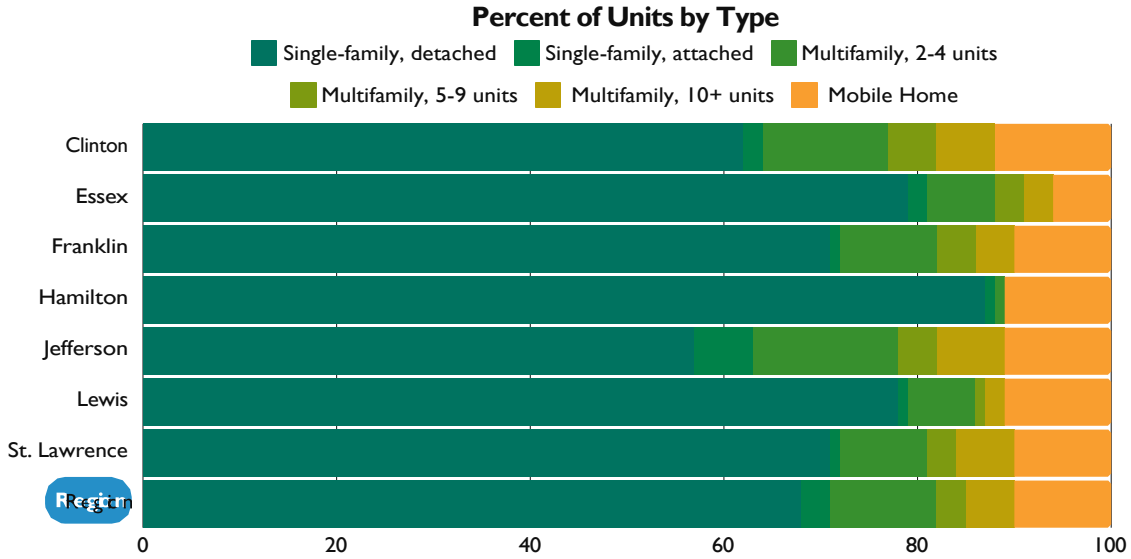
Summary of Housing Types *(See Appendix D for data sets.)*

Census Tracts	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Owner Occupied Units	Renter Occupied Units	Single Family Detached	Single Family Attached	Multifamily 2-4 Units	Multifamily 5-9 Units	Multifamily 10+ Units	Mobile Homes
DAC	39,293	34,072	5,221	21,057	13,015	24,091	1,081	5,390	2,187	3,062	3,563
Non-DAC	186,580	133,657	52,923	92,199	41,458	128,516	4,721	29,269	5,731	8,558	20,381

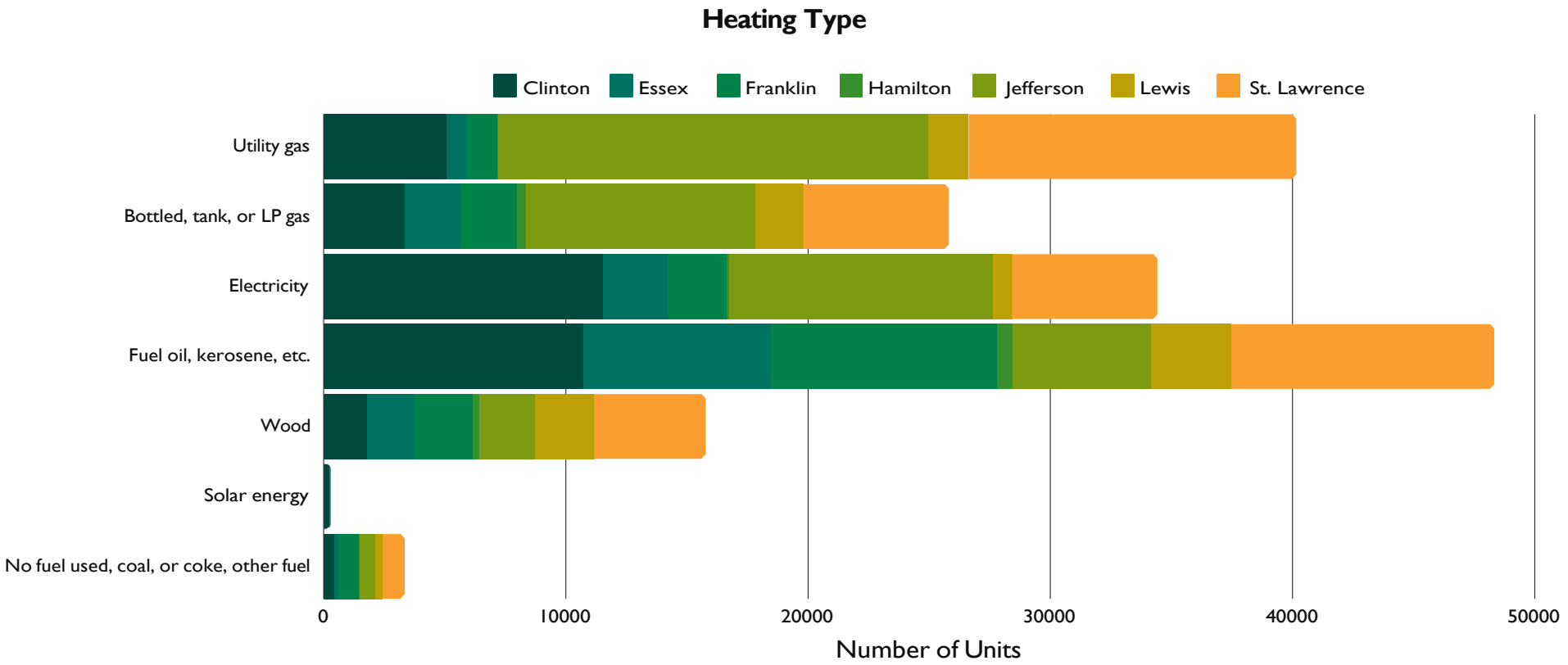








Building Typologies - State of Home Heating



Key Observations

- The majority of NC residents own their homes. Lower ownership numbers in Jefferson County may be due to the influence of Fort Drum.
- A high proportion of vacant housing units corresponds to the high number of seasonal, vacation, and short-term rental homes in the region.
- The majority of building types are single family homes, and about 10% of the building stock are mobile homes.
- About 60% of North Country building stock was constructed before 1980, illuminating the region's aging building stock.
- Primary heating fuel types vary across the region. Essex, Franklin and Hamilton counties rely heavily on delivered fuels. Jefferson and St. Lawrence counties have the largest share of utility gas customers. Wood heat is a significant primary heat source in Hamilton, Lewis, Franklin, Essex and St. Lawrence counties, and a widely used secondary heat source regionwide.
- There is little difference between DAC and non-DAC census tracts in the percentage of owner versus renter occupied units, mobile homes as a percentage of housing stock, and other metrics.
- To meet NYS Climate Act goals of 1-2 million homes electrified with heat pumps by 2030, between 26,000-52,000 homes will need to be prepared for heat pumps and have installations completed in the North Country.

Regional Partnership Development

The NC Hub will grow or establish partnerships in 5 categories to serve residents and small businesses:

- Contractors & Housing Development
- Utilities, Manufacturers, and other Clean Energy Industry Stakeholders
- Workforce Development and Education & Training Providers
- Social Service Providers, including Local Governments
- Economic Development Organizations

Key Observations

- Small communities and a relatively small overall population makes it technically feasible for the NC Hub to connect and build relationships with any and all partners needed to provide needed services for the region's residents.
- The region's vast territory means very few organizations serve all residents, much less each DAC.
- Long travel distances mean employment, contractor, and service opportunities are not evenly available in all areas.
- Some strategic partnerships will need to be established with organizations based outside of the North Country to fulfill demand for services.

Contractors and Housing Development

Potential Hub Partnership

- Critical home repairs & energy efficiency upgrades for DAC and LMI residents.
- Work-based learning & employment opportunities.
- Become NYSERDA-participating contractors.
- Awareness and education regarding home improvements, energy efficiency and clean energy transition.

Examples

- Building contractors
- Affordable housing developers
- Nonprofit housing organizations
- Weatherization Assistance Program providers
- Land banks

Utilities, Manufacturers, & Other Industry Stakeholders

Potential Hub Partnership

- Work-based learning & employment opportunities.
- Awareness and education regarding home improvements, energy efficiency and clean energy transition.
- Community campaign partnerships.
- Collaborate to leverage additional funding for residential and small business programs.

Examples

- Hydro, wind, and solar utilities
- Regional and national utilities
- Municipalities and localities
- Small businesses
- Manufacturers
- EV transportation

Regional Partnership Development

Workforce, Education, and Training

Potential Hub Partnership

- Accessible, responsive, low- and no-cost job training for DAC and LMI residents.
- Grow pipeline of job-ready individuals from childhood awareness through hiring, retention and upskilling.
- Awareness and education regarding opportunities in trades, clean energy, and related wraparounds careers.
- Build coalitions to leverage additional funding and improve region-wide collaboration.

Examples

- BOCES
- School districts
- Institutions of Higher Education
- Cornell Cooperative Extensions
- Credentialing Organizations
- Unions
- Workforce Intermediaries
- New York State Agencies
- Apprenticeship Liaisons

Social Service & Government

Potential Hub Partnership

- Provide DAC and LMI individuals with critical services necessary to complete home repairs, access clean energy upgrades, and improve career outcomes.
- Grow wraparound service programs to meet regional needs.
- Leverage additional funds to support Hub-aligned projects.
- Support awareness campaigns around home improvements, energy efficiency and clean energy transition.

Examples

- County & Local Governments
- St. Regis Mohawk Tribe
- County Weatherization Programs
- Social Service NPOs
- Church Communities
- Social & Fraternal Organizations

Economic Development

Potential Hub Partnership

- Small business development for contractors and clean energy businesses.
- Administrative support, including for NYSERDA program participation.
- Collaborate to leverage additional funding for home repairs, business development, and workforce development.
- Support locality participation in clean energy programs.
- Support awareness campaigns around home improvements, energy efficiency and clean energy transition.

Examples

- Community, Economic, and Industrial Development Organizations
- Chambers of Commerce
- Banks, Credit Unions, CDFIs, alternative lenders

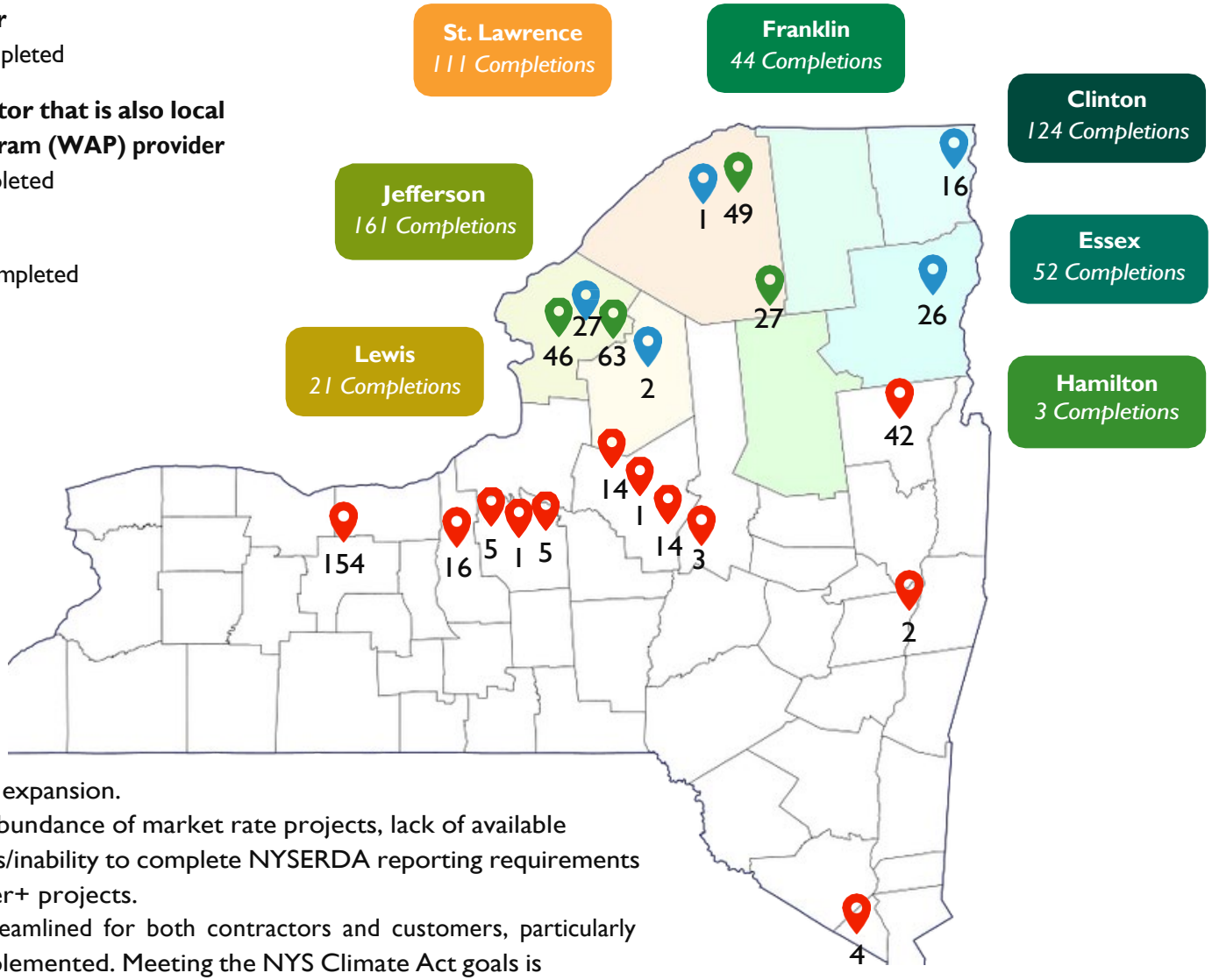
Existing Programs: Empower+ Participation

NYSERDA's Empower+ program offers significant incentives for LMI households to make their homes more energy efficient and save money on utility bills. North Country Hub staff work more closely with the Empower+ program than any other NYSERDA offering. Below is an analysis of the **476 Empower+ projects completed by 20 contractors** from September 2022 to July 2023. *(See Appendix E for data set.)*

North Country-based contractor
4 contractors, 185 projects completed

North Country-based contractor that is also local Weatherization Assistance Program (WAP) provider
5 contractors, 72 projects completed

Out-of-region contractor
11 contractors, 219 projects completed



Key Observations:

- 46% of Empower+ projects were completed by contractors based outside of the North Country.
- Large sections of the North Country region are poorly served or not served at all by Empower+ contractors, including the DAC tracts of Massena, Akwesasne and Plattsburgh.
- Existing North Country Empower+ contractors are at capacity, and face barriers to growth or expansion.
- Non-participating contractors report abundance of market rate projects, lack of available workforce, geography, and unwillingness/inability to complete NYSERDA reporting requirements as reasons for not completing Empower+ projects.
- Participation in Empower+ must be streamlined for both contractors and customers, particularly as Inflation Reduction Act funds are implemented. Meeting the NYS Climate Act goals is contingent upon ease of program participation experience for contractors and customers.

Existing Programs: Community Campaigns

Community campaigns are targeted outreach initiatives designed to encourage residents in a designated location to adopt a specific clean energy technology or program. Community campaigns are incorporated into NYSERDA's Clean Energy Hub and Clean Energy Communities (CEC) programs. There are currently no regionwide community campaigns in the region, but the Hub has funding to support community campaigns throughout the North Country.

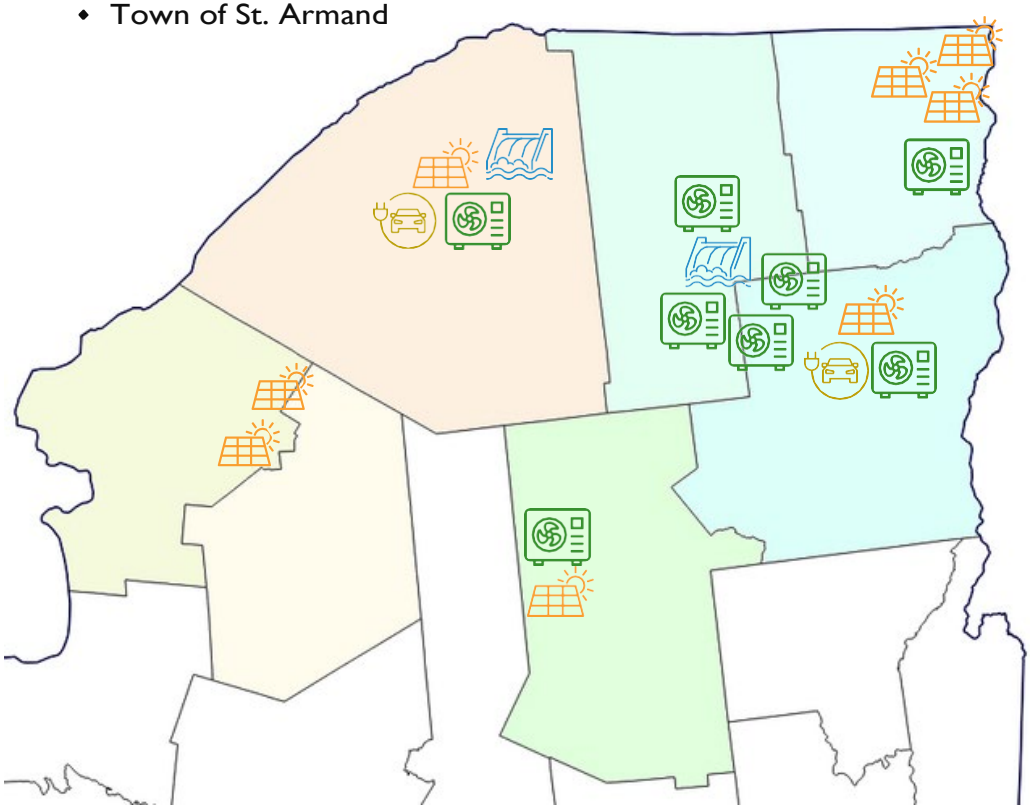
Since 2020, the following municipalities have hosted local community campaigns in conjunction with the CEC program:

Community Solar:
- Village of Canton
- Town of Champion
- Town of Champlain
- Village of Champlain
- Town of Chazy
- Town of Inlet
- Town of Jay
- Village of West Carthage

Clean Heating & Cooling
- Village of Canton
- Town of Harrietstown
- Town of Inlet
- Town of Jay
- Town of North Elba
- City of Plattsburgh
- Village of Saranac Lake
- Town of St. Armand

Community Hydro:
- Town of Potsdam
- Village of Saranac Lake

Electric Vehicle
- Village of Canton
- Town of Jay

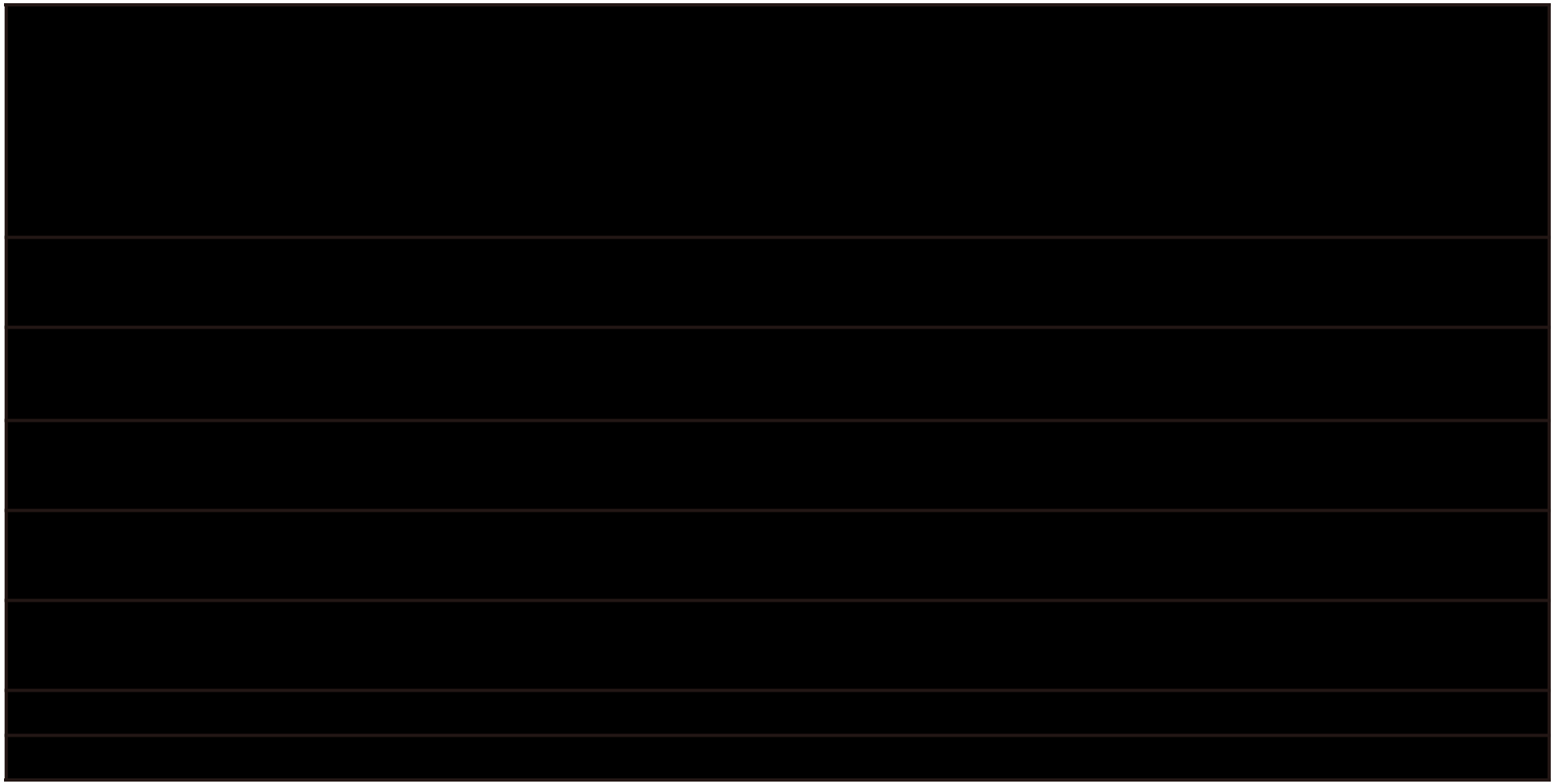


Key Observations:

Current campaigns:
- Serve small portions of the North Country,
- Primarily serve market rate customers,
- Are mostly led by community volunteers with support from municipal staff and CEC coordinators, and,
- In many cases have met their goals.

Community volunteers would welcome Hub capacity to expand efforts, so long as these new campaigns do not exacerbate existing bottlenecks including long program waitlists or contractor shortages, primarily for weatherization and energy efficiency. CEC and Hub campaigns must work together on tracking campaign outcomes instead of competing.

Clean Energy Workforce Development



In addition to clean energy careers, all skilled trades are in demand in the region and critical to completing energy upgrades. They are considered statewide and/or North Country priorities by the NYS Department of Labor (DOL), Empire State Development (ESD), and the North Country Regional Development Council (NC REDC). According to NYS DOL, strong growth is projected in these key sectors, led by those careers which integrate clean energy principles:

Construction (carpenters, laborers, supervisors, project managers, equipment operators, back office)

- Current employment: 1,900; Projected 2018-28 growth: 4.8%; Actual 2020-21 growth: 18.8%

Specialty Trade Contractors (electricians, laborers, pipefitters, truck drivers, carpenters, roofers, back office)

- Current employment: 3,100; Projected 2018-28 growth: 8%; Actual 2020-21 growth: 24%

Clean Energy Workforce Development

Based on interviews, survey responses, and data, the NC Hub is approaching the five, NYSERDA-identified clean energy sector categories as follows:

Higher Priority: Energy Efficiency and Renewable Energy. Sluggish growth in some counties noted in the chart on the previous page is likely the result of the limited regional workforce and small number of contractors, rather than a lack of demand. To improve the safety, comfort, and affordability of the North Country's homes and small businesses, solutions must be developed to sustainably address shortages in employers, workers, and training providers needed to complete home repairs, energy efficiency upgrades, and renewable energy projects.

Medium Priority: Clean Vehicles. While less of a priority than energy efficiency and renewable energy, demonstrated growth in this category, along with coming electric bus mandates and an EV cluster in Plattsburgh merit exploration of training and employment opportunities.

Lower Priority: Grid & Storage and Biofuels. A lower priority due to few or no open positions, industry clusters or other indicators of near term growth, these sectors nevertheless merit monitoring for future opportunities.

NYSERDA WFD Program Participation	
Clean Energy Internship Program (PON 4000)	
Adirondack North Country Association	Saranac Lake
Ducted Wind Turbines	Potsdam
Polaris Renewables	Potsdam
On-the-Job Training Program (PON 3982)	
ADK Solar	Saranac Lake
Ampersand Electric	Saranac Lake
Cornerstone Services	Norwood
G.R.O. Energy Solutions	Watertown
Heat Keepers	Saranac Lake
Mission Drives Corp.	Potsdam
Potsdam Sensors	Potsdam
Climate Justice Fellowship (PON 4772)	
Adirondack North Country Association	Saranac Lake

The NC Hub has also identified opportunities in these related job sectors, essential to clean energy adoption in the region:

Higher Priority: Construction Trades. To improve the safety, comfort, and affordability of the North Country's homes and small businesses, opportunities exist to strengthen and grow trades fields related to the clean energy sector. These individuals are critical to completing the building repairs necessary before considering energy efficiency projects, and present training opportunities to incorporate clean energy knowledge into their work.

Medium Priority: Childcare and Entrepreneurship. Extreme shortages in childcare providers and individuals with business skills reduces our region's ability to meet the needs of residents and small business owners. Opportunities exist to support the childcare sector and to train individuals with the business skills needed to stabilize and grow small contractor and clean energy businesses.

Clean Energy Workforce Development

Regional Training Assets	Solar	Wind	HVAC	Electrical	Construction	Energy Efficiency	Sustainability	Engineering	Business	Childcare
BOCES (High School)										
Champlain Valley				X	X			X	X	
Franklin-Essex-Hamilton			X	X	X					
Jefferson-Lewis-Hamilton			X	X	X					
St.Lawrence-Lewis			X	X	X					
Wash.-Sar.-War.-Ham.-Essex			X		X			X		X
SUNY										
Canton	X		X	X	X		X	X	X	X
Clinton CC		X							X	
Jefferson CC				X					X	X
North Country CC									X	X
Plattsburgh									X	
Potsdam									X	
Private IHE										
Clarkson University							X	X	X	
Paul Smith's College							X		X	
St. Lawrence University									X	

Key Observations:

- Surveys of and interviews with contractors, employers, and workforce development stakeholders almost unanimously reported shortages in the North Country workforce due to retirement, outmigration, and fewer young people.
- Employers report worker shortages, lack of capacity to train and/or complete NYSERDA paperwork, and inability to wait for reimbursement as reasons for low adoption of NYSERDA WFD programs, as well as pre-apprenticeship and Registered Apprenticeship programs, in the region.
- Gaps exist in available training programs, including no local energy efficiency programs. To grow training programs, lead partners will need to be identified, starting with SUNY Canton and CCE Jefferson, both signaling strong interest in Hub-related workforce initiatives.
- Some training providers exist across the region, but the availability of training programs for those young people skilling for the first time and adults in need of re- or upskilling is limited and highly dependent on location and awareness.
- There are few employers ready to hire needed positions in the region, such as building auditors.

Stakeholder Engagement - Overview

Four broad groups were identified for initial stakeholder engagement for this report. Residents, building contractors, small business owners, and other stakeholders, including social service organizations, training providers, and economic development and community organizations, were engaged through surveys, one-on-one conversations and interviews, roundtable conversations, and events.

Residents were engaged through a survey that was deployed throughout the North Country from July-November 2023. The survey was available digitally and print copies were distributed at in-person events and tabling opportunities. All respondents were entered in a raffle to win a $100 Stewart's gift card. In-person surveying was conducted in targeted communities, including Malone, Akwesasne, Ticonderoga, and Plattsburgh, to ensure DACs and low income areas were properly represented. Stewart's gift cards for coffee and ice cream were used to encourage survey responses in targeted communities. 445 people responded to the survey. 210 self-identified as LMI, and 122 were located in DAC census tracts.

Contractors were engaged through surveys deployed by ANCA in 2021 and 2019, the results of which reflect similar trends and themes in the current contractor landscape. 56 contractors replied to the survey in 2021 *(See Appendix G)* and their service areas covered all 7 North Country counties. The Hub also hosted a contractor roundtable at the Adirondack Building Conference held at The Wild Center in March 2023. Contractors were also engaged in one-on-one conversations throughout the launch of the Hub.

Small business owners throughout the North Country were engaged through one-on-one conversations about their current work and needs, and through small business participation in clean energy programs offered through ANCA's Center for Pandemic Response initiative.

Service, training, and community organizations were engaged through one-on-one conversations and a workforce development survey *(See Appendix H)* which was distributed through email to key partners. A workforce development roundtable was also held at the Common Ground Alliance event at Gore Mountain in October 2023. Hub staff also engaged several partners through two open meetings held in January 2024.

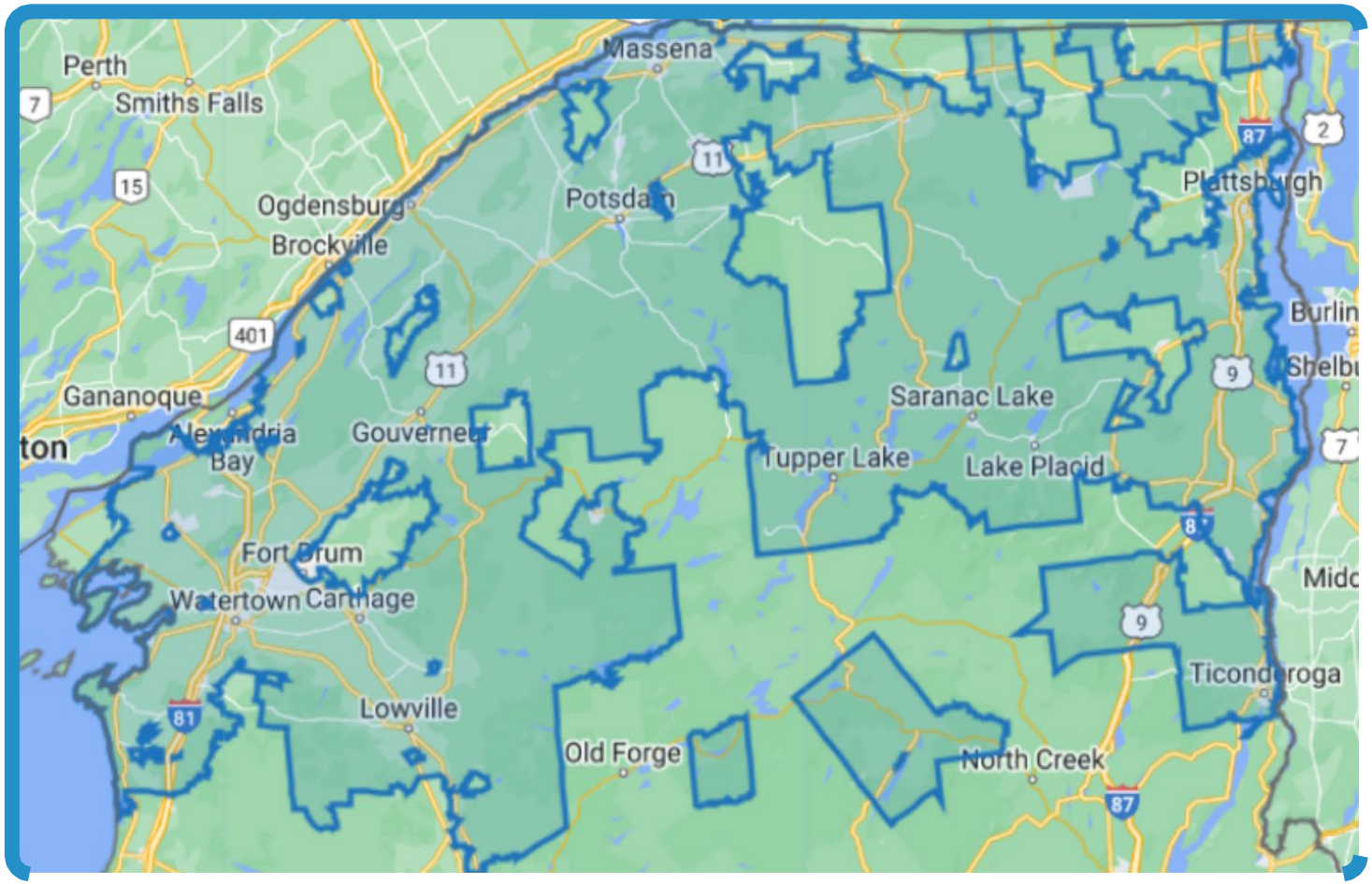
Stakeholder Engagement- Resident Survey Results

See 4 key questions summarized on pages 19-20, and a full list of questions and response summaries in Appendix F.

445 resident surveys were collected from the communities highlighted (by zip code).

210 self-identified as low-moderate income.

122 reside in DAC census tracts.



Key Observations:

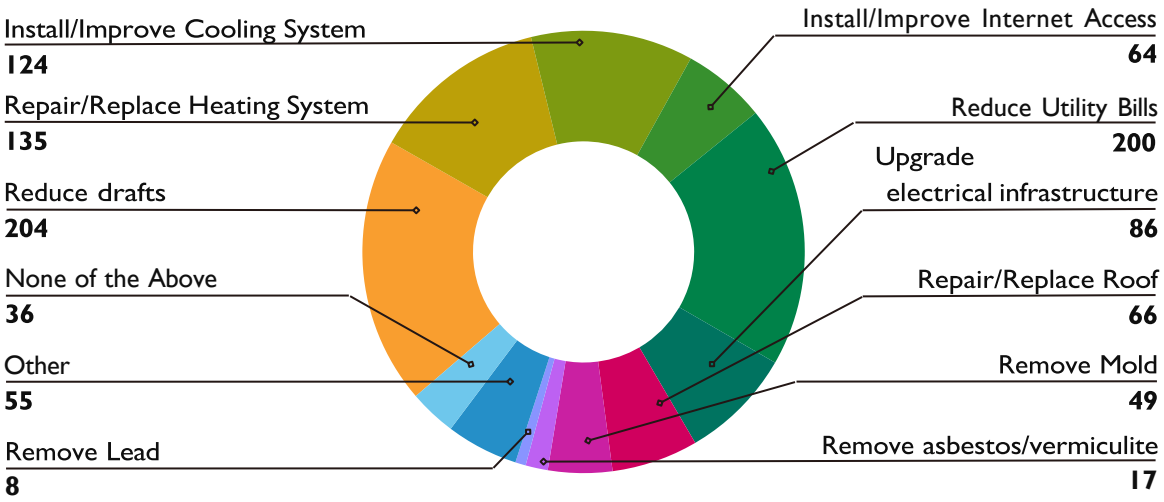
- Many North Country residents respond positively to messaging around the comfort, safety, and cost benefits of clean energy upgrades, and express interest in clean energy career opportunities, energy efficiency upgrades, and technologies like heat pumps.
- Misinformation, distrust of government programs, including those facilitated by NYSERDA, and skepticism of clean energy technologies exists throughout the North Country region.
- Building trust with North Country audiences, and partnering with messengers that broad audiences trust, is crucial to the success of the Hub and programs.
- Trusted messengers in the North Country include local municipalities, religious leaders, social networks and organizations (Rotary, fish & game clubs, other fraternal organizations), and local television and radio stations.

Stakeholder Engagement- Resident Survey Results

The responses to four key resident survey questions are below. DAC vs. non-DAC responses yielded substantially similar insights.

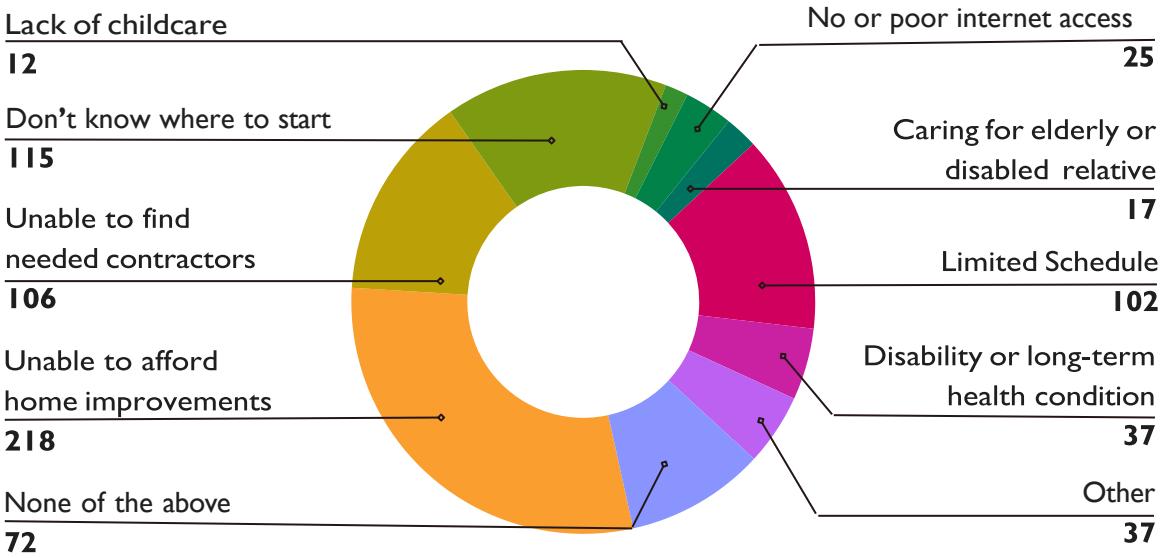
What do you need to make your home more comfortable, safe, and affordable? (Select up to 3.)

Survey results highlight trends that have long been barriers to clean energy adoption in the North Country. Respondents identified these needs to make their home more safe, affordable and comfortable. Nearly half of all respondents identified reducing drafts and utility bills as a primary need.



Do you experience any of the following limits that prevent you from participating in home improvements? (Select all that apply.)

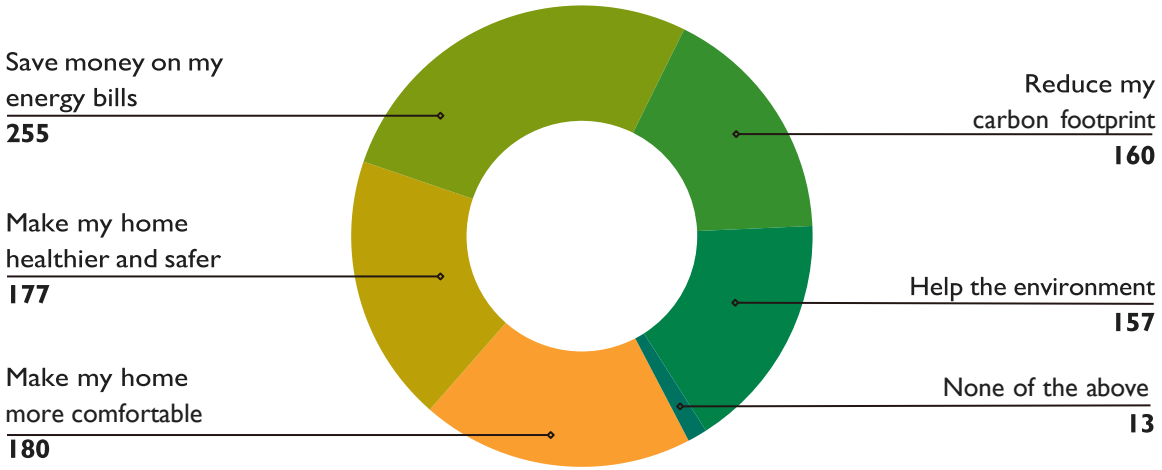
Respondents identified a host of barriers to meeting these needs. Half of respondents are unable to afford home improvements, and other top responses include unable to find needed contractors, not knowing where to start, and a limited schedule.



Stakeholder Engagement- Resident Survey Results

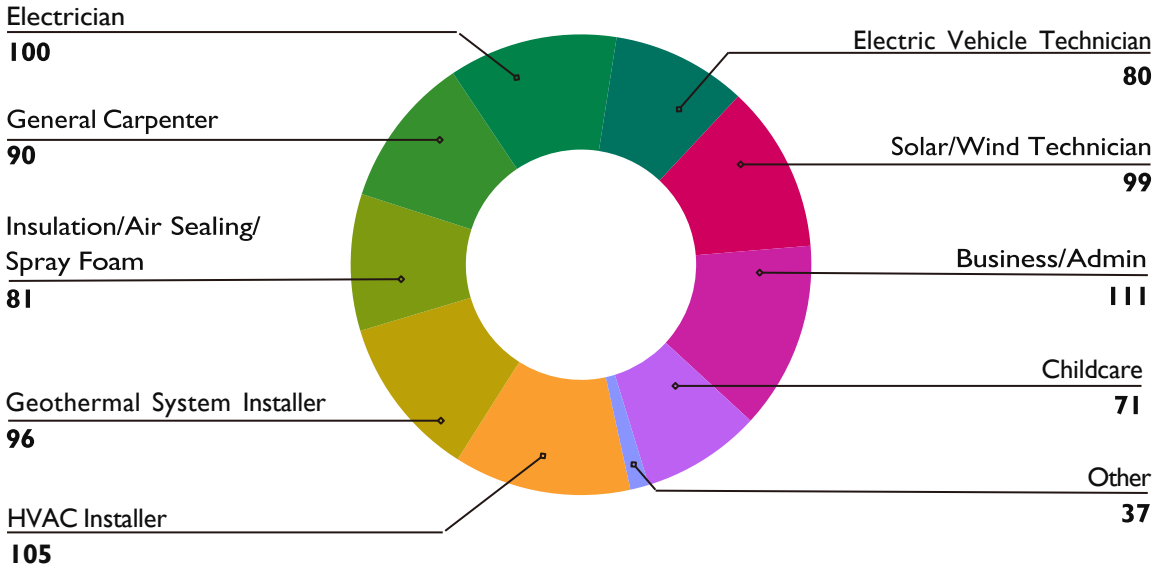
Which of the following statements appeals to you most? I want to... (Please select up to 2.)

Respondents were asked to select messaging that most strongly appeals to them. Nearly 60% of respondents selected messaging associated with saving money on utility bills, while 40% of respondents selected messaging associated with making their homes more comfortable, safe and affordable.



Are you or someone you know interested in training or job opportunities for the following careers? (Please select all that apply.)

Respondents expressed interest in training and/or job opportunities for all trades included in our survey.



> *We are barely scraping by with inflation but don't qualify for any of these programs. We desperately need support.*
>
> -Resident Survey Respondent

Barriers to Clean Energy Transition

Overarching Regional Barriers

- **Disadvantaged communities criteria implementation.** As there are only 16 DAC tracts in the North Country, the vast majority of the region, both by geography and population, is not a designated DAC. **Low-income households living outside of DAC tracts must be meaningfully included in all programs, opportunities, and policies that allocate resources to DACs.** This has implications across residential, small business, partner agency, and workforce sectors. As the North Country already struggles to access many clean energy opportunities, the DAC criteria should be a tool that supports the North Country in overcoming barriers instead of creating more.
- **Critically small number of building contractors.** No part of the clean energy transition can effectively take place without growth in the number of contractors in the region, especially those serving DAC and LMI populations and participating in NYSERDA programs. This impacts home and business repairs, response to no-heat situations, wait times for programs including Empower+, implementation of community campaigns and local pilots, and development of workforce pipelines.
- **Access to critical wraparound services.** There is a severe lack of all wraparound services for all segments and sectors in the region, including child care, elder care, transportation, health and nutrition, and housing assistance. No work in the clean energy space can take place without centering development of solutions to these challenges. Where available, wraparound services are limited in number, highly geographically dispersed, and prohibitive in cost.
- **Complex and restrictive program eligibility requirements.** Stacking programs and incentives is essential to achieving home upgrade affordability for LMI households. An increasingly detailed, complex, and strict program eligibility landscape is making it more difficult, and in some cases, impossible, to meet a realistic price point for LMI households to move forward with weatherization and heat pump projects.

In addition to barriers relating to DAC criteria, contractors, and wraparound services that impact every resident, business owner, and community in the North Country, the following are barriers faced by different regional populations.

Barriers for LMI Residents

- Lack of funding and administrative capacity for critical infrastructure needs, such as roof or health and safety repairs.
- Residents:
  - Are unable to afford repairs,
  - Don't know where to begin,
  - Are unable to prioritize non-urgent home improvements, and,
  - Distrust clean energy technologies and government programs.
- The current state of grid reliability and home electrification options is not adequate to meet the needs of all North Country residents.
- Residents of Akwesasne are unable to access financing for home improvements, including clean energy upgrades.
- Some DACs are municipal electric territories which affects eligibility for rebates and incentives.
- LMI residents often face compounding barriers to program and workforce participation, including lack of traditional educational attainment, criminal justice system involvement, child and elder care responsibilities, and disabilities.

Barriers to Clean Energy Transition

Barriers for Engaging Regional Partners

- Limited capacity of Hub staff and partners to serve a vast geographic territory.
- Long and unpredictable wait times to receive program services including Empower+.
- Organizational challenges, including operating at maximum capacity, frequent staff changes, and lack of collaboration.
- Partner organization service areas are fragmented, meaning, 1) multiple partners are required to address single issues in all areas of the region, and 2) availability and/or quality of services varies depending on location.
- High administrative burden to participate in NYSERDA programs.

Barriers to Participation in Clean Energy Workforce

- Our rural, dispersed population creates full-pipeline challenges for the clean energy workforce. All corners of the system present challenges due to a lack of:
  - **Training opportunities,** preventing interested individuals from receiving the skilling necessary for good jobs in the sector,
  - **Contractors,** preventing employment and on-the-job training opportunities for aspiring and current workers, and,
  - **Prepared trainees,** preventing development of training and employment opportunities.
- Employment opportunities in the clean energy sector, especially in energy efficiency and renewable energy, are often lower quality and/or temporary positions, with few if any opportunities for advancement. The region's work- or training-eligible workforce demand accessible, living-wage, long-term positions that is mismatched with the reality of many job opportunities in this sector.
- There are few eligible beneficiaries of NYSERDA workforce development programs and those who could be eligible report barriers, especially around administrative capacity to successfully apply for, utilize, and ultimately report on programs.
- A regional strategy to provide early exposure to clean energy careers in the region does not exist.

Anticipated Barriers to Community Campaigns

- Long and unpredictable program wait times.
- Inability of residents to afford needed financial contributions to complete projects.
- Technologies featured in Clean Energy Communities Campaigns are not accessible to DAC/LMI residents.

> *"We are getting more training and education assets in our area, but we need to do more hands-on recruitment of young people. Getting young people to recognize the opportunities is rarely addressed. When we can't fill the classes, we shrug and say there wasn't any interest. But we need to cultivate that interest and engagement at an early age. We're not doing that.*
>
> - Workforce Survey Respondent

Barriers to Clean Energy Transition

Barriers for Building Contractors and Clean Energy Businesses

Energy Efficiency Contractors

- Vast rural region with dispersed population centers makes work more expensive, and developing and retaining workforce challenging.
- Most are microbusinesses with limited or no administrative capacity to participate in NYSERDA programs including workforce development programs meant to engage DAC and LMI populations.
- Contractors can easily fill workloads with market rate jobs, making it difficult to incentivize low income or NYSERDA project work.
- Small contractors are not as able to accommodate on the job training or marketing and outreach to grow services.
- Currently, no Empower+ contractors install heat pumps, making it more difficult for LMI residents to access Inflation Reduction Act incentives

Renewable Energy

- Emerging sector faces workforce and training shortages, administrative challenges, and job quality issues.

Clean vehicles, grid modernization and battery storage, and biofuels

- Extremely small sectors in the region due to dispersed population centers, workforce and training challenges.

Barriers to Accessing Clean Energy Services for Small Businesses & Nonprofits

- Few responsive funding opportunities, including grants and lending, are available at the local, state, or federal levels.
  - Lack of upfront capital, accessible lending for clean energy projects, and reimbursement-based grants mean organizations need to have available cash prior to clean energy implementation. Long reimbursement wait times can create cash flow issues.
  - Funding opportunities have detailed eligibility requirements that are difficult to discern and exclude many motivated entities.
  - Available funding requires a significant, often untenable amount of time, resources, and experience accessing grant- or lending-based funding.
  - Available funding often involves funding displacement, requiring organizations to have to make significant compromises to access funding.
- Organizations often operate out of older buildings with significant energy efficiency needs and challenges to retrofitting and installation, including insulation, air sealing, windows, doors, and HVAC.
  - Current funding opportunities require ownership and operation of buildings for 12+ months prior to being eligible.
  - Critical repairs required for energy efficiency projects, including roof repair/replacement, electrical upgrades, plumbing, and wastewater upgrades are common needs and funding opportunities are limited or don't exist.
- A critical lack of contractors make even feasible, fundable projects challenging or impossible to complete.

Barriers & Opportunities Summary

Many barriers identified on the previous pages are systemic issues beyond the scope of the Hub. Opportunities listed here have been identified throughout the last year of Hub programming, are within the scope of the Hub, and could be addressed with current capacity.

Residents	Barrier	• Lack of accessible funding for critical home repair and health/safety issues • Distrust of clean energy technologies and government programs • Inability to afford home repairs and prioritize non-urgent home improvements • Remaining cost for upgrades after available incentives is prohibitively high • Insufficient current grid reliability and technology affordability
	Opportunity	• Heightened interest in electrification and clean energy in some areas • Moderate income and market rate customers highly interested in heat pumps • Radio and local television are trusted and utilized communication channels • Positive attitudes towards comfort, safety, and affordability of energy efficiency and clean energy projects
Small Businesses & Nonprofits	Barrier	• Existing programs do not support small businesses who are revitalizing vacant buildings • Extremely limited funding for structural repairs that must be completed before clean energy installations • Existing programs provide insufficient funding to make clean energy projects realistic for small businesses • No existing funding opportunities for emergency structural needs, such as a no-heat situation
	Opportunity	• Robust existing network of small business support services • Strong interest in energy efficiency improvements
Contractors	Barrier	• Training opportunities are costly and require travel out of the region • Additional administrative capacity needed to participate in NYSERDA programs • Can be cost-prohibitive to serve a geographically dispersed population
	Opportunity	• Growing number of NYS Clean Heat (air source and geothermal heat pump) contractors in the region • Demand exists to support new Empower+ contractors (46% of jobs are completed by out-of-region contractors)
Programs	Barrier	• Lack of wrap around services across all sectors, including child care, elder care, transportation, and housing assistance • Lack of administrative capacity across sectors to disperse additional funding opportunities • Few, if any, service agencies serve the entire region, requiring significant coordination on a project-by-project basis • Implementation of DAC criteria frequently excludes some of the few eligible entities from accessing programs
	Opportunity	• Strong potential for community campaigns in partnership with municipal leaders and the Clean Energy Communities Program • Region-wide interest in improving aging housing stock to address housing shortages
Workforce Development	Barrier	• Few employers prepared to hire needed positions such as building auditors • Lack of training opportunities and wraparound services affects availability of workforce
	Opportunity	• Broad interest in K-16 workforce development and educational opportunities • Sufficient demand exists to support additional building auditors and energy efficiency contractors • Expertise exists to build a training focused on entrepreneurship for building contractors

Recommendations

The following recommendations have been developed to address the barriers and capitalize on opportunities previously outlined in this report. The recommendations are split between those achieveable within the scope of the North Country Hub, and those that require action by either NYSERDA or another NYS agency.

1. Improve North Country access to NYSERDA programs, especially Empower+.	
North Country Hub Should:	• Streamline customer experience with application and project completion process • Where possible, work with local and out-of-region contractors to improve wait times • Support contractors with hiring, customer education and content expertise • Recruit new Empower+ contractors • Offer BPI building auditor training
NYSERDA & New York State Should:	• Increase flexibility within Empower+ measure incentive caps to make it easier to fully fund projects • Ensure LMI households outside of DAC census tracts receive all DAC benefits as intended • Increase contractor incentives to accept jobs in underserved areas • Prioritize flexible funding opportunities for small businesses, nonprofits, and urgent infrastructure needs • Ensure that households deferred from Empower+ and weatherization are documented • Improve funding opportunities and cross-agency coordination for households deferred from Empower+ or weatherization due to critical home repair needs and/or safety issues
2. Focus Hub Messaging on Comfort, Safety, and Affordability.	
North Country Hub should:	• Develop and utilize North Country-specific communication materials when possible • Honestly address challenges of utilizing clean energy technologies in some areas • De-emphasize messaging about clean energy and emissions reductions • Focus on building trust and developing relationships with hesitant audiences
NYSERDA & New York State Should:	• Provide for flexibility in local clean energy and energy efficiency messaging • Discontinue use of the term “Disadvantaged Communities.” Refer to Native communities as “sovereign nations” per the request of the Haudenoshaunee Environmental Task Force

Recommendations

3. Support workforce exposure and development across the region's K-16 landscape.	

North Country Hub should:	• Raise regional awareness of workforce development opportunities and funding, and where possible, support applications, including for partners and programs identified below.
	• Support SUNY Canton who is well prepared to lead a number of key initiatives to support key occupations/sectors (building auditors, contractor entrepreneurship, EV/electric bus, solar, heat pump, etc.), including:
	  ◦ Growing their successful Micro Course Mondays,
	  ◦ Developing in-demand microcredential opportunities,
	  ◦ Supporting pre-apprenticeship and Registered Apprenticeship programs, and,
	  ◦ Delivering summer camp opportunities for the region's youth and teens.
	• Support Cornell Cooperative Extension partners who are prepared to lead opportunities to expose K-12 students to clean energy career opportunities.
	• Support secondary, especially BOCES, and post-secondary schools to develop new or grow/align existing programs, especially short-term programs, to meet the needs of contractors and other employers, including in wraparound services.
	• Continue to promote NC Hub contractor open position listing.
	• Incentivize new energy efficiency contractors, or existing contractors expanding to include energy efficiency services

NYSERDA & New York State Should:	• Make all efforts to continue to simplify applications for NYS workforce development programs and funding • Ensure Technical and Community College campuses, as well as BOCES facilities, have adequate funding and support to develop and deliver programs responsive to regional contractor and employer needs

4. Continue Developing Partnerships to Reach LMI Residents.	
North Country Hub should:	• Prioritize outreach events held in partnership with other organizations • Develop consistent communications with partner agencies • Encourage agencies to develop processes to refer clients to the Hub
NYSERDA & New York State Should:	• Make connections to all regional offices for DSS, OFA, weatherization programs, and other relevant agencies • Work across agencies to identify funding solutions for households deferred from Empower+ for critical home repair and/or health and safety issues • Where possible, streamline eligibility requirements and application processes across LMI programs

> *For LMI households, the region could benefit from additional housing rehab programs that benefit LMI households and provide repairs and clean energy upgrades.*
>
> - Advisory Committee Member

Recommendations: Community Campaign & Local Pilot Projects

The North Country Hub is funded to implement two sets of projects to meet the North Country's unique energy transition needs:

- $250,000 is available for community campaigns to address barriers and gaps in residential energy efficiency projects, and,
- $300,000 is available for local pilot projects to provide flexible funding to address regional barriers and needs identified throughout this report.

The following opportunities have been identified as priority community campaigns and local pilot projects:

Community Campaign Recommendation

Provide gap funding to LMI households looking to upgrade heating systems, with a priority for full load heat pump systems.

Local Pilot Project Recommendations

Critical home repair grants for households deferred from Empower+ or weatherization, including roof repair and health and safety issues

Micro-grant program to support a new or expanding contractor to develop energy efficiency services, with a priority on coverage for Clinton and northern Franklin counties.

Next Steps: North Country Hub Initiatives

The following high-priority, high-impact recommendations are built on existing partnerships and the analysis featured in this report, representing significant program development initiatives.

Appendix

Contents

A. Endnotes

B. American Community Survey demographic & labor market data

C. Census tracts by DAC designation and LMI population

D. Housing typologies & heating types

E. Empower+ project completions

F. Resident survey questions and responses

G. Contractor survey questions and responses

H. Workforce development survey questions

Endnotes

These resources were used in development of this assessment and the observations, barriers, opportunities, and recommendations identified.

- **Regional Information, Building Typologies, Heating Types, DAC & LMI information**
  - 2020 Decennial Census and American Community Survey. www.census.gov
  - NYSERDA disadvantaged communities information. https://www.nyserda.ny.gov/ny /Disadvantaged-Communities
- **Existing Programs & Campaigns**
  - Adirondack North Country Association Clean Energy Communities information.
  - Empower+ Project Completion Data supplied by NYSERDA's Residential Team
- **Workforce Development**
  - The Business Council, Empire State Development, and NYS Department of Labor: 2023 Business Workforce Survey Results. https://dol.ny.gov/system/files/documents/2023/09/2023-business-workforce-survey -results.pdf
  - E2: Clean Jobs America 2023. https://e2.org/reports/clean-jobs-america-2023/
  - IREC: Cultivating a Diverse and Skilled Talent Pipeline for the Equitable Transition. https://irecusa.org/resources/key -recommendations-cultivating-a-diverse-and-skilled-talent-pipeline-for-the-equitable-transition/
  - Jobs for the Future: Framework for the Design and Implementation of College and Career Pathways in Rural Communities https://www.jff.org/idea/framework-for-the-design-and-implementation-of-college-and-career-pathways-in-rural-communities/
  - National Skills Coalition: Building the Future Workforce. https://nationalskillscoalition.org/resource/publications/building-the-future-workforce/
  - North Country REDC: Strategic Plan and Strategic Plan Updates. https://regionalcouncils.ny.gov/north-country
  - NYATEP: State of the Workforce 2023. https://www.nyatep.org/stateoftheworkforce2023
  - NYSERDA: 2023 Clean Energy Industry Report. https://www.nyserda.ny.gov/About/Publications/New-York-Clean-Energy -Industry -Report
  - NYSERDA: Clean Energy Workforce Development data and programs. https://www.nyserda.ny.gov/All-Programs/Clean-Energy -Workforce-Development-and-Training
  - NYS Department of Labor: 2021 North Country Labor Market data. https://dol.ny.gov/labor-statistics-north-country -region
  - NYS Department of Labor: 2023 Job Seeker Survey Results. https://dol.ny.gov/system/files/documents/2023/09/2023-job-seeker-survey -results.pdf
  - NYS ESD: Office of Strategic Workforce Development 2024 Annual Report. https://esd.ny.gov/sites/default/files/media/document/OSWD-Annual-Report-20240201.pdf
  - Workforce Development Boards of Jefferson-Lewis, North Country, and St. Lawrence FY21-25 Local Plans. https://dol.ny.gov/system/files/documents/2024/04/regional-plan-py21-py24-2023-modification.pdf
- **Stakeholder Engagement**
  - Residential survey deployed July-November, 2023. Appendix F
  - Contractor survey deployed, 2021. Appendix G
  - Workforce development survey deployed September 2023-March 2024. Appendix H
  - North Country Hub advisory committee meeting, May 2023
  - Partner organization collaborative meetings, January 2024
  - Adirondack Building Conference contractor round table, March 2023
  - Common Ground Alliance workforce development round table, July 2023
  - One-on-one conversations with partner organizations and small business, Ongoing

American Community Survey Demographic and Labor Market Data

The following aggregate data was used to examine demographic and labor trends.

	Essex County, New York			Franklin County, New York			Hamilton County, New York			Lewis County, New York			Clinton County, New York			Jefferson County, New York			St. Lawrence County, New York		
	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment	Total	Labor Force	Unemployment
Population 16 years and over	32,264	56.5%	5.1%	39,028	52.2%	5.1%	4,530	51.8%	4.9%	21,310	59.2%	5.2%	66,860	56.4%	4.2%	91,991	62.3%	5.2%	89,858	51.6%	5.5%
AGE																					
16 to 19 years	1,544	41.3%	19.6%	2,370	40.5%	8.7%	209	23.9%	0.0%	1,356	40.4%	11.3%	4,275	39.5%	22.6%	5,341	47.9%	18.4%	8,893	42.7%	9.6%
20 to 24 years	1,790	76.6%	14.2%	2,826	56.8%	7.4%	214	82.7%	21.5%	1,474	78.0%	12.7%	6,778	74.3%	11.0%	11,693	83.3%	3.7%	10,072	49.1%	7.7%
25 to 29 years	2,057	73.0%	5.9%	2,962	73.0%	4.8%	181	67.4%	0.0%	1,492	80.7%	1.7%	4,644	79.7%	0.8%	8,632	77.3%	1.9%	5,583	82.9%	1.7%
30 to 34 years	2,209	75.2%	3.1%	3,164	63.7%	11.6%	203	76.4%	1.3%	1,477	83.6%	4.9%	4,702	77.7%	4.5%	8,952	81.5%	15.2%	6,072	72.9%	4.3%
35 to 44 years	4,258	78.6%	4.8%	5,539	73.1%	4.3%	440	75.7%	3.0%	2,980	86.2%	4.6%	9,777	80.3%	2.8%	15,821	80.2%	4.9%	11,536	82.1%	2.1%
45 to 54 years	4,772	87.3%	3.0%	6,390	71.9%	4.2%	623	77.8%	7.0%	3,153	84.2%	3.5%	9,187	74.8%	2.2%	10,946	80.6%	2.2%	12,262	78.2%	10.8%
55 to 59 years	3,130	70.1%	2.8%	3,504	65.7%	4.0%	507	62.7%	7.5%	1,817	67.3%	6.3%	5,338	63.2%	0.0%	6,359	64.7%	2.8%	6,454	64.2%	4.3%
60 to 64 years	3,240	55.9%	5.2%	3,520	45.1%	1.1%	524	59.2%	0.0%	2,332	52.9%	5.1%	6,449	53.3%	2.3%	6,320	51.4%	1.0%	8,315	42.5%	0.0%
65 to 74 years	5,422	21.9%	1.3%	5,244	18.0%	3.7%	1,032	34.1%	0.6%	3,071	22.5%	2.2%	9,390	19.1%	0.9%	10,445	17.5%	3.9%	12,102	13.5%	3.3%
75 years and over	3,842	8.9%	1.2%	3,509	4.7%	0.0%	597	7.2%	11.6%	2,158	4.9%	0.0%	6,320	4.4%	0.0%	7,482	4.8%	0.0%	8,569	2.5%	26.9%
RACE AND HISPANIC OR LATINO ORIGIN																					
White alone	30,000	58.9%	4.9%	32,875	55.3%	4.4%	4,223	50.8%	5.2%	20,403	59.8%	5.0%	59,057	58.3%	4.2%	77,650	61.4%	5.5%	82,825	53.1%	5.6%
Black or African American alone	965	7.3%	11.4%	1,554	10.7%	4.8%	51	56.9%	0.0%	160	31.3%	14.0%	N	N	N	N	N	N	N	N	N
American Indian and Alaska Native alone	85	18.8%	0.0%	2,649	45.0%	8.1%	2	100.0%	0.0%	16	62.5%	0.0%	N	N	N	N	N	N	N	N	N
Asian alone	106	37.7%	0.0%	236	68.6%	9.3%	16	0.0%	-	60	18.3%	18.2%	N	N	N	N	N	N	N	N	N
Native Hawaiian and Other Pacific Islander alone	10	80.0%	0.0%	0	-	-	0	-	-	0	-	-	N	N	N	N	N	N	N	N	N
Some other race alone	432	25.9%	5.4%	923	21.8%	0.0%	48	6.3%	100.0%	150	40.0%	13.3%	N	N	N	N	N	N	N	N	N
Two or more races	666	47.1%	14.0%	791	62.6%	25.3%	190	87.4%	0.0%	521	54.1%	6.5%	N	N	N	N	N	N	N	N	N
Hispanic or Latino origin (of any race)	892	29.3%	10.7%	1,143	14.2%	2.5%	79	16.5%	23.1%	307	70.4%	4.3%	N	N	N	N	N	N	N	N	N
White alone, not Hispanic or Latino	29,633	59.3%	4.9%	32,631	55.5%	4.4%	4,208	50.9%	5.2%	20,240	59.6%	5.1%	58,798	58.2%	4.2%	75,300	60.6%	5.6%	81,942	53.1%	5.7%
Population 20 to 64 years	21,456	74.8%	4.9%	27,905	65.6%	5.1%	2,692	70.6%	5.7%	14,725	76.5%	5.1%	46,875	72.4%	3.5%	68,723	76.5%	4.7%	60,294	67.6%	5.1%
SEX																					
Male	11,451	72.0%	4.3%	15,411	63.3%	5.7%	1,364	75.4%	5.7%	7,573	80.9%	4.6%	24,840	70.2%	3.7%	38,556	83.4%	4.4%	31,263	68.9%	5.6%
Female	10,005	78.1%	5.4%	12,494	68.5%	4.4%	1,328	65.7%	5.7%	7,152	71.9%	5.7%	22,035	74.8%	3.3%	30,167	67.8%	5.0%	29,031	66.1%	4.5%
With own children under 18 years	3,388	84.3%	5.7%	3,789	77.2%	2.9%	351	81.8%	15.3%	2,650	78.9%	3.2%	N	N	N	11,867	61.1%	4.2%	9,206	73.5%	4.4%
With own children under 6 years only	768	68.8%	4.2%	927	68.1%	2.7%	164	79.3%	26.9%	654	72.8%	3.6%	N	N	N	2,769	47.2%	0.0%	1,652	79.8%	0.0%
With own children under 6 years and 6 to 17 years	368	74.5%	0.0%	867	67.6%	6.5%	20	80.0%	56.3%	483	67.1%	7.7%	N	N	N	3,303	44.9%	13.3%	2,570	60.6%	6.5%
With own children 6 to 17 years only	2,252	91.2%	6.8%	1,995	85.6%	1.8%	167	84.4%	0.0%	1,513	85.4%	1.9%	N	N	N	5,795	76.9%	2.4%	4,984	78.0%	5.1%
POVERTY STATUS IN THE PAST 12 MONTHS																					
Below poverty level	2,189	42.3%	17.7%	4,030	39.6%	21.6%	256	23.8%	41.0%	1,740	44.7%	19.9%	6,811	36.9%	21.0%	8,499	47.6%	17.3%	9,261	46.4%	28.3%
At or above the poverty level	17,710	85.4%	4.1%	20,685	79.9%	3.5%	2,418	75.6%	4.5%	12,944	81.0%	4.0%	36,487	84.8%	2.1%	56,838	81.2%	3.6%	44,936	79.1%	2.4%
DISABILITY STATUS																					
With any disability	2,641	47.0%	3.6%	3,782	31.9%	10.3%	449	24.1%	5.6%	1,876	46.4%	15.6%	6,988	40.8%	19.9%	9,422	44.8%	11.3%	9,293	49.7%	7.1%
EDUCATIONAL ATTAINMENT																					
Population 25 to 64 years	19,666	74.7%	4.0%	25,079	66.6%	4.9%	2,478	69.5%	4.1%	13,251	76.3%	4.3%	40,097	72.0%	2.2%	57,030	75.1%	4.9%	50,222	71.3%	4.7%
Less than high school graduate	1,579	34.1%	13.9%	3,151	31.2%	5.9%	366	25.7%	11.7%	1,010	57.7%	8.4%	4,264	36.9%	4.8%	3,268	43.8%	3.3%	4,705	43.3%	3.7%
High school graduate (includes equivalency)	6,401	71.0%	5.1%	8,794	59.2%	8.7%	808	81.3%	5.2%	5,518	71.6%	5.3%	12,823	58.1%	1.3%	19,440	71.5%	5.6%	16,377	66.2%	7.1%
Some college or associate's degree	5,709	80.7%	4.9%	7,710	76.8%	1.6%	721	71.3%	2.9%	4,068	82.2%	3.8%	10,455	82.2%	3.4%	18,672	77.8%	3.2%	16,649	78.0%	5.0%
Bachelor's degree or higher	5,977	83.6%	1.0%	5,424	84.9%	4.5%	583	78.6%	2.2%	2,655	84.4%	2.0%	12,555	89.7%	1.6%	15,650	83.0%	5.7%	12,491	79.5%	1.9%

North Country Census Tracts by DAC designation and percentage of LMI resident population

The following aggregate data was used to compare DAC status and LMI population across the region. While DAC tracts are few, LMI households are many, and distributed across the region.

DAC	Tract	LMI Percent	DAC	Tract	LMI Percent	DAC	Tract	LMI Percent	DAC	Tract	LMI Percent
	36019101100	100		36089491800	46.93		36089492800	38.47		36019100700	31.74
	36089491100	90		36031961200	46.64		36089490500	38.2		36089492100	30.93
	36019101300	73.76	x	36089491600	46.27		36033951100	38.15		36033950900	30.85
	36019101600	70.1		36031961000	46.11		36031960100	37.97		36019101400	30.84
	36089491200	68.29		36049950500	45.67	x	36089491700	37.91		36089490400	30.52
x	36019102200	67.4		36033950300	45.37		36041950400	37.59		36041950300	30.19
	36045061200	66.21		36031961300	45.06	x	36045061500	37.52		36031961100	30.12
x	36045062100	62.5		36019100400	44.72		36049950100	37.52		36031960800	29.97
	36019100900	61.63		36045062500	44.1		36041950500	37.43		36045060200	29.74
	36089490900	59.9		36033950502	44.03		36033951000	37.23		36045061100	29.74
	36045060804	59.83		36089492400	43.58		36089490800	36.99		36089492000	29.49
x	36045061400	58.26		36089490700	43.37		36045061000	36.93		36045060400	29.28
	36049950600	57.33	x	36089490300	43.29		36031960900	36.23		36019100800	28.82
x	36089490100	55.26		36019100100	42.2		36089492300	35.98		36045061800	27.57
x	36089491400	54.01		36045060700	41.8		36049950200	35.98		36019100200	27.44
	36045060803	53.74		36045060100	41.71		36089491300	35.75		36045061900	27.14
	36019102000	52.31		36045060900	41.14		36033951200	35.63		36031960200	26.81
x	36089491500	50.68		36033950400	40.88		36031960300	35.35		36031960598	26.18
x	36019102100	50.54	x	36089492900	40.87		36089490200	35.08		36019100600	25.95
	36033950501	50.5		36033950600	40.3		36049950300	34.86		36033950800	24.86
	36033950700	50		36089492600	40.17		36031960700	34.12		36019101900	24.64
x	36033950200	49.64		36049950400	39.89		36089492700	33.92		36045061600	23.39
x	36045061300	49.41		36019101700	39.88		36045060300	33.88		36019101000	22.61
	36089492500	48.94		36031960498	39.88		36045062200	33.81		36045062400	21.66
	36019100300	48.51		36033950100	39.83		36045060500	33.66		36089491900	0
	36045060600	47.53	x	36033940000	39.55		36045061700	32.86		36045980000	0
	36089490600	47.3		36089491000	38.7		36019101800	32.41		36045990001	0
	36049950700	47.06		36031961400	38.52		36041950100	31.84			

Housing Typologies & Heating Types by County

The following aggregate data was used to examine the types of housing and heating that individuals use across the region.

County	DAC_Designation	Total Housing Units	Occupied housing units	Vacant housing units	1-unit, detached	1-unit, attached	2 units	3 or 4 units	5 to 9 units	10 to 19 units	20 or more units	Mobile home
Clinton	Designated as DAC	8980	7982	998	6135	58	486	451	311	75	347	1117
Clinton	Not Designated as DAC	29484	25161	4323	17896	816	1696	1987	1711	902	903	3573
Essex	Not Designated as DAC	25262	15750	9512	20042	405	848	1053	652	191	544	1505
Franklin	Designated as DAC	3467	3185	282	2276	81	117	69	69	70	15	770
Franklin	Not Designated as DAC	20730	15256	5474	14811	103	1006	1302	855	366	546	1741
Hamilton	Not Designated as DAC	7920	1725	6195	6851	28	49	38	25	30	0	896
Jefferson	Designated as DAC	14544	12681	1863	7075	807	1310	1491	1413	290	1272	886
Jefferson	Not Designated as DAC	48205	33918	14287	28815	2822	2221	4183	1351	942	1554	6305
Lewis	Not Designated as DAC	15501	10672	4829	12103	119	420	559	178	86	235	1780
St. Lawrence	Designated as DAC	12302	10224	2078	8605	135	672	713	394	86	907	790
St. Lawrence	Not Designated as DAC	39478	31175	8303	27998	428	1679	1553	959	523	1736	4581
Total DAC		39293	34072	5221	24091	1081	2585	2724	2187	521	2541	3563
Total Non DAC		186580	133657	52923	128516	4721	18594	10675	5731	3040	5518	20381

County	DAC_Designation	Mobile home	Boat, RV, van, etc.	Built 2020 or later	Built 2010 to 2019	Built 2000 to 2009	Built 1990 to 1999	Built 1980 to 1989	Built 1970 to 1979	Built 1960 to 1969	Built 1950 to 1959	Built 1940 to 1949	Built 1939 or earlier	Owner-occupied	Renter-occupied
Clinton	Designated as DAC	1117	0	4	390	1085	989	1276	1032	714	1036	551	1903	5912	2070
Clinton	Not Designated as DAC	3573	0	46	1613	2694	3982	3660	3719	2156	3611	1560	6443	17067	8094
Essex	Not Designated as DAC	1505	22	50	849	3218	2506	2720	3138	2011	2067	1259	7444	12129	3621
Franklin	Designated as DAC	770	0	64	207	440	583	453	352	267	305	106	690	2444	741
Franklin	Not Designated as DAC	1741	0	40	657	1612	1809	2383	2539	1499	1238	1223	7730	10542	4714
Hamilton	Not Designated as DAC	896	3	0	303	716	859	820	1026	1081	724	587	1804	1465	260
Jefferson	Designated as DAC	886	0	0	1001	951	1506	1649	1329	996	1214	477	5421	5957	6724
Jefferson	Not Designated as DAC	6305	12	59	3714	5658	5746	5826	4250	3647	3058	1761	14486	19599	14319
Lewis	Not Designated as DAC	1780	21	39	820	1432	1918	1931	1703	1042	918	576	5122	8620	2052
St. Lawrence	Designated as DAC	790	0	76	214	567	675	897	1138	1378	1900	1075	4382	6744	3480
St. Lawrence	Not Designated as DAC	4581	21	75	2010	3022	4318	4993	5193	2870	4089	1677	11231	22777	8398
Total DAC		3563	0	144	1812	3043	3753	4275	3851	3355	4455	2209	12396	21057	13015
Total Non DAC		20381	79	309	9966	18352	21138	22333	21568	14306	15705	8643	54260	92199	41458

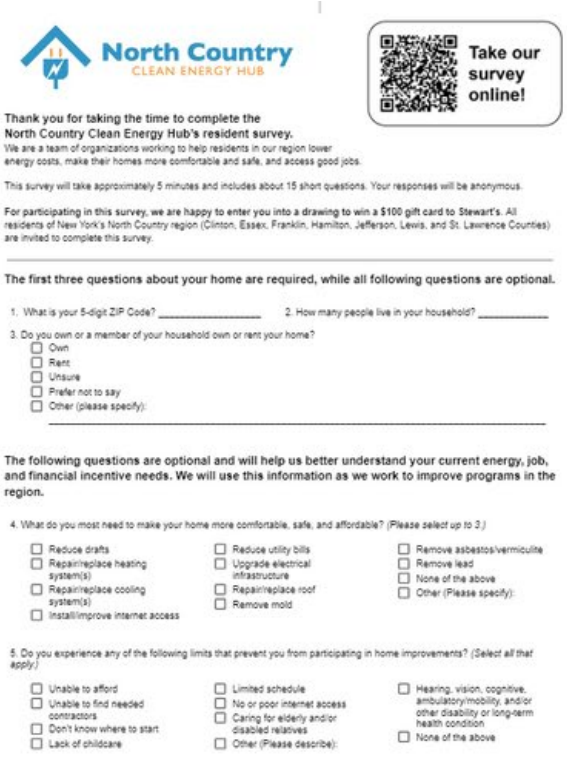
HOUSE HEATING FUEL	Clinton County	Franklin County	Essex County	Hamilton Count	Jefferson County	Lewis County	St. Lawrence County
Utility gas	5098	1263	814	36	17765	1655	13524
Bottled, tank, or LP gas	3336	2340	2324	341	9497	1972	6002
Electricity	11546	2425	2666	101	10906	780	5998
Fuel oil, kerosene, etc.	10741	9314	7748	653	5704	3308	10859
Wood	1796	2430	1924	295	2277	2447	4606
Solar energy	259	3	28	3	0	3	0
No fuel used, coal, or coke, other fuel	455	786	210	28	666	288	917

Empower+ Projects: Low Income Completions, September 2022-July 2023

	Base of Operations	Clinton	Essex	Franklin	Hamilton	Jefferson	Lewis	St. Lawrence

Resident Survey

The resident survey was offered in print and online versions and designed to address the NC Hub's research questions while, optionally, collecting key demographic information, and contact information for individuals interested in entering to win one of 3 Stewart's Shops gift cards offered to survey completers.



North Country
CLEAN ENERGY HUB

Take our survey online!

Thank you for taking the time to complete the North Country Clean Energy Hub's resident survey.
We are a team of organizations working to help residents in our region lower energy costs, make their homes more comfortable and safe, and access good jobs.

This survey will take approximately 5 minutes and includes about 15 short questions. Your responses will be anonymous.

For participating in this survey, we are happy to enter you into a drawing to win a $100 gift card to Stewart's. All residents of New York's North Country region (Clinton, Essex, Franklin, Hamilton, Jefferson, Lewis, and St. Lawrence Counties) are invited to complete this survey.

The first three questions about your home are required, while all following questions are optional.

1. What is your 5-digit ZIP Code? _____ 2. How many people live in your household? _____

3. Do you own or a member of your household own or rent your home?
- ☐ Own
- ☐ Rent
- ☐ Unsure
- ☐ Prefer not to say
- ☐ Other (please specify): _____

The following questions are optional and will help us better understand your current energy, job, and financial incentive needs. We will use this information as we work to improve programs in the region.

4. What do you most need to make your home more comfortable, safe, and affordable? *(Please select up to 3.)*
- ☐ Reduce drafts
- ☐ Repair/replace heating system(s)
- ☐ Repair/replace cooling system(s)
- ☐ Install/improve internet access
- ☐ Reduce utility bills
- ☐ Upgrade electrical infrastructure
- ☐ Repair/replace roof
- ☐ Remove mold
- ☐ Remove asbestos/vermiculite
- ☐ Remove lead
- ☐ None of the above
- ☐ Other (Please specify):

5. Do you experience any of the following limits that prevent you from participating in home improvements? *(Select all that apply.)*
- ☐ Unable to afford
- ☐ Unable to find needed contractors
- ☐ Don't know where to start
- ☐ Lack of childcare
- ☐ Limited schedule
- ☐ No or poor internet access
- ☐ Caring for elderly and/or disabled relatives
- ☐ Other (Please describe):
- ☐ Hearing, vision, cognitive, ambulatory/mobility, and/or other disability or long-term health condition
- ☐ None of the above

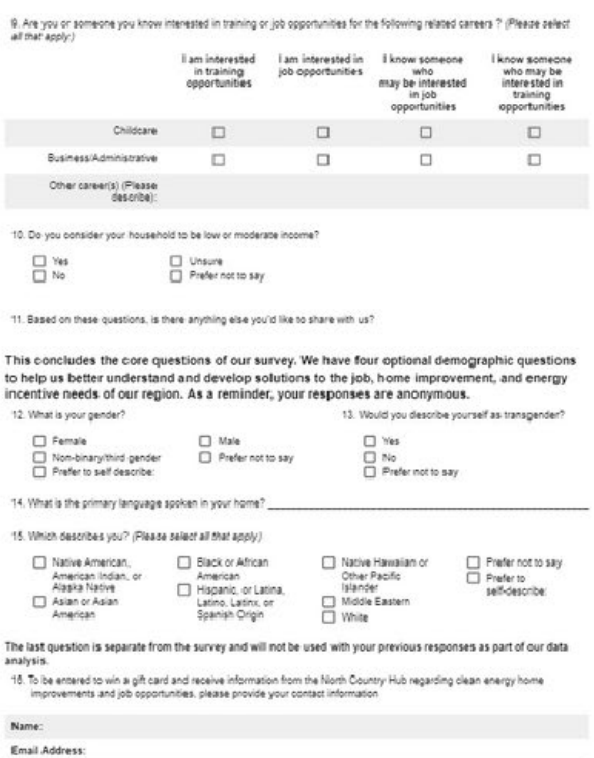
6. Which of the following statements appeals to you most? *(Please select up to 2.)*
- ☐ I want to make my home more comfortable
- ☐ I want to make my home healthier and safer
- ☐ I want to save money on my energy bills
- ☐ I want to reduce my carbon footprint
- ☐ I want to help the environment
- ☐ None of the above

7. Are you familiar with or interested in, or do you know someone who may be interested in, any of the following programs? *(Please select all that apply.)*

	I am familiar	I am interested	I know someone who may be interested
Empower+	☐	☐	☐
Heat pump rebate	☐	☐	☐
Inflation Reduction Act (IRA) tax credits	☐	☐	☐
Solar rebates	☐	☐	☐
Residential home energy audits	☐	☐	☐
National Grid Marketplace	☐	☐	☐
NYSEG Smart Solutions	☐	☐	☐

8. Are you or someone you know interested in training or job opportunities for the following careers? *(Please select all that apply.)*

	I am interested in training opportunities	I am interested in job opportunities	I know someone who may be interested in job opportunities	I know someone who may be interested in training opportunities
Heating, ventilation, and air conditioning (HVAC) installer	☐	☐	☐	☐
Geothermal system installer	☐	☐	☐	☐
Insulation/spray foam/air sealing contractor	☐	☐	☐	☐
General carpenter	☐	☐	☐	☐
Electrician	☐	☐	☐	☐
Electric vehicle technician	☐	☐	☐	☐
Solar and wind technician	☐	☐	☐	☐
Other career(s) (Please describe):				



9. Are you or someone you know interested in training or job opportunities for the following related careers ? *(Please select all that apply.)*

	I am interested in training opportunities	I am interested in job opportunities	I know someone who may be interested in job opportunities	I know someone who may be interested in training opportunities
Childcare	☐	☐	☐	☐
Business/Administrative	☐	☐	☐	☐
Other career(s) (Please describe):				

10. Do you consider your household to be low or moderate income?
- ☐ Yes
- ☐ No
- ☐ Unsure
- ☐ Prefer not to say

11. Based on these questions, is there anything else you'd like to share with us?

This concludes the core questions of our survey. We have four optional demographic questions to help us better understand and develop solutions to the job, home improvement, and energy incentive needs of our region. As a reminder, your responses are anonymous.

12. What is your gender?
- ☐ Female
- ☐ Male
- ☐ Non-binary/third gender
- ☐ Prefer not to say
- ☐ Prefer to self describe:

13. Would you describe yourself as transgender?
- ☐ Yes
- ☐ No
- ☐ Prefer not to say

14. What is the primary language spoken in your home? _____

15. Which describes you? *(Please select all that apply.)*
- ☐ Native American, American Indian, or Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic, or Latina, Latino, Latinx, or Spanish Origin
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Middle Eastern
- ☐ White
- ☐ Prefer not to say
- ☐ Prefer to self-describe:

The last question is separate from the survey and will not be used with your previous responses as part of our data analysis.

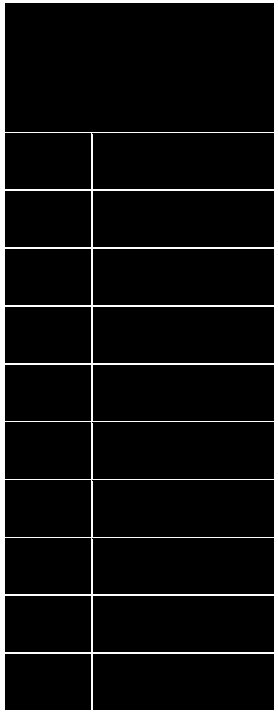
16. To be entered to win a gift card and receive information from the North Country Hub regarding clean energy home improvements and job opportunities, please provide your contact information

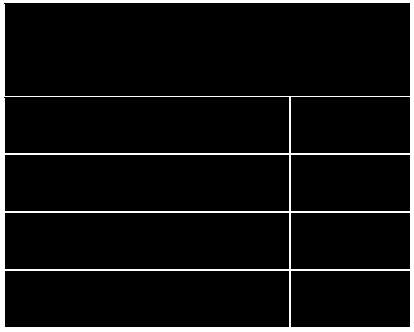
Name:

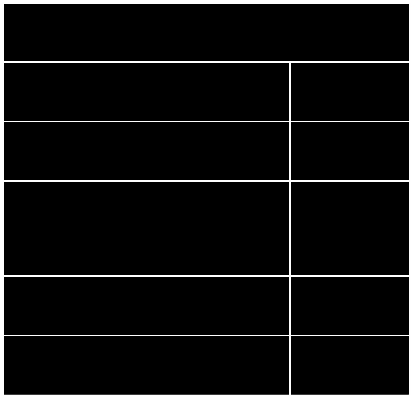
Email Address:

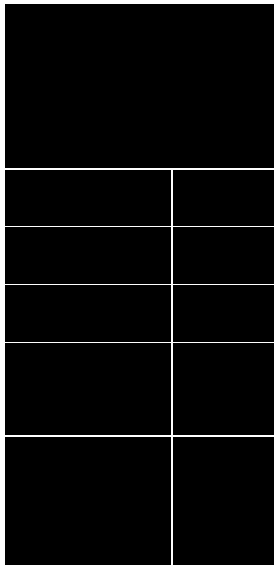
Phone number

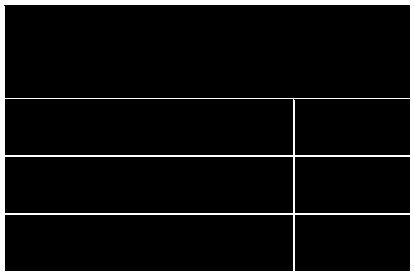
Resident Survey Responses (1/2)

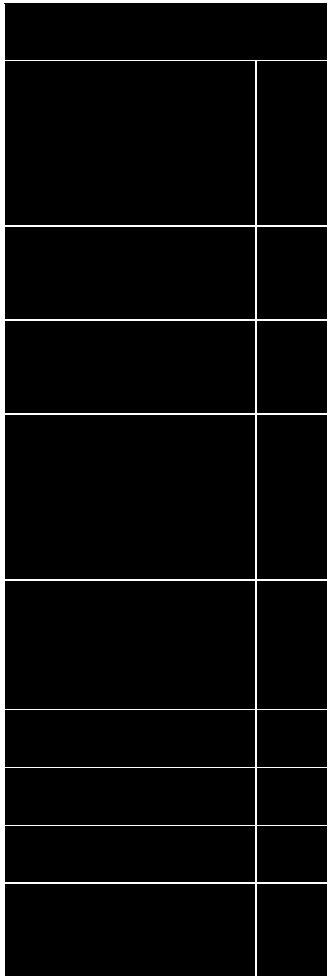


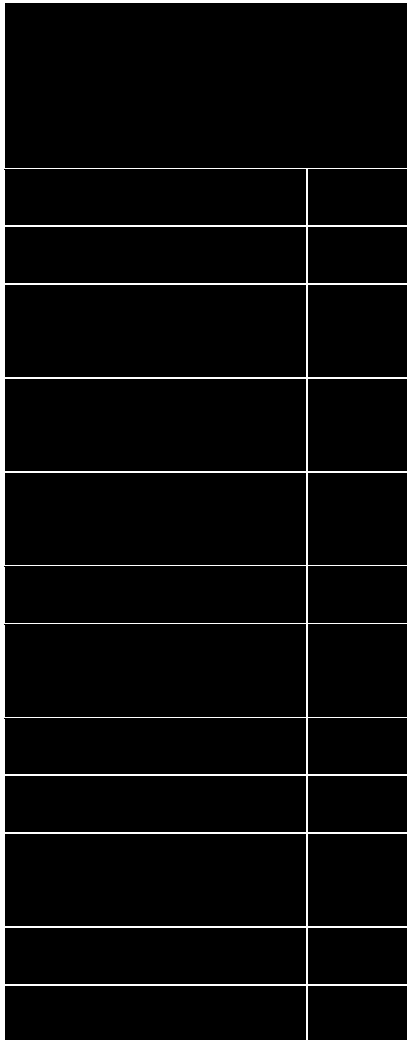


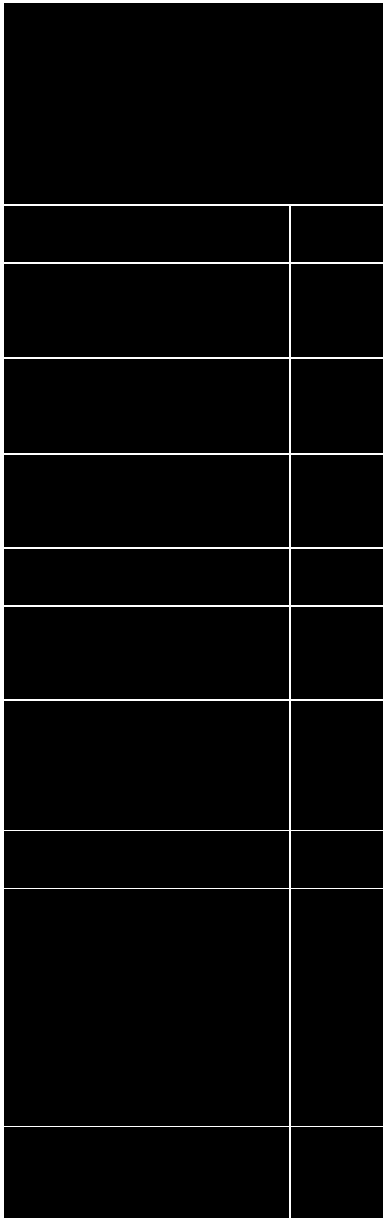


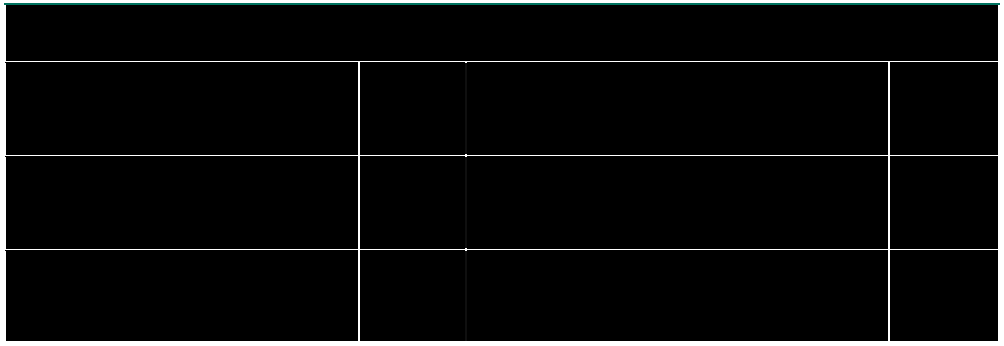




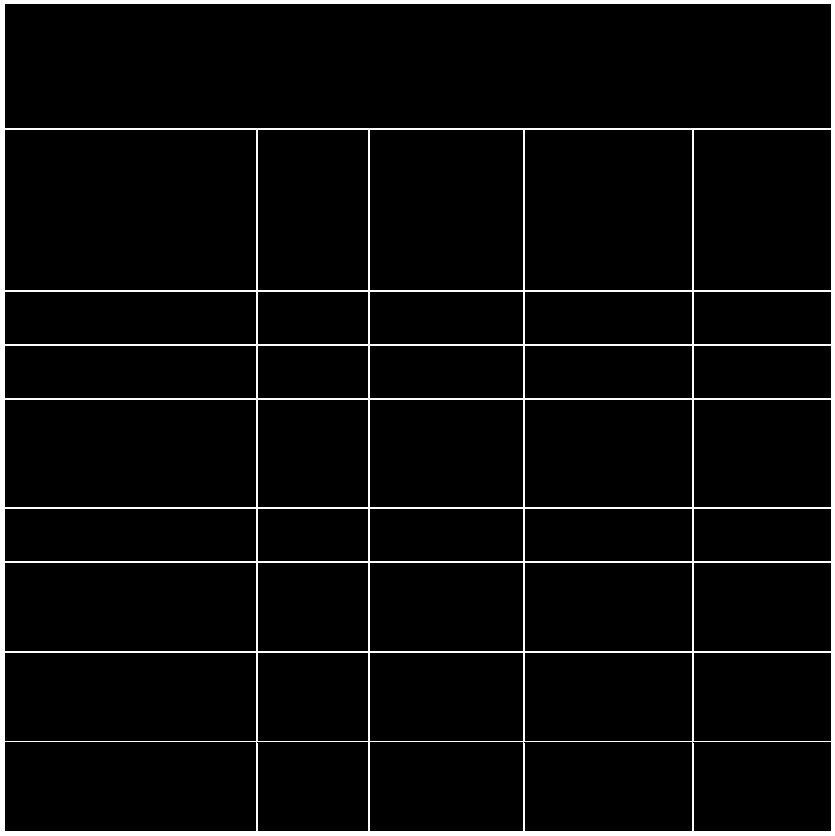


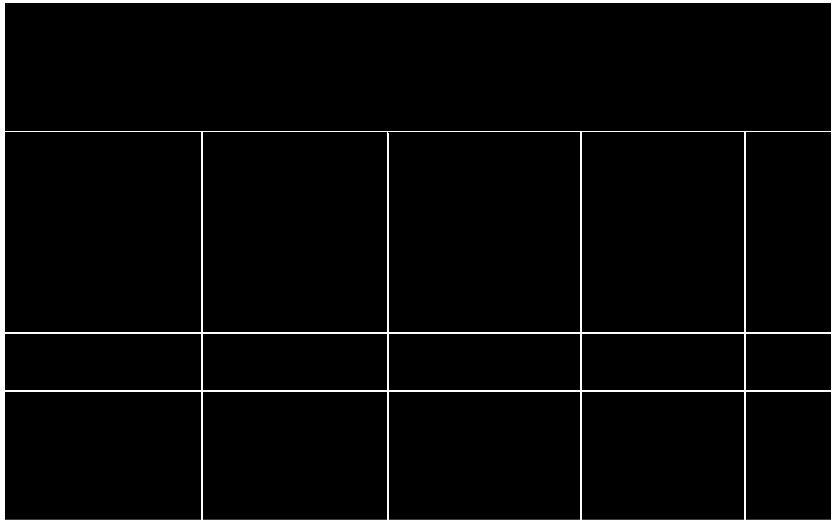


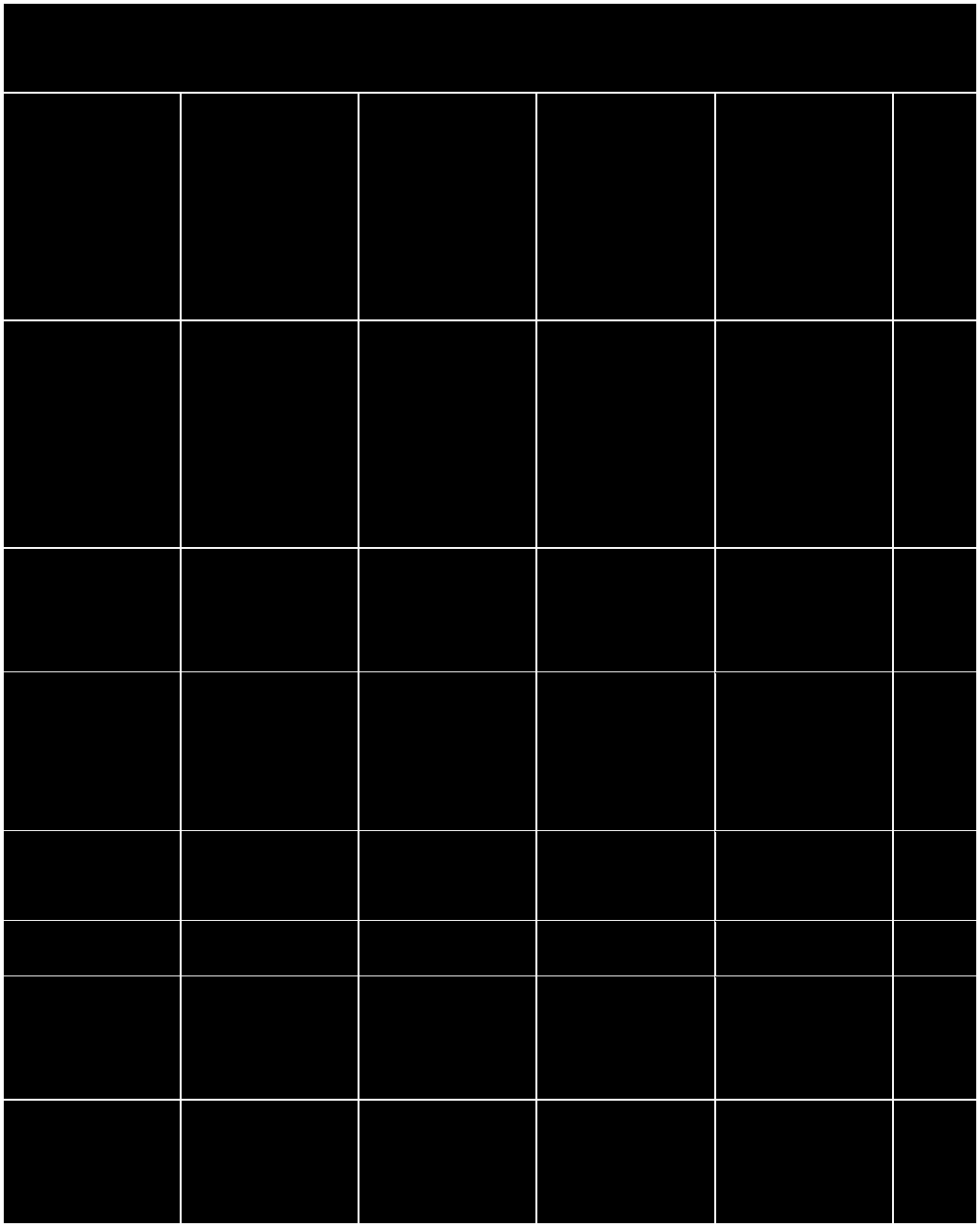




Resident Survey Responses (2/2)







Contractor Survey Questions and Responses

In 2021, ANCA deployed a contractor survey, receiving 56 responses from regional contractors. The data and assumptions drawn from these survey results were used throughout conversations, roundtables, and interviews conducted with contractors and other clean energy employers throughout 2023 and early 2024. The resulting insights were utilized throughout this report.

Which counties do you primarily serve? (All that apply)	
Clinton	11
Essex	25
Franklin	25
Hamilton	10
Jefferson	15
Lewis	10
St. Lawrence	15

What sector do you serve? (All that apply)	
Residential	50
Commercial	26
Industrial	4
Institutional	5
Municipal	8
Other	3

What services do you provide? (All that apply)	
Home performance	26
Energy audits	15
HVAC/plumbing	16
Renewable Energy	7
Carpentry	23
Electrical	17
Masonry	9
Roofing	9
EVs	2
Property Management	5
Other	18

What certifications or credentials do you currently posess?	
BPI	20
ASHRAE	6
HERS	1
LEED	5
NATE	3
NORA	1
ICP	0
AEE	0
OSHA	19
NFI	0
NABCEP	3
None	12
Other	14

Are you interested in pursuing industry relevant certifications or credentials?	
Yes	27
No	26
Maybe	16

Do you currently or have you in the past participated in NYSERDA programs?	
Yes	30
No	25

Would you like to participate in NYSERDA programs?	
Yes	26
No	8
Maybe	20

How often are you contacted by potential customers to perform work under NYSERDA programs?	
10+ times/yr.	17
5-10 times/yr.	3
1-5 times/yr.	4
Never	12

Do you currently or have you in the past participated in utility-sponsored programs?	
Yes	20
No	35

Would you like to participate in utility-sponsored programs?	
Yes	22
No	9
Maybe	24

How can we support your business?	
Certification training	17
Business development	9
Connect with new customers	15
NYSERDA involvement	13
Workforce training	17
Other	8

Workforce Development Survey Questions

A qualitative workforce development survey was developed and deployed to employers, nonprofits, economic development organizations, schools and other organizations, and other key stakeholders. Results were collected, in some cases, via an online form, but most were collected via conversations, roundtables, and other forms.

The North Country Clean Energy Hub (the NC Hub) is a team of organizations working to help residents in our region lower energy costs, make their homes more comfortable and safe, and access good jobs. Learn more about the Regional Clean Energy Hubs and North Country Clean Energy Hub on our website. As part of a barriers analysis, the NC Hub is conducting a survey to collect expert and stakeholder insights into a series of workforce development-related questions.

All questions are optional. Thank you for providing as many insights, in as much detail, as you're able at this time. Please feel free to pass this survey along to others, including a more appropriate completer within your organization, if applicable.

As you complete survey questions, please keep the following key populations and sectors in mind:

- Key career sectors: Clean energy, building and construction trades, wraparound services
- Populations: LMI individuals (low- to moderate-income, earning less than 80% NYS median income), priority populations, residents of designated disadvantaged communities

1. Briefly describe your organization, mission, and service area (either specifically, or generally if you wish for your response to remain anonymous).
2. If your organization provides education or training, please describe the activities, level, credential, and expected outcome.
3. Please share what other workforce development activities, if any, your organization is involved in. This may include wraparound and social service provision, employment services, economic and community development, policy, etc.
4. What prevents the North Country workforce from meeting the existing demand for residential efficiency and energy upgrades, especially for LMI households?
5. What prevents the North Country workforce from meeting the existing demand for small business efficiency and energy upgrades?
6. What assets and gaps exist in the region regarding training and education, employment services, and wraparound services?
7. For what clean energy, building trades, and related sectors do strong career pipelines exist, and for which do you see opportunities to strengthen pipelines?
8. What trends are you observing in these fields in the region? (Or, from beyond the region if there is a helpful lesson to be learned.)
9. What is preventing North Country residents, especially LMI residents, from entering these fields?
10. What engagement or campaign ideas could best reach LMI individuals who may be interested in careers in these fields?
11. Who is engaging in high-quality workforce development work in these fields and/or for LMI residents in the region? (Or, beyond the region if there is a helpful lesson to be learned.)
12. How can New York State (government, agencies, leaders) improve workforce development in these fields?
13. How can the Hub be most helpful in supporting and/or adding capacity to your work?
14. If the Hub could focus efforts and funding on addressing one workforce challenge in the North Country, what do you think it should it be?
15. How would you like to stay engaged with the North Country Regional Clean Energy Hub?
16. Please feel free to share anything else about clean energy, workforce development, and related issues and opportunities.

Regional Assessment & Barriers Analysis

BRONX & BROOKLYN ENERGY HUB

NEW YORK STATE | Regional Clean Energy Hub
Partnering Organization

Bronx & Brooklyn Regional Clean Energy Hub

February 2025

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The Bronx and Brooklyn Regional Clean Energy Hub is made up of Association for Energy Affordability (AEA), Center for NYC Neighborhoods, Solar One, Bronx Neighborhood Housing Services, Bronxworks, The HOPE Program, CAMBA, and NHS Brooklyn.

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I. Executive Summary

The Bronx and Brooklyn Regional Assessment and Barriers Analysis (RABA) examines the conditions that present both key challenges and opportunities to expanding access to clean energy in disadvantaged communities (DACs) in the boroughs of the Bronx and Brooklyn.

The report provides a baseline characterization of the boroughs' demographic, economic, built environment, and civic landscape, as well as current clean energy program participation. It shows that the Bronx and Brooklyn are a densely-populated and -built region with a diverse and growing but highly unequal economy. Low- and moderate-income (LMI) communities and communities of color demonstrate less participation in clean energy upgrades, jobs, and other economic opportunities.

Despite these barriers, the Bronx and Brooklyn's DACs have strong community-based and non-profit organizations with a range of expertise in housing, workforce development, and other direct social services. Using these findings, this report identifies key challenges and opportunities for the Bronx and Brooklyn Clean Energy Hub and NYSERDA to expand access to the clean energy economy, especially in the boroughs' disadvantaged communities.

Key Takeaways

- **Baseline Regional Characterization and Baseline Assessment of Clean Energy Program Participation**

Sociodemographics
The Bronx and Brooklyn are among the most ethnically diverse areas in the state. Nearly all of the Bronx and half of Brooklyn consist of disadvantaged communities, where the median household income is not a living wage. More than half of Bronx residents and over 40% of Brooklyn residents speak a language other than English at home.

Building and Sector Assessment
There is a high proportion of 1-4 unit buildings in both boroughs. Residents face very high housing and energy costs, and low- and moderate-income residents are particularly struggling.

Clean Energy Workforce
The region's green economy is small but growing, driven by strong climate policies and investment. Over 85% the clean energy jobs in the Bronx are within the borough's DACs, while less than half the clean energy jobs in Brooklyn are located within its DACs, nearly half of jobs in the green economy are in building decarbonization, but other sectors, like offshore wind, are projected to grow. White workers are over-represented in green sectors and disproportionately work in higher paying jobs.

Baseline Assessment of Clean Energy Program Participaton
The Bronx received the least amount of NYSERDA funding per person compared to the other boroughs in New York City. NYSERDA funding distribution varies greatly in Brooklyn, with some areas that are not designated DACS receiving more funding. Areas with large foreign born populations in both boroughs receive the least
amount of funding.

Barriers

Information Overload and Misinformation
There is an overwhelming amount of information about clean energy initiatives available from many different sources with different levels of trustworthiness. Misinformation and scams about clean energy home upgrades are spreading, particularly among solar energy programs.

Knowledge Gaps
Knowledge of clean energy opportunities is inequitably distributed, and outreach to some groups is harder than others. People of color, low-income people, renters, and people with lower levels of education know less about clean energy technologies and programs. There are a number of households in both the Bronx and Brooklyn DACs that don't have internet access, and older people are less likely to have or know how to use the internet to find out about opportunities.

Language Resources Needed
The Bronx and Brooklyn Hub spans both a much more diverse and a much larger population than most of the other Hubs in the state, but has not been given commensurate funding to conduct adequate outreach across all of these communities.

Complex Building Stock
NYC has an older residential building stock than the rest of the state, and its building typologies are very unique not only statewide but nationwide, making retrofits more complicated and costly.

Inadequate Incentive Programs
Homes often have structural or health and safety problems that must be addressed before installation of clean energy upgrades, and these fixes are not covered by home retrofit incentive programs like WAP and EmPower+. Programs that do cover repairs, like HomeFix and RESTORE, are vastly underfunded to meet the need for repairs.

Opportunities

Strong Community Networks
There is a community of existing trusted CBOs in the Bronx and Brooklyn that have their own audiences, and can be partners. Many of the Hub organizations also provide other services for clients who could benefit from learning more about existing green economy/clean energy programs.

Wide Interest in Climate Initiatives
Increasing attention to and urgency of the climate crisis are pushing more housing and other organizations to incorporate strong sustainability components into their work. The green economy increasingly touches everything. Even organizations whose main focus is elsewhere understand that it is relevant to them.

Improved Technology and Opportunities
Funding from the Inflation Reduction Act (IRA) and other sources, policies like Local Law 97, and improved technologies are expanding access to home energy upgrades and the green economy.

Recommendations

Launch Marketing Campaigns
The Hub and NYSERDA should launch multilingual campaigns to promote Hubs and available incentives, demystify technologies and programs, and dispel misinformation.

Build Partnerships
The Hub should continue to grow partnerships with CBOs, contractors, and green employers to strengthen its network.

Simplify and Expand Programs
NYSERDA should identify ways to simplify program application processes, develop strategies and programs to help renters and people with home repair needs, and use new funding streams to expand access and outreach.

Learn from the Hub
NYSERDA should learn from the Hub about the unique qualities and diversity of the region and tailor programs and outreach in response.

Support and Expand the Hub
NYSERDA should ensure that the Hub is equipped to help clients navigate the green economy through investment in training and marketing, and provide the Hub with more funding commensurate with the task of helping the region’s vast and diverse DAC communities access the green economy.

II. Baseline Regional Characterization

Baseline Regional Sociodemographics

See Appendix A for a more detailed discussion of the topics covered here.

Table 1. Population, Age, and Sex[1, 2]

		The Bronx	The Bronx DACs	Brooklyn	Brooklyn DACs
Total Population		1,443,229	1,291,161	2,679,620	1,222,191
Age	Under 18	24.7%	25.3%	22.6%	22.9%
	18-64	62.0%	62.6%	63.1%	64.1%
	65+	5.7%	12.4%	6.2%	5.7%
Sex	Male	47.4%	47.4%	48.9%	46.8%
	Female	52.6%	52.6%	52.4%	53.2%

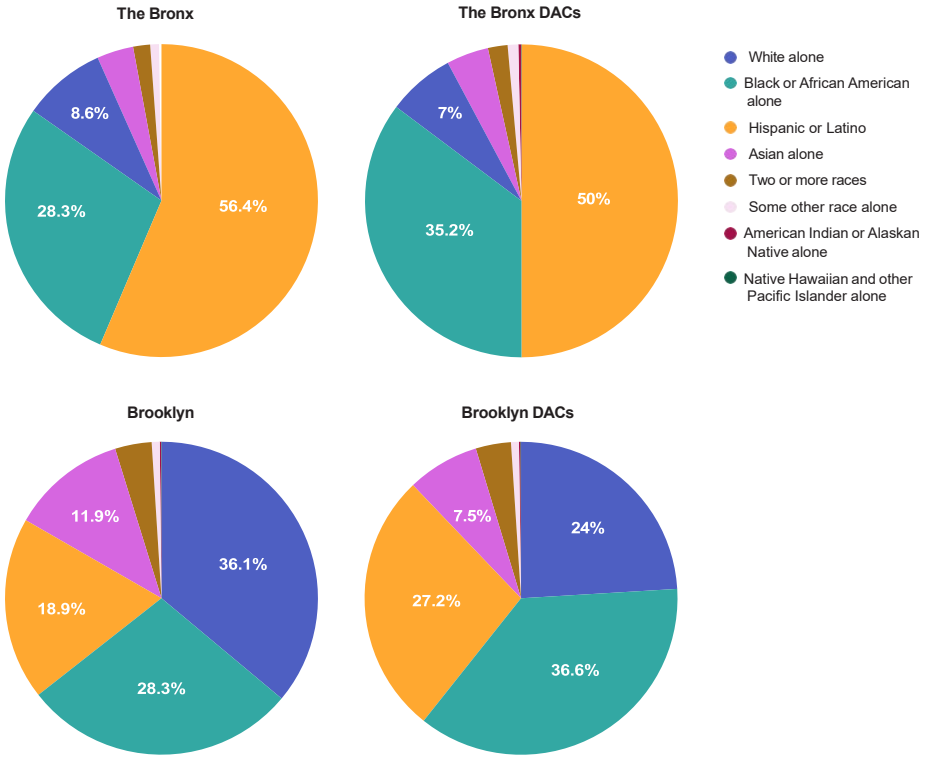
Nearly all (89%) of Bronx residents and nearly half of Brooklyn residents (46%) live in DACs.[3] The Bronx DACs are in most neighborhoods throughout the borough. Brooklyn DACs are concentrated largely in Northeast Brooklyn, including neighborhoods such as Brownsville and East New York.

• Race & Ethnicity

Approximately 18% of Bronx residents are White alone, and only 15% of DAC residents are white, compared to 55% of all NY State residents.[4] There is a large proportion of Hispanic/Latino in the Bronx, as shown in Chart 1. The Bronx DACs racial populations are similar to the borough as a whole. The Bronx is segregated, with many ethnic enclaves, as shown in Map 1. 34% of the Bronx population is foreign-born with more than half being U.S. citizens.

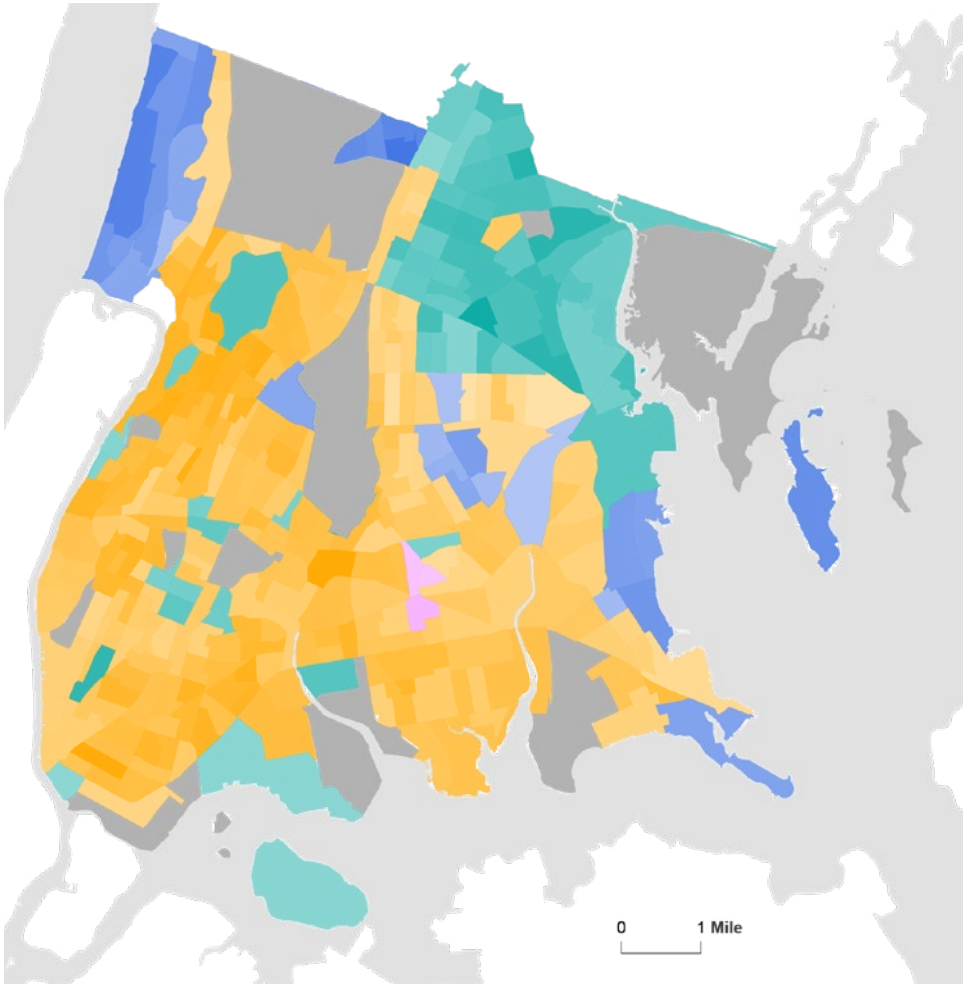
As shown in Chart 2, Hispanic/Latino residents comprise 28% of the DAC population in Brooklyn. Nearly 40% of the DAC population is Black, and nearly 8% is Asian. As shown in Map 2, Brooklyn's communities of color are predominantly located in the central and Northeast. Black and Hispanic/Latino residents are the predominant race/ethnicity in most neighborhoods of color in Brooklyn. 35% of Brooklyn's population is foreign-born and more than half are U.S. citizens. 60% of the foreign-born population in Brooklyn come from Latin America, with more than half coming from the Caribbean. There are significant concentrations of foreign-born Brooklyn residents outside of DACs.

Charts 1-4. Race & Ethnicity, The Bronx and Brooklyn[10]

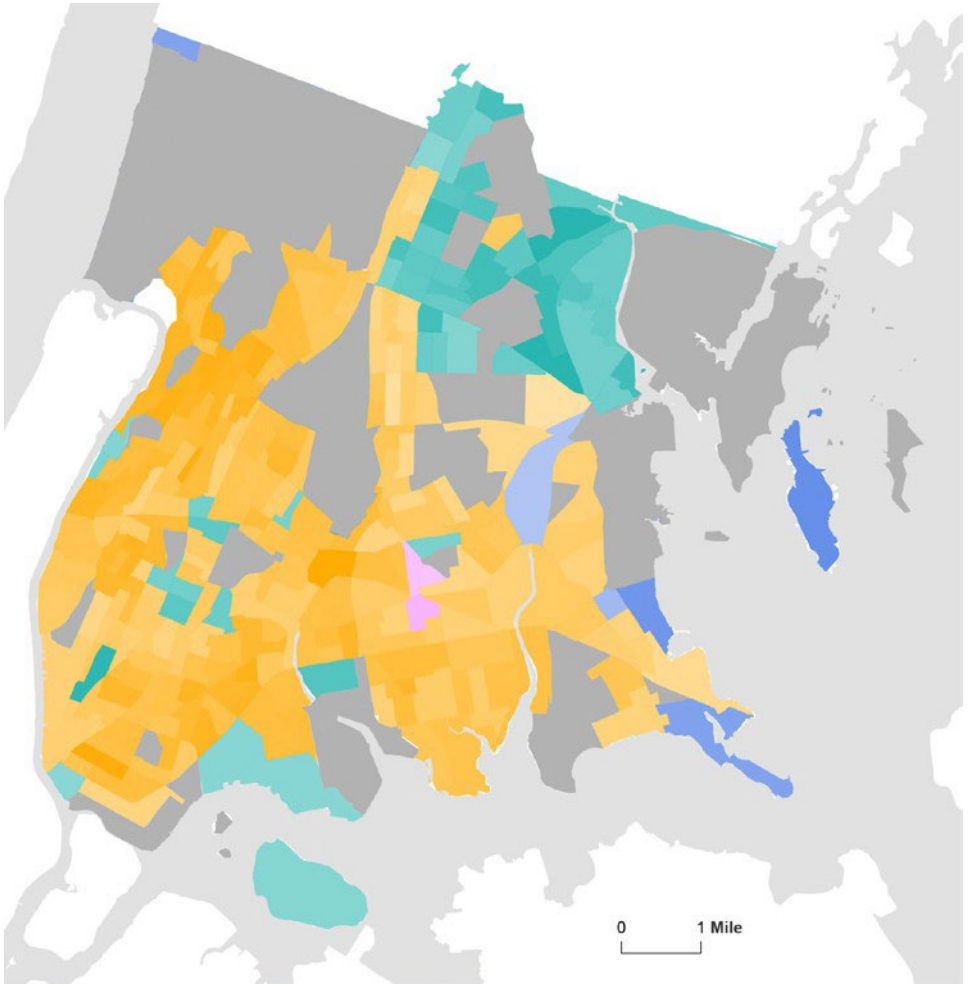


Map 1. Predominant Race by Census Tract, the Bronx[8]

The Bronx



The Bronx DACs



White alone, not Hispanic or Latino

Hispanic or Latino

Black or African American alone, not Hispanic or Latino

Asian alone, not Hispanic or Latino

American Indian or Alaskan Native alone, not Hispanic or Latino

Two or more races, not Hispanic or Latino

Native Hawaiian and other Pacific Islander alone, not Hispanic or Latino

Some other race, not Hispanic or Latino

Strength of predominance

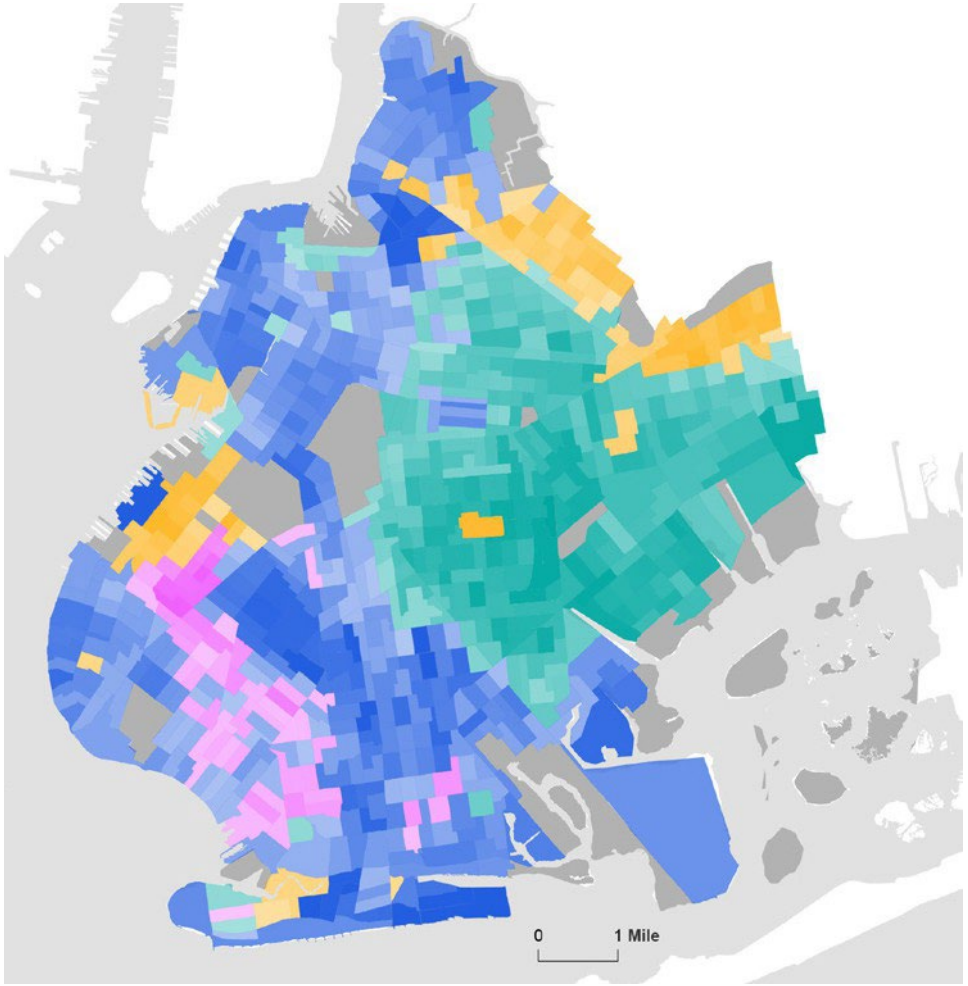
0-13

13-97

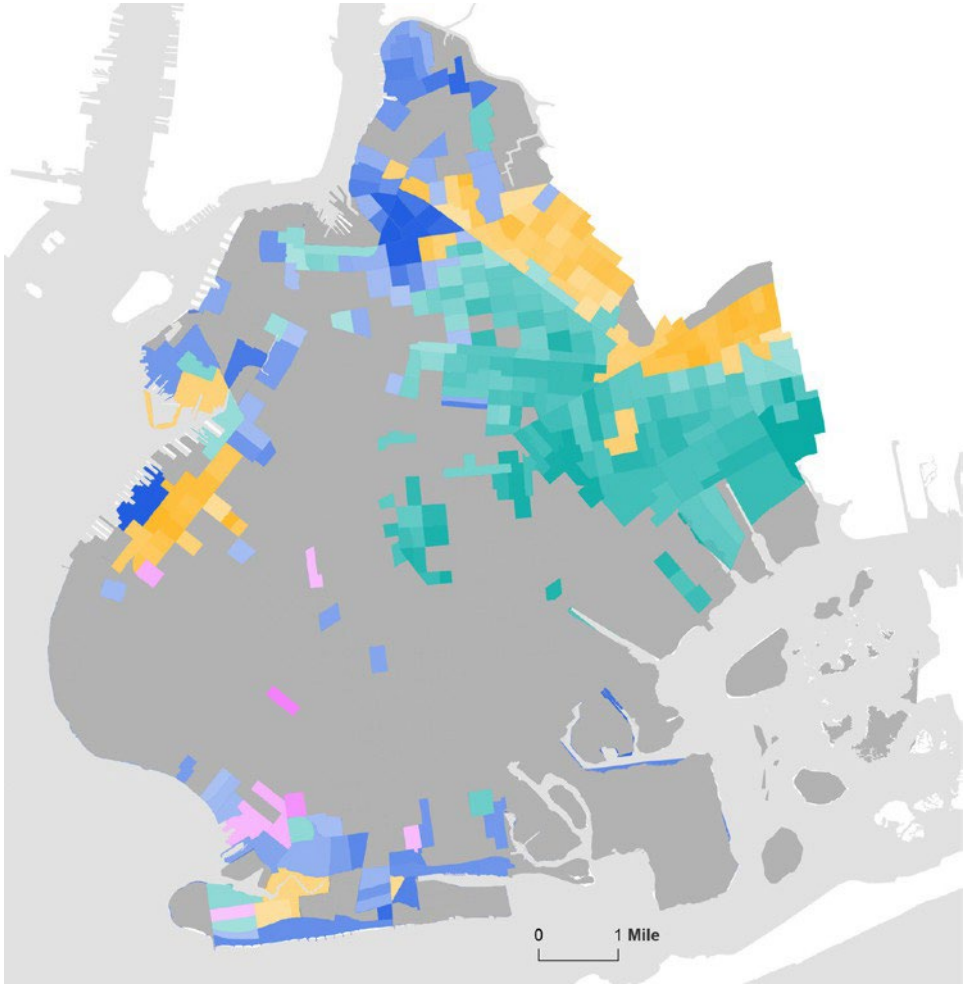
97-100

Map 2. Predominant Race by Census Tract, Brooklyn[9]

Brooklyn



Brooklyn DACs



White alone, not Hispanic or Latino

Hispanic or Latino

Black or African American alone, not Hispanic or Latino

Asian alone, not Hispanic or Latino

American Indian or Alaskan Native alone, not Hispanic or Latino

Two or more races, not Hispanic or Latino

Native Hawaiian and other Pacific Islander alone, not Hispanic or Latino

Some other race, not Hispanic or Latino

Strength of predominance

0-13

13-97

97-100

• Language

More than half of Bronx residents and residents in the DACs speak a language other than English at home, compared to 30% of all NY State residents.[5] In the Bronx DACs, almost half the population speaks Spanish at home. Nearly 20% of DACs' total population are limited-English speaking, with a majority being Spanish language households.[6]

Over 40% of Brooklyn DAC residents and Brooklyn overall, speak a language other than English at home, compared to 30% of NYS residents. Top languages spoken in Brooklyn other than English include Spanish, German or West Germanic Languages, Russian, Polish, or other Slavic Languages, and Chinese. There is also a significant population of residents that speak French Haitian (Kreyol) or Cajun.[7]

Table 2. Household Language and Limited English Proficiency by Household[11]

Household Language	The Bronx	The Bronx DACs	Brooklyn	Brooklyn DACs	NYC	NYS
Spanish	46.80%	49.80%	14.60%	21.60%	23.30%	14.80%
French, Haitian, Or Cajun	1.60%	1.60%	3.50%	2.90%	2.30%	1.50%
West Germanic or Slavic Languages	0.50%	0.40%	10.40%	7.90%	5.10%	3.50%
Other Indo-European Languages	3.20%	2.90%	3.90%	2.80%	5.50%	3.90%
Asian And Pacific Island Languages	1.40%	1.10%	8.40%	4.90%	8.80%	5.10%
Other Languages	4.60%	4.70%	3.30%	2.40%	2.90%	1.80%

• Income

The Median Household Income (MHI) for the Bronx and Brooklyn is not a living wage. The Bronx MHI is not a living wage, based on the University of Washington's Self-Sufficiency Standard (SSS), which measures the income families need to meet an adequate standard of living around the country. The Bronx MHI in 2022 was $47,036, which is just 55% of the SSS for a family of two adults and two children, meaning that a family of that size earning the median income was $38,201 short of meeting its basic needs.[12] Median household income is lower for BIPOC people than white people. The MHI for Brooklyn as a whole is $74,692. Brooklyn DACs MHI in 2022 was $58,712, or 68% of the borough's SSS,[13] meaning that median earners cannot meet their basic needs. Brooklyn DACs residents MHI is nearly $16,000 less than the borough-wide MHI.

Table 3. Median Household Income by Race and Ethnicity[14]

	The Bronx	The Bronx DACs	Brooklyn	Brooklyn DACs	NYC	NYS
Race						
White Alone Householder	$55,583	$45,017	$95,280	$82,916	$102,992	$90,866
Black or African American Alone Householder	$47,762	$45,483	$59,090	$49,900	$58,011	$58,805
American Indian and Alaska Native Alone Householder	$46,568	$44,825	$57,771	$58,503	$59,928	$59,483
Asian Alone Householder	$70,275	$66,115	$82,647	$75,052	$84,031	$91,254
Native Hawaiian and Other Pacific Islander Alone Householder	$35,433	$35,426	*	$51,840	$59,792	$57,817
Some Other Race Alone Householder	$39,923	$38,557	$50,030	$43,341	$50,448	$55,421
Two or More Races Householder	$49,348	$47,725	$73,626	$61,407	$70,068	$74,254
Ethnicity						
Hispanic or Latino Householder	$41,220	$39,858	$55,916	$47,870	$53,670	$61,135
White Alone Householder, Not Hispanic or Latino	$75,289	$61,092	$99,789	$91,218	$110,890	$92,218
Overall MHI	$47,036	$43,799	$74,692	$58,712	$76,607	$81,386

** Not enough responses to make estimate for entire Brooklyn population*

• Education & Employment

The majority of people in the Bronx and Brooklyn have a high school education or more. However, educational attainment is lower in the Bronx and Brooklyn than in the rest of NYC and the state, especially in DACs. The Bronx labor force participation rate is 58% both in DACs and in the entire borough. This is slightly less than city and state rates, both around 63%. The Bronx unemployment rate is 6.5%, and 6.8% in DACs. This is higher than the state's 3.9% unemployment

rate.[15] Brooklyn's labor force participation rate is nearly 62% in DACs and 64% in the borough as a whole, which is comparable to NYC and NYS labor participation rates. Unemployment is significantly higher in DACs (5.3%) than it is borough-wide (4.6%), city-wide (4.8%), and state-wide (3.9%).[16]

Table 4. Educational Attainment Level for Persons Aged 25+[17]

Educational Attainment Level (Ages 25+)	The Bronx	The Bronx DACs	Brooklyn	Brooklyn DACs	NYC	NYS
Less than High School	25.50%	27.20%	16.20%	19.20%	16.70%	12.40%
High School Graduate or More (Includes Equivalency)	74.50%	72.80%	83.80%	80.80%	83.30%	87.60%

• Transportation

Just 25% of workers residing in the Bronx, and 37% of workers residing in Brooklyn, have jobs in the boroughs they reside in.[18] Average commute time in the Bronx is 45 minutes, 12 minutes longer than the NYS average. 58% of DAC residents and 56% of all Bronx residents take public transit to work, compared to 48% of NYC residents and 24% of NYS residents. 60% of Bronx households, and 63% of the borough's DAC households, do not have access to a car. The average commute time in Brooklyn is 43 minutes both in and outside of DACs, longer than both the NYC and NYS averages. More than half of Brooklyn residents both in and outside of DACs use public transportation to get to work. Nearly 64% of households in Brooklyn DACs don't have access to a car.[19]

Building and Sector Assessment

See Appendix B for a more detailed discussion of the topics covered here.

Table 5 shows buildings by land use, including small and large residential, small and large commercial, mixed use, and industrial. The Hub is focusing on small (1-4 unit) residential buildings, which are the focus of this section.

Table 5. Land Use Overview[23]

Buildings by Land Use	# of Buildings, The Bronx	% of Total Buildings, The Bronx	# of Buildings, Brooklyn	% of Total Buildings, Brooklyn
Residential	88,250	84%	281,461	84.60%
1-4 Unit	**77,273**	**73.5%**	**253,941**	**76.3%**
5+ Units	10,934	10.4%	27,473	8.3%
0 Units or Blank	43	0%	47	0%
Commercial*	3,213	3.1%	6,321	1.9%
Small (>25,000 ft²)	2,871	2.7%	5,536	1.7%
Large (<25,000 ft²)	262	0.2%	617	0.2%
0 Commercial sq. ft. or Blank	80	0.10%	168	0.1%
Mixed use (residential + commercial)*	5,327	5.1%	27,937	8.4%
1-4 Unit (residential)	**2,438**	**2.3%**	**19,870**	**6%**
5+ Units (residential)	2,634	2.5%	6,844	2.1%
0 Units or Blank	255	0.2%	1,223	0.4%
Industrial	1,519	1.4%	4,928	1.5%
All Other Land Use Types	6,774	6.4%	12,121	3.6%
Total	105,083	--	332,768	--

• Building Stock

Land use in the Bronx and Brooklyn is mostly residential. The majority of residential buildings in these boroughs have 1-4 units, over 70% of the boroughs' total residential units. In the Bronx DACs, 1-4 unit buildings make up 69% of residential units, compared to 16% of units in NYC.[20] In the Bronx as a whole, 72% of 1-4-unit buildings were built between 1900 and 1959, while 69% of buildings in DACs were built in that same time frame.

In Brooklyn DACs, 65% of residential units are in 1-4 unit buildings, compared to 16% of units citywide.[21] Buildings with 5+ units make up around 13% of buildings in Brooklyn overall and 8% in Brooklyn DACs. In Brooklyn as a whole, 49% of 1-4 residential unit buildings were built between 1900-1929 (Chart 6). A further 28% of buildings were built between 1930-1959, indicating an older housing stock than other boroughs such as Staten Island.[22]

• Household Energy

The average LMI resident in The Bronx and Brooklyn is energy cost-burdened, spending 6% and 5% of their income on energy, respectively. The average LMI owner of a 1-4-unit home in the Bronx spends even more, 12%. The average LMI owner of a 1-4-unit home in Brooklyn spends 6%. Average annual energy cost in the Bronx is $2,224, slightly less than that of NYS. Owners of 1-4-unit homes are particularly burdened by high energy costs, with an average annual energy cost of $5,356, more than double the state average. At $2,099, Brooklyn's average annual energy cost is nearly $300 less than that of NYS.[26]

In the Bronx, most owner-occupied, (about 63%), and nearly half of renter-occupied housing (about 46%) units use utility gas for heating. Only 20% of owner-occupied units and 29% of renter-occupied units use fuel oil, and 9% of owner-occupied units and 15% of renter-occupied units use electricity for heating. Around 71% of renter-occupied housing units and 81% of owner-occupied housing units in Brooklyn use utility gas for heating.[27] Slightly under 3% of owner-occupied and renter-occupied units use fuel oil. Approximately 7% of owner-occupied units and 13% of renter-occupied units use electricity for heating in Brooklyn.[28]

Chart 5. Age of 1-4 Unit Buildings, the Bronx[24]

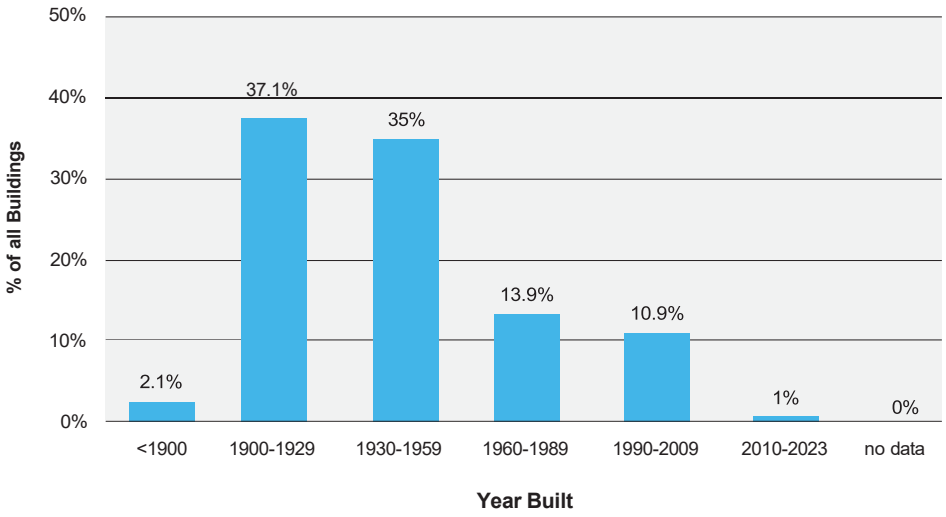


Chart 6. Age of 1-4 Unit Buildings, Brooklyn[25]

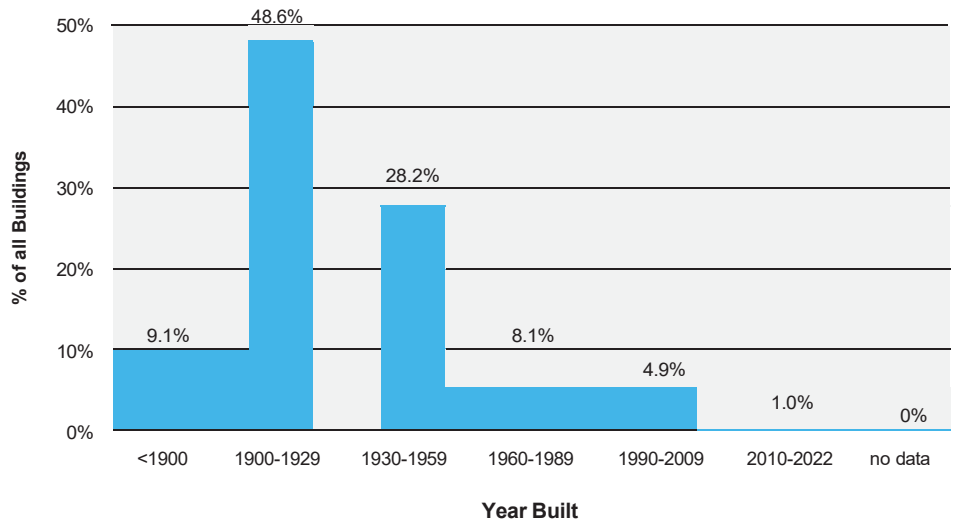


Chart 7. Average Household Annual Energy Costs, The Bronx[29]

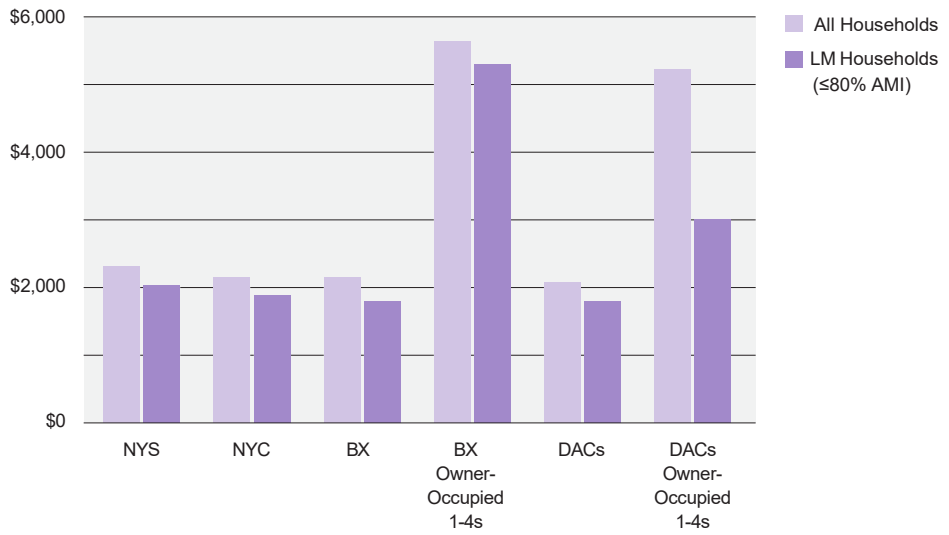
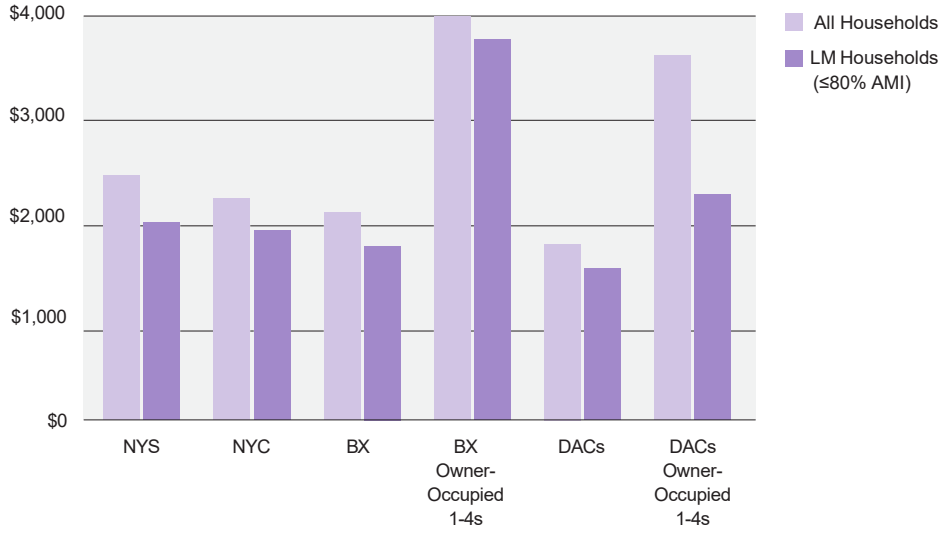


Chart 8. Average Household Annual Energy Costs, Brooklyn[30]



Housing Vacancy and Tenure

NYC is in the midst of a housing crisis: housing costs have risen more quickly than incomes over the last decade, and the majority of households citywide are rent-burdened.[31] Low vacancy rates are a primary indicator of this crisis. According to 2022 ACS estimates, the most recent year for which borough-level vacancy data is available, the vacancy rate in the Bronx was 1.86%. Brooklyn was 2.55%. More recent citywide data suggests that housing is even more scarce today: the 2023 Housing and Vacancy Survey shows that the net vacancy rate for rental units has decreased dramatically since 2021 from 4.5% to 1.4%. Among lower-cost units, vacancy rates are even lower.

The Bronx, like the rest of NYC, is majority renter. This is especially true in DACs, where 81% of occupied units are home to renters, compared to 41% in NYS. A larger percentage of renters in DACs occupy buildings that are 5+ units: nearly 68%. In DACs, only 10% of Hispanic residents own their home, compared to 37% of non-Hispanic white residents and 40% of Asian residents. The homeownership rate in Brooklyn (28%) is slightly less than NYC's homeownership rate overall (29.9%). There is only a 19% homeownership rate in Brooklyn DACs. Within DACs, Asian households makeup a large percentage of homeowners, followed by white and Black households.

Regional Clean Energy Workforce

The Green Economy in the Bronx and Brooklyn continues to grow. **NYSERDA estimates that in 2022, The Bronx had 3,468 clean energy jobs and 9,153 in Brooklyn.**[33] In the Bronx, a majority of these jobs are located within the borough's DACs. The Bronx had 3,007 clean energy jobs in its DACs—over 85%. Less than half of the clean energy jobs in Brooklyn were in DACs (4,258).[34] The City of New York estimates that the city as a whole had 133,000 green economy jobs across 21 sectors in 2021, representing 3% of all jobs citywide and $16 billion in earnings.[35] Nearly half of these jobs are in building decarbonization (49% of green economy jobs), among which roughly half are in HVAC and renewable heating and cooling, nearly a third are in ENERGY STAR, efficient lighting and reduced water consumption products, 11% are in green building management and operations, and 6% are in advancing materials and insulation.

Approximately 9% of green economy jobs are in energy, of which 37% are in solar, 20% are in hydropower, and 16% are in on-shore wind, and the remainder are in a range of other sub-sectors.[36] The citywide clean energy workforce landscape aligns with statewide trends; building decarbonization and energy efficiency represented nearly three-quarters of all clean energy jobs in the state in 2022.[37]

Green economy jobs have grown approximately 5% per year between 2016 and 2021, driven primarily by 1) local climate and energy policy, including new buildings and energy regulations and targets, 2) federal and other government investment in resiliency and infrastructure projects and green technologies, 3) consumer market demand for sustainable products, and 4) increased private investment in clean energy technology. As these trends continue, the City projects ongoing rapid growth in the green economy to 400,000 jobs (or 7% of all jobs) by 2040, primarily in buildings (an estimated 85,000 jobs) and finance and consulting (an estimated 80,000 jobs). The majority of these jobs will be in existing professions adopting sustainable practices and an estimated 30% will be in new jobs. (Other estimates for job growth include the State's Just Transition Working Group's projection that the city will see an increase of 43,000 green jobs by 2030, and Green Economy Network's projection of 90,000 new green jobs between 2021 and 2030.)

Offshore wind will be an important green industry for Brooklyn. In the coming years. Empire Wind will create an offshore wind hub at South Brooklyn's Marine Terminal, which recently broke ground in June 2024. It is estimated that more than 1,000 union jobs in Brooklyn will result from this project.[38]

The demographic composition of the green workforce skews white: in 2020, 72% of green economy workers statewide identified as white, 15% as Hispanic/Latinx, and 8% as Black.[39] White workers are overrepresented in green sectors as compared to the overall workforce, and disproportionately work in higher-paying jobs. Black, Latinx, and Asian workers are overrepresented in lower-paying jobs, including building trades jobs that do not require a college degree.

Women are also underrepresented in the green economy, particularly in the building trades, where less than 2% of jobs are held by women, as well as in design and engineering jobs. This is consistent with statewide clean energy workforce demographic disparities.[40]

Some buildings trade jobs that are expected to see growth, such as roofers, solar installers, maintenance/repair workers, and construction workers see slightly lower median annual salaries ($53,300-$52,500). The green economy offers lower barriers to entry and better salaries than many other high-demand fields. The majority of the annual projected job openings in clean energy occupations typically require no more than a high school diploma or equivalent. Green jobs that are open to people without a college degree generally pay better and are more secure than other jobs open to people with similar levels of education. For example, many building trades jobs that do not require a college degree have average salaries above $73,000.[42]

The City's Green Economy Action Plan will prioritize education, training, and outreach for those occupations in the green economy that pay living wages of $63,000 per year (in today's dollars) or more. Many of these jobs do not require significant new skills training or education specific to green technologies or policies. Approximately a third of projected job openings in clean energy require a bachelor's degree, like engineers, managers, and sales representatives.[43]

Despite many green jobs not requiring advanced degrees, some require technical training. Expanding training programs while lowering barriers to participation will be key to helping green businesses find workers and underemployed workers get jobs, while enabling the industry to diversify. There are a variety of existing workforce programs offering training in numerous sectors of the green economy to Bronx and Brooklyn residents. Of particular note are programs at CUNY's Bronx Community College, Lehman College (Bronx), City Tech (Brooklyn), and Kingsborough Community College (Brooklyn). These campuses are investing in offshore wind and other green economy training programs.[44] Programs include training related to green

energy work such as welding for offshore wind infrastructure, electric car repair training, solar energy harvesting, and biodegradable batteries.

Important policy changes are underway at all levels of government that will significantly expand the green economy. Notably, the federal Inflation Reduction Act will add an estimated $34 billion to NYS's green economy through 2030 and expand the market for home and business building retrofits.[45] Compliance with Local Law 97 is projected to create more than 40,000 green jobs and to expand the annual building retrofit market to $20 billion, more than 13 times larger than its size in 2021.[46] Finally, the State's upcoming Cap and Invest Program is projected to fund between $4 to 8 billion in statewide decarbonization investments annually and create over 28,000 green jobs by 2030.[47]

Regional Partners

Only a small selection of key partners are listed here. Find a full list of potential partners in Appendix C. Neither the following list nor Appendix C are intended to be exhaustive.

Civic Institutions and Community Centers: Secular gathering places like schools, hospitals, community centers, and libraries that people are already connected to and frequent in their day to day lives.

Hub collaboration:
Outreach partners. Potential hosts of energy education and workforce programs. Certain community institutions, particularly CUNY, offer workforce and other sustainability programming that the Hub can plug into.

Key partners:
Brooklyn Public Library • New York Public Library • CUNY (esp. City Tech, Lehman College Bronx and Kingsborough Community Colleges) • NYC DOE schools • NYC Parks• Senior centers • Youth Recreation Centers • NYCHA Community Centers • YMCA

Religious Congregations: Mosques, churches, temples, synagogues, etc. Regular meeting places for particular cultural communities that may be hard to reach in other ways. Congregants trust their congregations to give them accurate information. Some congregations are connected to social services programs.

Hub collaboration:
Outreach partners. Potential hosts of energy education and workforce programs. Congregations may also be interested in assistance with retrofitting their physical spaces.

Key partners:
Green Faith • Catholic Charity Network

Cultural or Immigrant Organizations: Secular groups that provide services or programming to benefit a particular ethnic/cultural group or work primarily with immigrants.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education and workforce programs. These organizations are often skilled at working with non-English speakers and people from different cultural backgrounds, and can help the Hub reach and tailor its messaging to the communities they serve.

Key partners:
AYAB Alliance • Make the Road • Haitian American Community Coalition • New Immigrant Community Empowerment (NICE) • The YMCA's New Americans Initiative

Housing Organizations: Organizations providing or helping people find or stay in affordable housing, or organizations working to repair or retrofit housing.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education programs. Certain housing organizations are program administrators for important home repair or retrofit programs, like HomeFix and WAP. The Hub can work with individual residents to navigate the landscape of existing housing programs and organizations and harmonize their offerings. The Hub can also help organizations build their own capabilities interfacing with home retrofit programs.

Key partners:
Bronx NHS • NHS Brooklyn • Neighborhood Restore •CNYCN (HomeFix) • AEA (WAP) • CAMBA

Social Services Organizations: Organizations providing a range of services to disadvantaged communities including food, legal and administrative assistance, afterschool programs, etc. These groups often offer wide ranging services that can also encompass housing and workforce related programs.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education and workforce programs. The Hub can turn to these organizations when clients need wraparound services that are outside of its scope.

Key partners:
Food pantries • NYC Hospitals • Bronxworks • CAMBA

Environmental Organizations: Organizations working on environmental or sustainability issues. Includes resiliency or disaster preparedness organizations.

Hub collaboration:
Outreach partners. Pre-existing community solar, home retrofit, and green workforce programs that the Hub can plug into. Technical expertise on home retrofits. Potential to partner or collaborate on future energy education programs and community campaigns.

Key partners:
Solar One • Urban Green Council • RETI Center • South Bronx Unite • Food & Water Watch • Sunset Park Redevelopment Committee

Workforce Development Organizations: A mix of nonprofit and for profit organizations offering green workforce training, general remedial education, and English language learning programs. Some organizations

focus on particular communities, such as youth, NYCHA residents, justice involved people, or immigrants.

Hub collaboration:
Client referrals. Preexisting green workforce programs that the Hub can plug into. Potential to partner or collaborate on future workforce programs. English learning and remedial education programs are essential wraparound services that many clients may need before being able to work in the green economy.

Key partners:
NYC Employment and Training Coalition • Green Economy Network • HOPE Program • Green City Force • Soulful Synergy • Solar One • Willdan • TMI Waterfront • La Colmena • Nontraditional Employment for Women (NEW) • Interstate Renewable Energy Council (IREC) • Energy Economic Development Corporation • AEA • Bronxworks

Economic Development Organizations: Organizations that promote business interests and economic growth. Some organizations are very involved in promoting the growth of the green economy, especially offshore wind, and green job training programs.

Hub collaboration:
Outreach partner for work involving small businesses and green employers.

Key partners:
NYC EDC • Central Brooklyn Economic Development Corporation • Brooklyn Chamber of Commerce • Bronx Chamber of Commerce • South Bronx Economic Development Corporation • BIDs

Contractors: Companies that install green home upgrades like solar panels, heat pumps, weatherization, etc. Other types of contractors, like electricians and plumbers, are also important in home repairs and retrofits.

Hub collaboration:
Client referrals. Having a strong network of trusted contractors will streamline the home retrofit process for clients. Contractors are also a potential green employer. Potential to educate contractors on low income programs and new technologies.

Key partners:
MWBEs and other companies owned by people of color and women, especially those from DACs in NYC • See Appendix D for some of our key contractor partners.

Major Green Employers: Companies that work in renewable energy, building decarbonization, sustainable manufacturing, recycling/composting, etc.

Hub collaboration:
Potential employers for clients seeking to work in the green economy.

Key partners:
Offshore wind companies working on Empire Wind project • See Appendix D for other potential green employer partners

Other businesses: Various other private businesses not directly involved in the green economy.

Hub collaboration:
Various, see description of key partners.

Key partners:
Small landlords (potential clients for retrofitting affordable rental housing) • Management companies (potential clients for retrofitting affordable rental housing and a connection to landlords) • Local/ethnic media (outreach partners in hard-to-reach communities) • Neighborhood gathering places (businesses like barbers, cafes that function as community spaces.)

City Government: Mayor's offices, executive agencies, and other branches of city government.

Hub collaboration:
Various, see description of key partners.

Key partners:
NYC Accelerator—offers assistance to large buildings in decarbonizing • NYC Public Housing Authority (NYCHA)—outreach partner for workforce programs) • Community boards—local planning bodies with appointed boards. Outreach partners. • NYC Department of Housing Preservation and Development (HPD)—administers the HomeFix home repairs program • NYC Department of Small Business Services (SBS)—outreach partner for small businesses.

Local Elected Officials

Hub collaboration:
Outreach partners.

Key partners:
State Assembly members • State Senators • City Councilors • US Representatives • Borough Presidents

Utilities: Electricity and gas utilities.

Hub collaboration:
Outreach partners. Line of communication to streamline incentive application and retrofit processes. Potential green employers.

Key partners:
ConEd • National Grid

Regional Assets

Assets are defined as existing organizations, partnerships, or organizational capabilities and programs that can assist with overcoming a barrier or accomplishing a recommendation.

Hub team organizations have a long history in the Bronx and Brooklyn DACs, and these communities know that the Hub organizations are helpful, trustworthy partners. Hub organizations have extensive experience working with and engaging diverse communities in different languages. People already know to turn to them for help for many housing, workforce, and other needs.

The eight Hub team organizations are collectively very experienced in all aspects of the Hub's work. The Hub is an extension of the housing counseling, retrofits, workforce development, and business development work that Hub organizations have been doing for many years.

Hub team organizations have existing relationships with other organizations throughout the Bronx and Brooklyn that can expand the reach of outreach and wraparound services. Hub organizations also take part in other coalitions and many provide other services such as homeowner assistance, supportive housing, and workforce development.

The Bronx and Brooklyn have established civic engagement and information infrastructure.

- Local elected officials often offer strong constituent services and programming.
- Community Boards also play an important role in relaying information about programs to the community.
- Established community-based organizations play leadership roles in sharing information about public policy and programs in their communities.
- The Bronx and Brooklyn are also host to a range of public and shared spaces that are essential for community gatherings and outreach, including parks, libraries, senior centers, hospitals, recreation centers, and schools.

Many organizations throughout the boroughs have complementary missions and expertise to the Hub organizations, focusing on housing counseling, repair and retrofits, green economic development, job training, and more. (See Regional Partners section).

- These organizations run a number of useful events that the Hub can plug into, such as job and housing fairs. The hub is presently taking on these types of events in their current outreach
- Bronx and Brooklyn residents have access to green job training programs both in our boroughs and citywide, and access to this type of training is continually improving.
- Partnerships will be especially useful in connecting clients to wraparound services such as social and legal services, remedial education, language learning, and accessing financing.

City and State governments, including institutions like EDC, CUNY, and the Mayor's Office, are aligned in developing the local green economy, especially in key industries like offshore wind.

III. Baseline Assessment of Clean Energy Program Participation

Baseline Assessment of Regional Clean Energy Programs

For a list of home retrofit and green programs, see Appendix D.

Overall, the Bronx has received about $30 million and Brooklyn about $68 million in NYSERDA residential and multifamily funding since August 2023.[48] As shown in Table 6, this works out to about $20 per person in The Bronx and $25 per person in Brooklyn. The Bronx, which has more renters, more immigrants and non-English speakers, and lower incomes, is especially poorly served by NYSERDA programs. The Bronx receives the fewest dollars per person in NYSERDA funding in comparison to the other boroughs.[49]

The CLCPA mandates that at least 35% of program impacts, with a target of 40%, flow to DACs and LMI households. As shown in Chart 9 and 10, NYSERDA has not been successful in meeting these targets. In the Bronx, NYSERDA hits the CLCPA target of 40%, but with 90% of Bronx residents living in DACs, there is much need for deeper investments. In Brooklyn, nearly half of the population resides in DACs and NYSERDA just meets its CLCPA target there as well.

Map 3 shows Bronx census tracts by the amount of NYSERDA Residential and Multifamily funding they have received per person. Large funding amounts for Residential/ Multifamily are concentrated in only a few census tracts, which is concerning considering most of the tracts in the Bronx are DACs. Most census tracts have received less than $25 per person which does align with the overall lesser funding the borough receives as a whole ($20).

The bottom five neighborhood tabulation areas (NTAs) in the Bronx by NYSERDA funding per person, including Spuyten-Duyvil, Kingsbridge, Kingsbridge Heights, Norwood, Longwood, and Parkchester, are all poor neighborhoods of color and have received on average only $2 per person in NYSERDA funding. These areas have only seen an annual energy cost savings of $1.50. In some of these areas, spending per person and energy savings are less than $1. The top five neighborhood tabulation areas (NTAs) in the Bronx by NYSERDA funding per person, includes Woodlawn-Wakefield, Melrose South-Mott Haven North, Crotona Park East, Claremont-Bathgate, and Morrisania-Melrose. Most of these areas are lower income neighborhoods than the bottom five and have received spending per person that exceeds $30, with annual bill savings ranging from $8-33. While this is a move in the right direction, considering that most of the borough is considered a DAC, there is inconsistency in where money is allocated. Many of the areas that receive less than $25 per person do have higher counts of projects in those tracts, which is likely due to the projects in these areas going to larger multifamily buildings with a high density population.

In Brooklyn, the distribution of NYSERDA funding appears to have a broader range of distribution, with some census tracts within DACs receiving upwards of a $100 or more per person. However, the distribution of funds per census tract within the DACs is often lower than non-DAC tracts. The bottom five neighborhood tabulation areas (NTAs) in Brooklyn are Greenpoint, Brighton Beach, Sunset Park, Starrett City, and Northside-Southside (a section of Williamsburg). These consist of neighborhoods of various diversity, but are low-to moderate in income. These areas also have significant amounts of single family homes (which in other borough analysis shows to indicate more NYSERDA spending).

NYSERDA has spent between $2-6 per person in these areas, with an average savings of less than $3 per person. As these areas have large foreign-born populations from Southeast/East Asia, Latin America, and Eastern Europe, language barriers may be the reason why spending in these areas is low. The top five neighborhood tabulation areas (NTAs) in Brooklyn include Brownsville, East New York, East Flatbush-Farragut, East New York (Pennsylvania Ave), and Ocean Hill. These areas are close in proximity to each other, and are DACs, with some of the lowest median incomes in Brooklyn. NYSERDA spending per person on average exceeds $60 and annual savings of $20 per person.

Chart 9. NYSERDA Funding Impacts in DACs: Bronx, NYC, New York State[51]

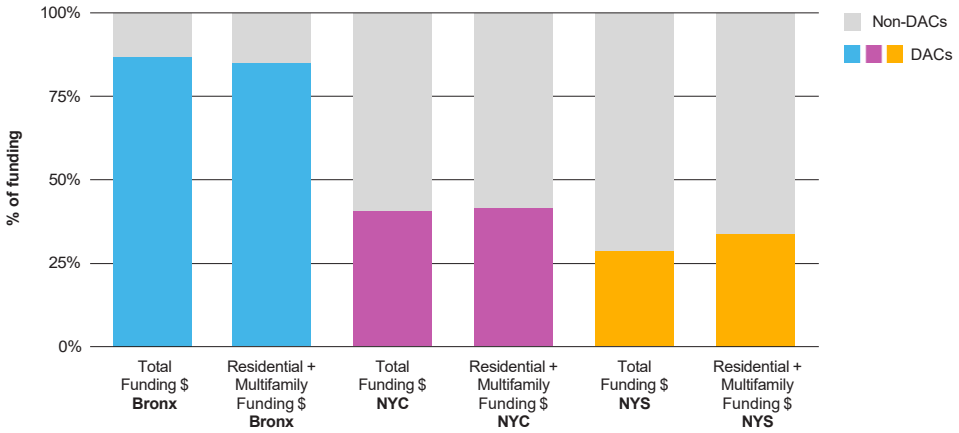
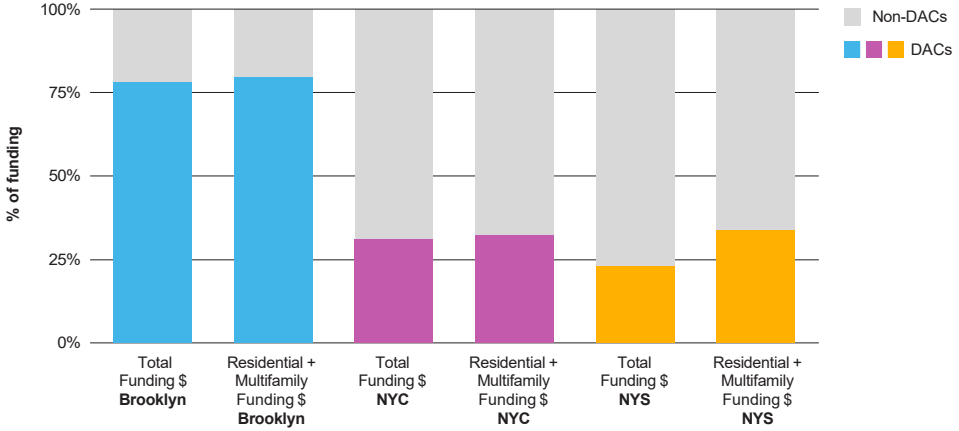


Chart 10. NYSERDA Funding Impacts in DACs: Brooklyn, NYC, New York State[52]



Existing NYSERDA Community Campaigns

NYSERDA has not implemented any community campaigns in the Bronx or Brooklyn.

IV. Stakeholder and Community Engagement

Outreach Tools & Methods

Community engagement and stakeholder research were central to our analysis of regional assets, barriers, and opportunities in the Bronx and Brooklyn. Research and engagement methodologies included individual interviews with Clean Energy Hub members, a focus group of small businesses, and surveys of residents and jobseekers.

Over 700 people were engaged during RABA development through a focus group and a resident survey. Feedback from public engagement formed the backbone of the Barriers and Opportunities Chapter, as well as the Regional Partners and Regional Assets sections of the Baseline Regional Characterization. See those sections for an understanding of the main takeaways from community engagement.

• Interviews

Pratt Center worked with the Hub organizations to hold a small business focus group, summarized in Table 15, that corresponded with their existing programs or target communities. Participants in the focus groups were given a $40 incentive.

• Survey

The Hub designed and fielded an online survey intended for residents of our boroughs with a focus on DACs. The survey was offered in English and Spanish. Due to funding limitations, the Hub could not translate it into more languages to match The Bronx and Brooklyn's diverse populations. It was open for nearly three months. Hub organizations promoted the survey through various channels. Remote outreach included email blasts, social media posts, and phone calls. In person outreach included tabling at various events throughout both boroughs and Hub organizations that provide wraparound services were able to survey people as they were assisting them with other matters.

The survey focused on information sources and community group respondents engage with, sustainable home upgrades, and clean energy job training and placement. It had logical rules that asked different respondents different questions. For example, renters saw a shortened version of the home upgrades section, since they have less agency to make these upgrades. A summary of survey results can be found in Appendix G.

The survey received 732 total responses, with 299 coming from The Bronx and 388 from Brooklyn.[53] This was well above our target numbers for each borough (200 per borough). 89% of survey takers took the English version, and 4% took the Spanish version, with most of the Spanish language respondents coming from The Bronx). 48% of respondents were renters and 22% were homeowners (the rest had other housing situations). 59% of respondents who gave their income had a household income of less than $60,000 per year.

Key findings regarding The Bronx & Brooklyn stakeholders' information, perspectives, and participation in clean energy programs are summarized below. Survey results are detailed in Appendix A.

Stakeholder and Community Engagement Feedback

• Clean Energy Upgrades

Residents who filled out the survey expressed interest in clean energy upgrades. Renters noted a challenge in doing so as the upgrades they would like to do are limited as they do not own their homes or are unaware of what upgrades are available to renters. Owners want to do clean energy upgrades and are more motivated to do these upgrades if they are part of a larger repair effort such as a roof replacement or mold or lead abatement. Making the temperature in their homes more comfortable and protecting their home from natural disasters and power outages are also motivating factors.

Participants in the small business focus group expressed the desire to participate in clean energy upgrade programs. Food businesses were highlighted, as they face

a lot of challenges with refrigeration, particularly in summer as their refrigerators overheat and risk shutdown due to lack of adequate HVAC to keep spaces cool and well-ventilated. As many are renting their commercial space, there are challenges in addressing the larger HVAC issues. It was noted that many businesses in one Business Improvement District (BID) use reduced operating hours as a cost savings measure, which is not ideal on many levels though it is effective. Reduced hours impact street safety and limit economic opportunity for business owners and their employees. While many businesses have participated in programs to switch to LED bulbs, their usage bills are still high as there are limited options in obtaining electricity from other utility providers. This also impacts street safety, as these businesses are hesitant to keep lights on during off-hours. There is interest in exploring other energy upgrades such as solar, but their perspective is that there currently isn't enough on-the-ground assistance to facilitate these conversations.

• Workforce Development Training and Green Jobs

There is an interest from residents in these boroughs to enter the green economy workforce. Nearly half of respondents to the survey indicated interest in working in the green sector. Solar manufacturing/installation and renewable energy/energy efficiency were areas that respondents had the expressed the most interest. Many respondents were interested in gaining or improving basic computer skills and job seeking skills as well as GED and remedial training.

• Information Sources

Residents rely on their personal networks, social media, internet searches, TV/radio, and community events for information. Many do attend events such as religious services, resource fairs, and cultural events. Flyers, newspapers, mailers and other printed materials aren't as popular for information. Small businesses prefer to use social media, newsletters, texts, flyers, and on-site visits scheduled in advance to learn about opportunities. There is a growing need for language accessibility beyond Spanish for businesses. BIDs can also be very helpful in connecting businesses to agencies and other clean/green energy entities, but they need to be engaged for this to move forward.

V. Barriers and Opportunities

Barriers

1. Barriers to Outreach & Communication

There is an overwhelming amount of information about clean energy initiatives available from many different sources of different levels of trustworthiness. People don't know where to turn for accurate information. (1.1)

- Self-interested private sector companies are often the loudest promoters of clean energy upgrades.
- Misinformation and scams about clean energy home upgrades are spreading, particularly among solar energy programs. It was noted by a few Hub organizations that what they've heard from their clients are anecdotal stories of friends and family being taken advantage of, or the organizations are working directly with people who have been taken advantage of when attempting to access clean energy programs.

Public organizations like NYSERDA, and the programs it offers, have limited name recognition and trust, and are not well promoted. (1.2)

- Marketing has been very limited. Most people find out about clean energy opportunities through personal networks, social media, and web searches, meaning they are only reaching people who are already interested and motivated.[54]

Knowledge of clean energy opportunities is inequitably distributed, and outreach to some groups is harder than others. There has not been sufficient effort to close these information and outreach gaps. (1.3)

- The RABA survey found that people of color, low-income people, renters, and people with lower levels of education know less about clean energy technologies and programs, and that young people and seniors were less likely to attend community events where they could learn about these programs.
- 14% of households in both the Bronx and Brooklyn DACs don't have internet access, and older people are less likely to have or know how to use the internet to find out about opportunities.[55]

NYC communities are far more diverse ethnically and linguistically than typical Upstate communities, and NYSERDA has not invested enough in multilingual, culturally competent outreach programs. (1.4)

- 19% of Bronx DAC households and 13% of Brooklyn DAC households have limited English proficiency, compared to 8% of NYS households.[56]
- NYC agencies routinely translate materials in up to 11 languages, but NYSERDA materials are often only available in English and sometimes Spanish.[57]
- Enabling non-English speakers to participate in clean energy programs requires deep investment in multilingual events, applications, one on one assistance, and more, not just translating flyers informing them of programs and events not equipped for further translation.
- Cultural differences may require different approaches to outreach and messaging in different communities.
  - Whatsapp is a very important information source in some immigrant communities, as are newspapers published in their native languages. These channels are often ignored by the government.
  - Historically-marginalized communities often lack trust in government institutions and require increased investment of time to gain their trust.
  - Some organizations find more success talking through applications and processes with their clients, even those where English is their first language, but are foreign-born. They need everything explained carefully in order to feel comfortable. This is time consuming and reduces capacity within organizations.
  - Some applications are online-only. Some clients want paper copies to review and read more carefully and this inability to access paper copies results in them becoming disinterested in applying.

The Bronx and Brooklyn Hub spans both a much more diverse and a much larger population than most of the other Hubs in the state, but has not been given commensurate funding to conduct adequate outreach across all of these communities. (1.5)

- For example, the RABA Survey struggled to reach Arabic speaking populations in the Bronx, as well as Russian, Urdu, and Haitian Kreyol speakers in Brooklyn. Asian communities in both boroughs were also excluded due to translation limitations with the RABA survey. Time constraints and lack of resources did not allow for the facilitation of a focus group with some of these language speakers.

2. Barriers to Residential Program Implementation

People don't know about all technologies and programs that exist to upgrade their homes. (2.1)

- As shown in Chart 11, while more than 25% of respondents were aware of technologies such as energy efficient appliances, LED bulbs, electric/induction stoves, and solar panels, they were far less aware of other technologies.
- As shown in Chart 12, there was no clean energy incentive program that even half of RABA survey respondents had heard of. Nearly a third of respondents had not heard of any of the programs. Only 12% of people had heard of the EmPower+ program. Only one of the three most known programs was a NYSERDA program—Comfort Home.
- As discussed earlier, there are knowledge disparities of clean energy technologies and programs across racial, income, educational, housing tenure, and other lines.
- There are knowledge disparities of home energy incentive programs across housing tenure, racial, educational, and other societal groups.

Some of the non-environmental benefits of home energy upgrades, like lower energy bills and healthier, more comfortable homes, are not well known or publicized, and people can be skeptical of the benefits of clean energy technologies. (2.2)

- Respondents to the RABA survey ranked lowering utility bills and making needed home repairs like a roof replacement, or mold or lead abatement as part of the upgrade as the highest motivators.
- Messaging has focused too much on helping the environment and technical details, not enough on personal benefits.
- Technologies have improved greatly in recent years, and people may have out-of-date ideas about their costs and benefits.
- As discussed earlier, misinformation about clean energy technologies and programs is spreading and erodes trust in claims from reputable sources. Certain communities also have less trust in government generally.
  - Certain technologies, solar panels, have been particularly targeted by misinformation. In the RABA survey, solar panels ranked highest as the clean energy upgrade people did not want, followed closely by electric/induction stoves.

NYC has an older residential building stock than the rest of the state, and its building typologies are very unique not only statewide but nationwide, making retrofits more complicated and costly.[58] (2.3)

- Over 70% of buildings in Bronx and Brooklyn DACs were built before 1960.[59]
- Older homes often need electrical upgrades and improved insulation before being able to handle more sophisticated electrical equipment.
- Other design features of some older or more urban building typologies, such as low ceiling heights, masonry walls, small rooms, pipes wrapped in asbestos, and lead paint, can present further challenges to green upgrades.

Homes often have structural or health and safety problems that must be addressed before installation of clean energy upgrades, and these fixes are not covered by home retrofit incentive programs like WAP and EmPower+.[60] Programs that do cover repairs, like HomeFix and RESTORE, are vastly underfunded to meet the need for repairs. (2.4)

- Solar installations often require a roof replacement, and weatherization often requires lead/mold/asbestos abatement. Many RABA survey respondents ranked highly the ability to address these types of repairs as a motivation to get clean energy upgrades.
- Affordable housing, rentals, and older buildings are more likely to have problems, and residents of these housing types are lower income and have fewer resources to deal with the problems.
- Repair funding through the HomeFix, RESTORE, and AHC programs is only sporadically available and difficult to access, and these programs come nowhere close to meeting the demand for repairs from people who qualify for them.
  - Only people who are current on their mortgages and bills qualify for these programs
- NYSERDA relying on these external funding sources to fix these issues is not a successful or scalable solution.

Homeowners have competing priorities vying for their time and money. (2.5)

- Median incomes in NYC, especially in DACs, do not match the cost of living and housing prices. People are stretched thin paying for day to day expenses.
- Increased flooding and other climate hazards are adding to the list of maintenance problems that homeowners must prioritize.
- Clean energy investments often do not respond to an immediate need. Even if they improve home health/comfort, this may not be an immediate priority.

It is difficult to find accurate information on how much home upgrades will cost in advance of actually making the investment and how much residents' long term savings will be, making financial planning difficult. (2.6)

- Many online resources citing estimated costs are based on figures from outside New York City which are much lower than actual costs in the city.
- Quotes often vary widely between contractors.

- Inflation means that many estimates that are only a few years old are likely out of date.
- Initial project scopes and budgets often balloon if complications - such as finding undiscovered leaks when insulating, lead paint, problems fitting equipment through small doorways, and required energy service upgrades - arise. This is especially common in older buildings with maintenance issues.

Incentive programs do not provide enough help to surmount cost barriers for low income households and are not structured in a way that meets their needs. (2.7)

- Eligibility for the EmPower+ Low Income Incentive, WAP, and HEAP programs is set at 60% of State Median Income (SMI). Using SMI rather than AMI to determine eligibility excludes hundreds of thousands of low to moderate income NYC residents who may be over the income limit but face much higher costs of living than many other parts of New York State.[61]
  - The IRA defines low income as under 80% of AMI, which is currently the income limit for the EmPower+ Moderate Income Incentive.[62]
- Many tax credits, including those from the IRA and the NY State Solar Tax Credit, are nonrefundable, meaning that low income people with low tax liability receive less benefit from them (and very low
  - Incentives in the form of tax credits or rebates require residents to pay upfront and be refunded later. Most low income people do not have the on-hand capital to bridge this gap in time.
  - There is often no assurance of exactly how much money they will get back as a rebate, which is stressful and makes financial planning difficult.

Middle income people are often left out of the more generous incentive programs, but can't afford market options. (2.8)

- Many programs offer incentives to middle income people in the form of loans. Many people are turned off by the conditions of loans or the very idea of taking a loan.

Many homeowners can't afford home upgrades even after incentive programs. (2.9)

- Even if clean energy upgrades eventually pay off, many homeowners can't afford a large upfront cost.
- As shown in Table 6, "I can't afford the upfront cost of the upgrades I'm interested in" was the biggest barrier to installing an upgrade for respondents to the RABA survey.

Table 6. Obstacles to Making a Home Energy Upgrade

How big of an obstacle would these be to making a home energy upgrade?	Average (scale of 1-5)
I cannot make the upgrades I'm interested in on my own as a renter (ONLY RENTERS)	4.1
I don't know what kinds of upgrades, technologies, and programs exist and what is possible for me to do as a renter	3.6
Other home repairs or upgrades are a bigger priority for me (ONLY HOMEOWNERS)	3.3
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do	3.2
I can't afford the upgront cost of the upgrades I'm interested in	3.9
The process of receiving upgrades (getting permission from landlord, how to access incentive programs, etc.) is complicated (ONLY RENTERS)	3.8
The process of receiving upgrades (how to find a contractor, how to access home incentive programs, etc) is complicated (ONLY HOMEOWNERS)	3.6
I don't want people coming into my home to install upgrades.	2.4

The process of getting a home retrofit is very complex and confusing, and there is no easy-to-follow, defined path. Customers must develop extensive knowledge on a variety of technologies, programs, and procedures to decide on their own path. (2.10)

- A significant number of RABA survey respondents said there was at least one technology that they wanted but didn't know how to access or afford.
- Incentive programs are confusing. Multiple programs do similar things (often at different levels of government), and it is unclear which can be overlapped, which are standalone, what technologies each incentive program covers, caveats, etc.
- Incentives and qualifying criteria have been changing quickly (EmPower+, IRA, etc)
- There is no centralized, consistently updated source of information where people can get accurate, authoritative information about every step of the retrofit process and the options available to them.
- As discussed in Barrier 1.1, many sources of information offer conflicting, not always accurate information.

Chart 11. Knowledge of Clean Energy Technologies[64]

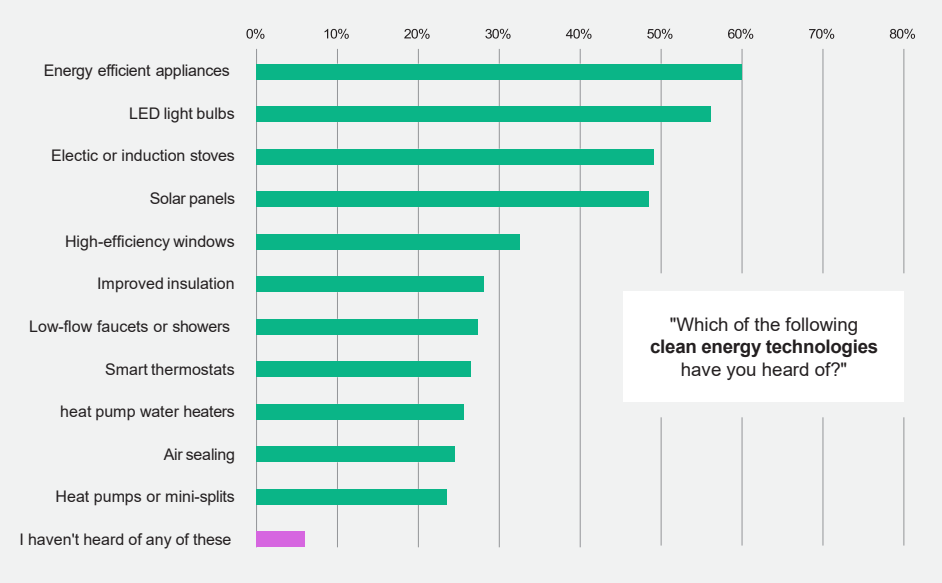
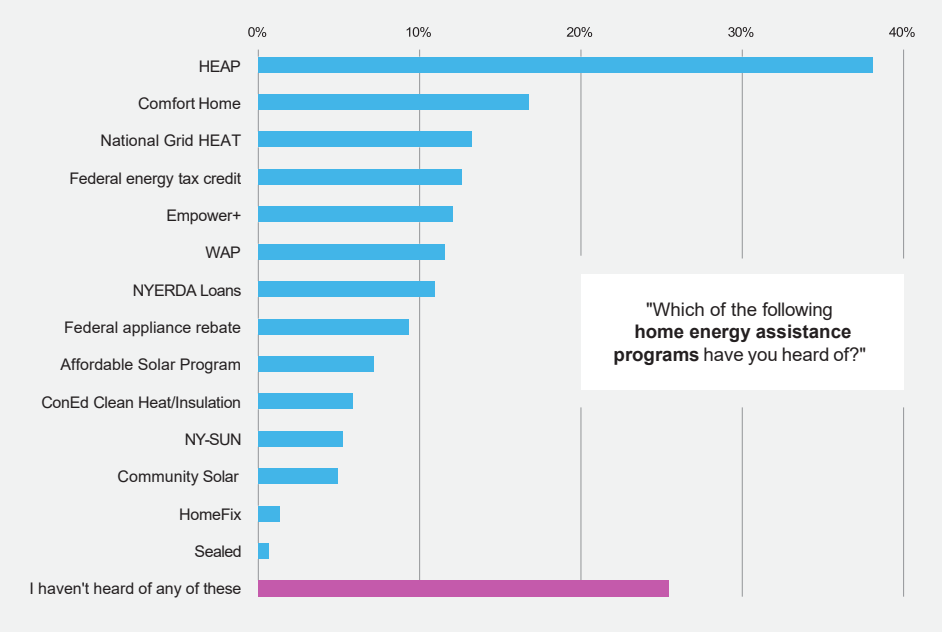


Chart 12. Knowledge of Home Energy Assistance Programs[65]



- Project scopes from contractors are confusing for customers and hard to interpret. Work scopes often don't come with an explanation of what each item is, making it difficult for customers to understand what is happening in their homes.
- Subcontractor agreements coming from DOE and NYS contain complex legal language that people cannot easily understand on their own.

For renters, both the options for upgrades and the potential benefits of them are greatly reduced. (2.11)

- 80% of occupied units in the Bronx DACs, and 72% in Brooklyn DACs, are occupied by renters.
- As shown in Table 6, RABA survey respondents who were renters ranked “I can't make the upgrades I’m interested in on my own as a renter” as the biggest barrier to making a home upgrade.
- Renters have little agency to make large changes to their homes. There are few options available to renters, and few renters know about these options.
- Renters have little leverage to get their landlords to make upgrades, and may fear eviction or rent increases if they complain about utility bill issues.
- Landlords do have agency to make changes, but retrofits are more complicated in buildings with renters, even in smaller buildings. Getting access to the unit from the tenants and figuring out financing, including requiring tenants to prove their income eligibility, is more complicated than retrofitting a single family owner occupied home.
- Split incentive: the benefits of home energy upgrades in rental housing are split between occupants and owners, giving each side less of an incentive to make the upgrade.
- Many landlords live elsewhere so don’t get the health/comfort benefits, while renters do not want to go through the hassle of dealing with landlord/ construction when they do not see monetary benefits and may not live there long-term.
- Buildings over 25,000 square feet are required to sharply cut their carbon emissions by NYC’s Local Law 97 or pay steep penalties, giving landlords a strong incentive to make upgrades. But smaller rental buildings have no such mandate. Many rental buildings in The Bronx and Brooklyn are under 25,000 square feet.

While electrification is often touted as a way to lower energy bills, for renters, electrifying heating systems often has the opposite effect - making residents pay for heat via their electricity bills that was previously covered by building owners. (2.12)

- Converting more rental units to electric heat has the potential to significantly worsen already high levels of housing and energy cost burden unless paired

with reforms or affordability programs. Rent-regulated units are not exempt from this, as capital repairs can be passed onto renters through Major Capital Improvement (MCI) or Individual Apartment Improvement (IAI). While these increases are capped at a certain percentage, these increases are in addition to whatever rent annual rent increase rent-regulated tenants are subject to and can impact affordability.

3. Barriers to Workforce & Business

Jobseekers:

People don't know much about the green economy, and there is a lack of clarity about what it encompasses. (3.1)

- It is difficult to find comprehensive, reliable information about the field, paths into it, types of jobs, and necessary skills/qualifications for these jobs.
- People do not know about specific companies that are hiring within the field, or job training programs that can help them get skills and find a job.
- Many people do not realize how green jobs help individuals and communities, not just the environment.
- While the industry is growing, it is still relatively small. Few people know anyone working in it. This is especially challenging in NYC, as many communities consist of people of color but the green economy workforce is largely white.
- In the RABA survey, Hispanic, Black, and Asian respondents were much more likely than white respondents to indicate that they were unsure or wanted more information about the green economy, as were women, and people with lower levels of education.

The green economy is dominated by white men, which presents barriers to women and people of color learning about or participating in the industry. (3.2)

- 75% of green economy workers identify as male.[66] Construction is particularly dominated by men. In the RABA survey, women were significantly less likely than men to be interested in working in manual labor and technical trades.
- 72% of green economy workers identify as white.

People are not aware of green job training programs, and these programs can be difficult to participate in. (3.3)

- As shown in the RABA Survey results (Appendix G) the largest obstacle noted by respondents in participating in a green jobs training program is that they did not know how to find one.
- Programs are time consuming and often cost money. They can be difficult to participate in, especially for those with a full time job or a family. Free programs have an opportunity cost when there are no stipends provided, and people will choose working over training.
- Many workers need general job skills in addition to more specialized skills. This includes educational remediation (for example core literacy, writing, and math skills).
- When asked about skills they are interested in gaining/improving, respondents to the RABA survey ranked general skills, like basic computer skills, job-seeking skills, and obtaining a driver's license highest.
- Because many green jobs haven't yet arrived, it is difficult to know what to train for - both for potential participants and for organizations designing programs.

There are challenges in placing trainees who have completed programs
It can be a daunting task to place recently trained workers with businesses. Businesses often don't see the benefits of hiring employees from a non-traditional background (not having attended college). (3.4)

- Competing workforce training programs which offer similar credentials (OSHA, Scaffolding, etc.).
- Some businesses do not wish to pay a living wage to new employees
- Some potential employees would like to be paid more, seeing the value in their training.
- Incentivizing businesses to hire trained workers is a long bureaucratic process.
- There is a prevalence of agencies/organizations (ConEd, NYSERDA, Willdan, etc), resulting in multiplying, duplicative paperwork.
- Public sector agencies can move on a very slow timeline, which adds costs, makes project planning and scheduling difficult, and further discourages participation.
- Potential employees are also frustrated by this process (internships, on-the-job training requirements) as they feel they are ready to work.

Immigrants, people of color, low income people, unhoused people, justice involved people, and other marginalized groups experience general systemic barriers to employment.[67] (3.5)

Businesses:

For businesses that are not already established in the green economy, finding opportunities, funding, and information is difficult. (3.6)

- The green economy is still very nascent. Many projects that will create jobs,

like offshore wind on have yet to arrive, and there are many unknowns about what these projects will end up looking like and the impacts they will have.
- There is no centralized place to look for green opportunities, making it difficult to figure out what skill sets, certifications, or training employees might need and how to offer it.
- For businesses that are not directly in the green economy but offer complementary services (for example, plumbing), the challenge of finding opportunities is even greater.

Businesses pivoting to the green economy must invest in significant capacity building. (3.7)
- It is often hard to find skilled workers, and there are not enough programs to help with job training.
- Rapid change in the industry, both among personnel and programs, discourages companies from investing in training.

Non-Green Economy/Clean Energy Small Businesses want to lower energy costs, but don't have much support. (3.8)
- Non-green economy small businesses haven't been engaged regularly by utility companies for clean energy/cost saving measures.
- LED bulbs are in use by many small businesses but because their usage in businesses is so high and there is a monopoly on energy providers, there really isn't much of a cost savings.
- Some businesses shorten their operating hours to conserve energy—not ideal for the business or their employees—and can impact neighborhood safety if blocks of storefronts implement similar tactics, resulting in less-active streets.
- Food businesses are at greater risk, especially in the summer months, for outages due to refrigeration. HVAC in the buildings can not support the refrigeration systems, which tend to overheat. This also contributes to the overall energy consumption/grid stress experienced by neighborhoods throughout the summer.

Opportunities

1. Outreach and Comunication Opportunities

Communications channels outside of existing NYSERDA and private sector marketing offer opportunities to increase the reach and effectiveness of outreach. (1.1)
- There is a community of existing trusted CBOs in the Bronx and Brooklyn that have their own audiences, and can be partners. Many of the Hub organizations also provide other services whose clients could benefit from learning more about existing green economy/clean energy programs.
- Some local elected officials have been champions of the green economy and have experience communicating with their own communities.
- Word of mouth, especially from within one's own community, can be a powerful motivator to get clean energy upgrades or work in the green economy.
- In the RABA survey, 56% of respondents said they often turn to personal networks for important information related to housing and job opportunities.

Other organizations are interested in being more involved in the green economy. (1.2)
- Increasing attention to and urgency of the climate crisis along with standards like Enterprise Green Communities, regulations like Local Law 97, and funding streams like the IRA and Infrastructure Bill are pushing more housing and other organizations to incorporate strong sustainability components into their work.
- The green economy increasingly touches everything. Even organizations whose main focus is elsewhere understand that it is relevant to them.

Hub Organizations are trusted sources and provide many services. (1.3)
- Most Hub organizations are over 10 years old—many have been operating for more than 30 years—and provide an array of services, many completely unrelated to the green economy.
- They are trusted and are able to introduce programming and activities and community campaigns within the green economy in ways clients may be more receptive to as they receive assistance for other issues. They are also in partnership with many other organizations throughout the region.

Renters can be allies in advancing energy upgrades (1.4)
- The majority of residents in the Bronx and Brooklyn are renters. Working more closely with renters to implement permissible upgrades in their units

and appealing to property owners for more building-wide upgrades can build momentum which may result in more energy upgrades in rental housing stock.

2. Clean Energy Program Adoption Opportunities

There is wide interest in sustainable home upgrades. (2.1)

- When asked in the RABA survey which motivators to getting a home energy upgrade were most effective, survey respondents ranked almost every motivator as very effective.
- When asked about what technologies people did want or already had, survey respondents ranked LED light bulbs and energy efficient appliances, highly.

Few people in the Bronx and Brooklyn have participated in existing energy incentive programs available to them. This lack of participation signals that with the right programs and support, there are huge opportunities to enroll more people. (2.2)

- Nearly 80% of respondents have not participated in any listed program.
- Only 1% of people have participated in EmPower+.

There are synergies between existing housing and financial counseling programs offered by Hub organizations and other organizations throughout these boroughs and clean energy advising. (2.3)

- Housing/financial counseling can help people understand what they can afford and create a plan for how to pay for upgrades that incorporates a holistic understanding of their financial picture.
- Organizations offering these services often have programs that allow them to give clients more favorable rates.

Significant funding is becoming available to expand home energy upgrades for LMI and DAC residents. (2.4)

- NYS was awarded $250 million to expand solar deployment in LMI communities as part of the federal Solar for All grant program.[68]
- The federal government recently awarded $20 billion to a network of “green banks” that will focus on expanding green energy investment in DACs nationwide.[69]

Clean energy technologies are becoming better adapted to the urban environment through increased market interest and strategic government investment. (2.5)

- The new Gradient window heat pump, developed as part of a NYCHA competition, has the potential to make installing heat pumps in older NYC apartment buildings dramatically cheaper and simpler.[70]

3. Business & Workforce Opportunities

Green jobs offer higher pay than many other jobs open to people with lower levels of formal education. (3.1)

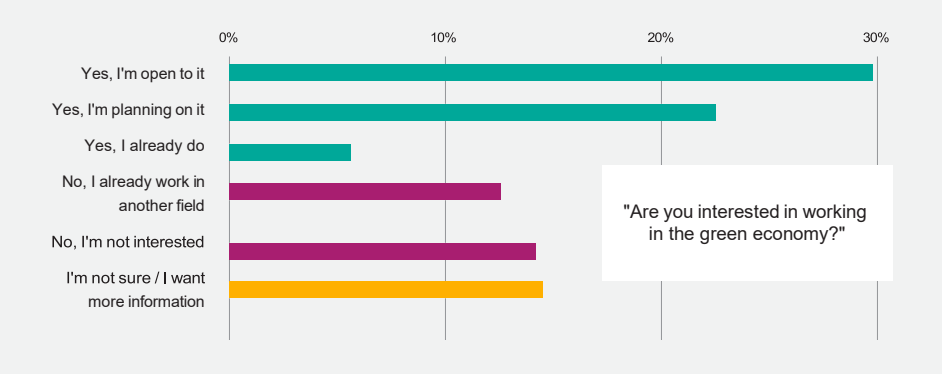
- The industry’s fast growth and competition for workers means there is room for career growth.
- Green jobs in construction trades are often well paying and unionized, and provide a good alternative to people without a college degree.
- On average, energy efficiency jobs pay about $2 per hour more than the national average hourly wage, and clean energy production jobs pay about $5 more.[71]
- More than 50% of the annual projected job openings in clean energy occupations typically require no more than a high school diploma or equivalent.[72]

The green economy is broad, and has room for people with many skills and career backgrounds. Bronx and Brooklyn residents have diverse skill sets that green employers can tap into. (3.2)

Most people, including those who are currently underrepresented in green careers, are interested in working in the green economy. (3.3)

- As shown in Chart 13, over half of RABA survey respondents said they were interested, open to, or already working in the green economy.
- RABA survey respondents from communities that have received less benefits and attention from NYSERDA are more likely to want to work in the green economy.
- Low income people and renters were more likely to choose the “yes” or “unsure” options.
- Black, Hispanic, and Asian respondents were generally open to working in a wider array of green economy sectors, including the more technical and labor intensive sectors.
- RABA Survey respondents indicated interest in higher paying jobs that offer the potential to learn, earn more money, and help their communities and the environment.

Chart 13. Interest in Working in the Green Economy



Green industries are expanding rapidly in the region. (3.4)

- The green economy is growing faster than the overall economy in NYS.[73]
- Major government policies and legislation, such as the IRA, NYC's Local Law 97, and the State's forthcoming Cap and Invest program, are supercharging the green economy.
- Offshore wind, specifically Empire 1, is projected to bring over 1000 union jobs to Brooklyn.[74] Solar and building decarbonization are also growing quickly throughout the city.
- Employers are flexible about certifications, skills, experience due to high demand for workers.

Non Green Economy/Clean Energy Small Businesses want to be engaged thoroughly. (3.5)

- Some property owners and business owners have interest in solar panels but they don't know where to begin and haven't been able to get far in learning how to move forward.
- Some businesses have been engaged by utility companies in the past but not consistently.
- There needs to be language support for small business engagement. For example, Pitkin Avenue BID, located in Brownsville, Brooklyn, has a large population of small business owner that speak Chinese, Korean, and Spanish.

VI. Recommendations

This chapter represents recommendations for both NYSERDA and the Bronx/Brooklyn Hub to pursue in response to RABA findings.

The recommendations are organized on a timeline:

A. Short term: recommendations for the coming year, through mid-2025.

B. Medium term: recommendations for the remainder of this Hub contract, through mid-2026.

C. Long term: recommendations stretching beyond the end of this Hub contract.

A. Short Term

• Residential Program Adoption

Increase funding devoted to outreach and marketing for LMI programs, especially in DACs. (Implementers: NYSERDA)

Significantly increase monetary investment and staffing for multilingual outreach and translation services that are available for Hub organizations to utilize, not just for marketing but also for providing all Hub services. Utilize a trans-language approach, in which programs are provided entirely in other languages rather than being translated from English.[75] (Implementers: NYSERDA, Hub)

- In the Bronx and Brooklyn, Spanish, Russian, Chinese, Urdu, Arabic, and Haitian Kreyol are the most prominent languages.
- Language needs will vary by area for small business engagement but the need still exists
- NYC government translates all relevant materials into 11 languages.

Create a consumer-facing NY State Clean Energy Hubs website that offers centralized information about the types of programs and technologies available in the state and directs to individual Hubs' websites. Launch a marketing campaign to promote this website and the Hubs. When necessary, work with Hubs to create their own standalone websites. Ensure there is multilingual accessibility here. (Implementers: NYSERDA, Hub)

Ensure that energy advisors are provided the tools to offer helpful and timely assistance and stay on top of programs by investing in robust, continuous training, and simple client tracking tools. Create accountability structures through program design to ensure that customers receive timely responses and do not fall through the cracks. (Implementers: NYSERDA, Hub)

Co-brand the Hub with the existing, trusted CBOs that are a part of it and emphasize their role in its activities and programs. (Implementers: Hub)

Continue to build a network of partners to amplify the Hub's reach: make connections between climate, housing, and workforce organizations. Cultivate a referral network in which clients are directed to other organizations to access wraparound services, and those organizations refer to the Hub for the services it provides. (Implementers: Hub)

Use a mix of outreach methods to reach different audiences. (Implementers: NYSERDA, Hub)

- While personal networks ranked the highest as an information source, social media, internet search, TV/Radio and Community events all ranked highly

Harness the power of word of mouth and cultivate trusted messengers. Document and highlight DAC community members' positive experiences with home upgrades and green jobs through events, building tours, etc. Compensate these community members for their help. (Implementer: NYSERDA, Hub)

- The RABA survey found that the top method people find their information is through personal networks.

Meet people at the events and locations they already visit (e.g. street fair or cultural event, religious services, schools, community centers, hair salons, parks, bodegas). (Implementers: NYSERDA, Hub)

- The Hub is already very adept at this and the RABA survey response is evident of this. NYSERDA should support these strategies.

Support the Hub in offering incentives to those who attend Hub events - free food, money, giveaways, games, child care, etc. (Implementers: NYSERDA, Hub)

- The Hub organizations already do this and have found this to be successful but more support and resources should be allocated.

Launch a campaign to combat misinformation and scams surrounding clean energy home upgrades. Work with the Hubs to identify and punish scammers and companies with bad business practices. (Implementers: NYSERDA, Hub)

Partner with culturally embedded CBOs to create communications materials that explain how programs work in easy to understand, graphical ways, like timelines, checklists, etc. (Implementers: NYSERDA, Hub)

Make program applications more accessible to people with limited tech access or knowledge. Create paper versions of online-only applications for people to take home to review if they request. Design forms that people can fill out on their phones and ensure there is multilingual accessibility here as well. Be able to assist people with a computer, scanner, and tech support at Hub organization offices. (Implementers: NYSERDA, Hub)

Conduct in person program intakes at Hub events. This is already a Hub strategy and proved successful in the RABA survey outreach. (Implementer: Hub)

Identify more physical spaces in each borough that are available for Hub programming. (Implementers: Hub)

• Home Energy Upgrades

Support Hubs in building relationships with local contractors. Vet and update lists of contractors working in certain programs/geographies more thoroughly and frequently to ensure that they are accurate. (Implementers: NYSERDA, Hub)

Support and train contractors on how to navigate rebate/incentive program processes, and about the opportunities of working in DACs. Focus on expanding the number of contractors working in Bronx and Brooklyn DACs. (Implementers: NYSERDA, Hub)

Utilize new revenue sources like the IRA and Cap & Invest to make incentives for home upgrades more generous, especially for LMI residents. Provide larger incentives, more grants, fewer loans, and increased income eligibility. (Implementers: NYSERDA)

Explore ways to make program applications more user friendly. Streamline and reduce paperwork burden wherever possible. Field test with Hub partners. Ensure multilingual accessibility. (Implementers: NYSERDA)

Work with Hubs to develop a strategy for assisting renters and helping them access programs available to them. Engage small landlords, helping them make upgrades while ensuring tenants also benefit. Create a toolkit and support for tenants organizing to get their landlord to make changes. Lead with smaller changes to build trust to work towards larger energy changes. (Implementers: NYSERDA, Hub)

• Workforce

Build relationships with major green workforce organizations and employers citywide to offer wider workforce options beyond our boroughs (Implementers: NYSERDA, Hub)

Identify, build awareness, and make referrals to existing certifications/ training/apprenticeship programs that meet employers needs. (Implementers: Hub)

Support the Hub in hosting green career fairs and career exploration workshops that incorporate certifications/training programs. (Implementers: NYSERDA, Hub)

B. Medium Term

• Home Energy Upgrades

Overhaul community solar. Expand it, improve its benefits, work out kinks with utilities applying credits, and automatically enroll and notify batches of LMI renters. (Implementers: NYSERDA, utilities)

Use 80% AMI to define low-income for all NYSERDA programs, including to define eligibility for the EmPower+ low income incentive, to reflect differences in cost of living across the state and match the federal IRA definition.[76] (Implementer: NYSERDA, utilities)

Identify ways to dramatically expand access to funding to cover necessary structural/health and safety repairs alongside home energy upgrades. (Implementers: NYSERDA) Potential Opportunities to do this include:

- Expand EmPower+ to cover these repairs or launch a new program eligible to anyone for EmPower+ to cover these needed repairs.
- Dramatically expand HPD's HomeFix to become a year-round and adequately funded program.
- AHC's RESTORE program could serve as a model. It offers up to $20,000 in grants for home repairs to elderly homeowners making less than 100% AMI. An expanded version could serve homeowners of all ages.

Create more programs allowing renters to benefit from the clean energy economy. Examples could include helping renters get induction stoves and energy efficient appliances, better engaging landlords and helping residents do the same. (Implementers: NYSERDA)

Address the problem of electrification increasing renters' utility costs by reforming utility rate structures or creating a new energy affordability program for renters living in electrified units. (Implementers: NYSERDA)

Explore ways to prequalify more residents to LMI programs: (Implementers: NYSERDA)

- Bring back and expand geo-eligiblity programs to cover residents of DACs.
- Prequalify applicants that are accepted to a particular income restricted program to additional income restricted programs.
- Coordinate with agencies administering low income benefits programs to prequalify and notify recipients.

Increase transparency of pricing for home energy upgrades and how much customers can expect incentive programs to cover. (Implementers: NYSERDA)

Build in more quality checks and accountability for contractors to do good work into program design. (Implementers: NYSERDA)

Explore using community campaign funding to address specific localized problems. (Implementers: Hub)

- Offer free necessary structural/health and safety repairs in cases where these are necessary to enable efficiency upgrades.
- Take advantage of uniform building characteristics in particular areas to access economies of scale through bulk purchasing, standardization. Test this model in NYC's densely populated neighborhoods.
- Connect resilience and sustainability: provide special outreach, assistance, and funding to customers after natural disasters.

• Workforce

Work with Hubs to **launch a public awareness campaign to educate communities about what the green economy is, combat misconceptions, showcase the breadth of opportunities, highlight success stories, explain the importance of green jobs for the environment and economy, and demystify paths to entering these careers.** (Implementers: NYSERDA, Hub)

Work with clean energy employers and workforce development programs **to establish robust follow-up systems to track the hiring, retention, and advancement of priority populations**, as well as the career progression of participants in certification and training initiatives. (Implementer: NYSERDA)

Explore ways to **streamline the processes by which green economy businesses and contractors interact with NYSERDA.** Offer extra assistance with administrative burden to smaller/MWBE businesses without as much experience navigating government programs. (Implementers: NYSERDA)

Educate non-green economy businesses from underrepresented communities about how to get involved in the green economy, available certifications, and benefits of doing so.(Implementers: NYSERDA, Hub)

C. Long Term

• Outreach and Communication

In the next round of Hub contracts, **provide Hubs with significantly more funding to expand the number of energy advisors and community campaigns that are necessary to cover boroughs with millions of people.** (Implementers: NYSERDA)

Consider restructuring the Hubs within NYC (the current breakdown of boroughs is confusing) and/or encourage more coordination between NYC Hubs. For example, have monthly NYC Hub meetings rather than statewide Hub meetings where much of the focus ends up being on upstate NY, in a way that is not always very relevant to NYC hubs. While CBOs tend to have their own

catchment areas, organizations in NYC do know each other and facilitating this type of communication could improve effectiveness for everyone as it would encourage resource sharing in addressing problems that are common to all. (Implementers: NYSERDA)

• Home Energy Updates

Create more programs that center and integrate resilience in response to escalating climate threats. Examples include programs that integrate batteries and solar, moving equipment out of basements, and giving economic incentive to those who have gone through a natural disaster. (Implementers: NYSERDA)

• Workforce

Devote more resources to workforce development in the next iteration of the Hubs, and shift the focus of workforce development work more towards supporting workers, especially from underrepresented communities, as opposed to employers. (Implementers: NYSERDA)

Identify additional partners to offer wraparound services like a stipend, necessary tools for the job, transportation, child care, and food to facilitate participation in green jobs training programs. Many of the Hub organizations have departments that already do this work. Providing more resources to expand this to Hub work would be more efficient. (Implementers: NYSERDA, Hub)

Where needed, work with partners to develop additional certifications/training programs serving priority populations that will facilitate entry into the clean energy industry to fill gaps. (Implementers: NYSERDA)

Build relationships with and support unions/organizing in the green economy to ensure that green jobs continue to be good livable jobs. (Implementers: NYSERDA, Hub)

Conduct deeper research on the current and future green economy in NYC, such as sector specific analyses, to become an authority on green workforce issues. (Implementers: NYSERDA, Hub)

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51. Gagnon, R., & Podapati, Y., "Community Hubs Dashboard."
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71. Expanding Opportunity Through Energy Efficiency Jobs, ACEEE
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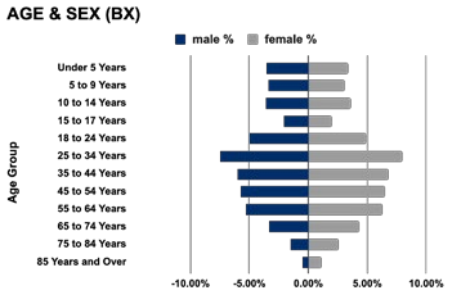
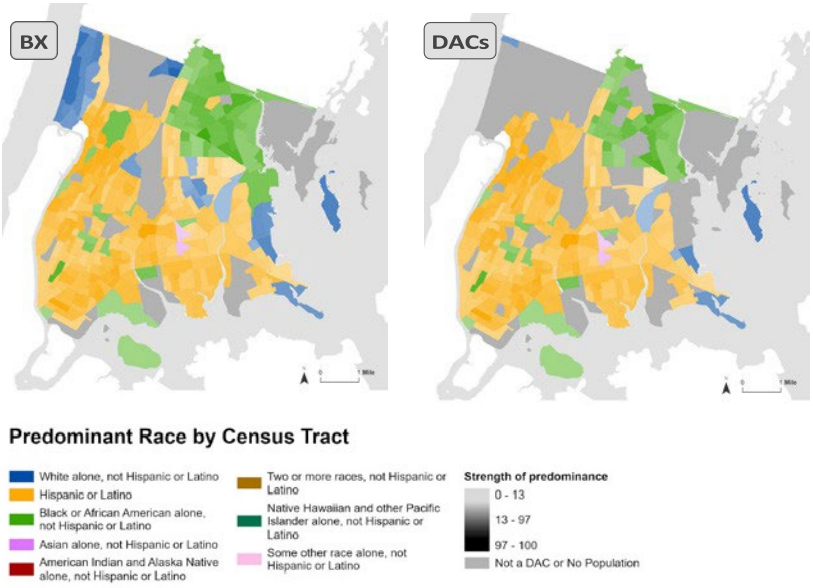
Appendix A
Complete Sociodemographic Data

THE BRONX: OVERVIEW

TOTAL POPULATION [1]
1,443,229

TOTAL POPULATION DAC [1,2]
1,291,164 ***(89% of total pop.)***





[1] ACS 5-Year Estimates, 2022
[2] NYSERDA Final Disadvantaged Communities, 2023

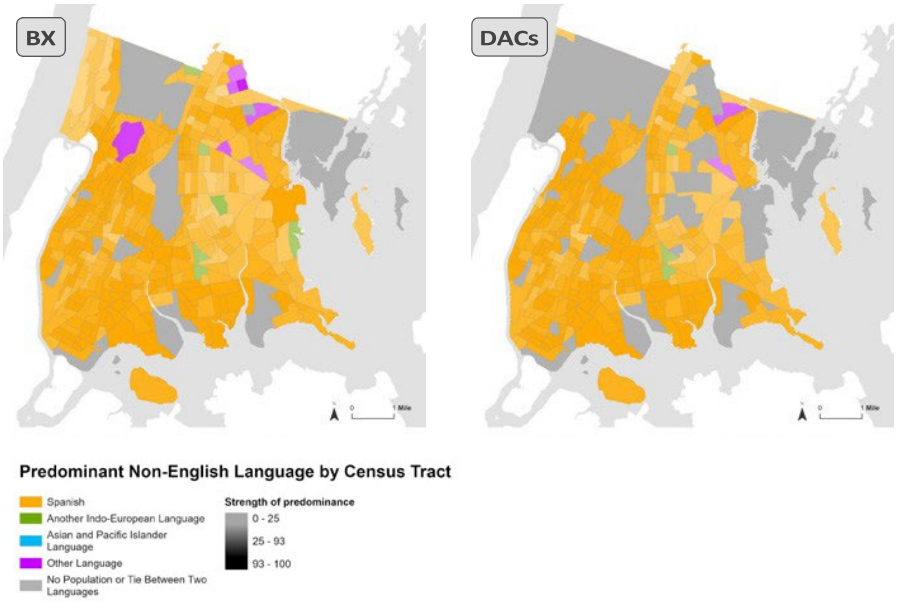
RACE & ETHNICITY

Race	DACs	Bronx	NYC	NYS
White Alone	15.2%	17.9%	37.5%	58.8%
Black or African American Alone	34.7%	34.1%	23.1%	15.1%
American Indian and Alaska Native Alone	1.0%	1.0%	0.6%	0.5%
Asian Alone	3.7%	3.9%	14.5%	8.8%
Native Hawaiian and Other Pacific Islander Alone	0.1%	0.1%	0.1%	0.1%
Some Other Race Alone	34.1%	32.0%	15.4%	9.4%
Two or More Races	11.1%	11.0%	8.9%	7.4%

Ethnicity	DACs	Bronx	NYC	NYS
Hispanic or Latino	**59.6%**	**56.4%**	**29.0%**	**19.5%**
White Alone	*9.6%*	*9.3%*	*6.3%*	*4.9%*
Black or African American Alone	*6.2%*	*5.7%*	*2.1%*	*1.2%*
American Indian and Alaska Native Alone	*0.8%*	*0.8%*	*0.4%*	*0.3%*
Asian Alone	*0.1%*	*0.2%*	*0.1%*	*0.1%*
Native Hawaiian and Other Pacific Islander Alone	*0.1%*	*0.1%*	*0.0%*	*0.0%*
Some Other Race Alone	*33.3%*	*31.1%*	*14.2%*	*8.6%*
Two or More Races	*9.5%*	*9.2%*	*5.8%*	*4.4%*
Not Hispanic or Latino	**40.5%**	**43.6%**	**71.0%**	**80.5%**
White Alone	*5.6%*	*8.6%*	*31.2%*	*53.8%*
Black or African American Alone	*28.5%*	*28.3%*	*21.0%*	*13.8%*
American Indian and Alaska Native Alone	*0.2%*	*0.2%*	*0.2%*	*0.2%*
Asian Alone	*3.5%*	*3.8%*	*14.4%*	*8.8%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*0.9%*	*0.9%*	*1.1%*	*0.8%*
Two or More Races	*1.6%*	*1.8%*	*3.1%*	*3.1%*

LANGUAGE [1]

Language Spoken at Home (Population 5+)	DACs	Bronx	NYC	NYS
Speak Only English	39.6%	42.0%	52.2%	69.4%
Spanish	49.8%	46.8%	23.3%	14.8%
French, Haitian, Or Cajun	1.6%	1.6%	2.3%	1.5%
German Or Other West Germanic Languages	0.1%	0.1%	1.6%	1.4%
Russian, Polish, Or Other Slavic Languages	0.3%	0.4%	3.5%	2.1%
Other Indo-European Languages	2.9%	3.2%	5.5%	3.9%
Korean	0.1%	0.1%	0.8%	0.5%
Chinese (Incl. Mandarin, Cantonese)	0.3%	0.4%	6.2%	3.2%
Vietnamese	0.2%	0.2%	0.1%	0.1%
Tagalog (Incl. Filipino)	0.3%	0.4%	0.6%	0.4%
Other Asian And Pacific Island Languages	0.2%	0.3%	1.1%	0.9%
Arabic	0.6%	0.5%	1.0%	0.6%
Other And Unspecified Languages	4.1%	4.1%	1.9%	1.2%



LANGUAGE [1]

Top non-English languages in DACs *(~10,000 speakers above age 5)*:

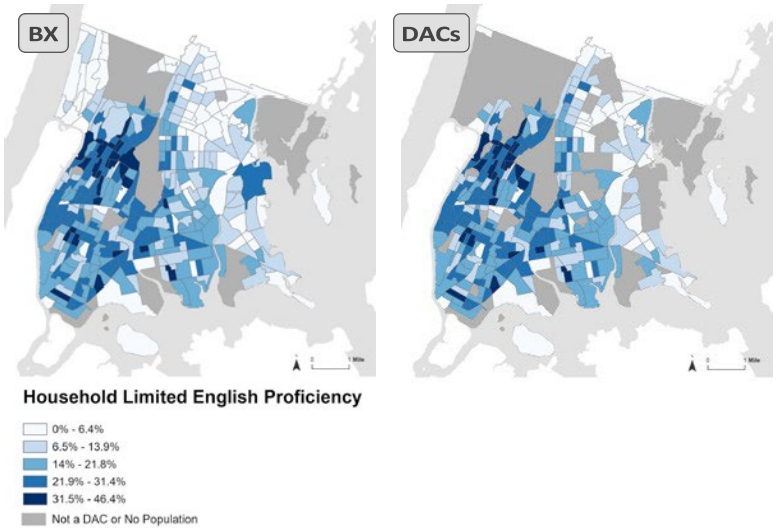
1. **Spanish**: *597,676 speakers*
2. **French, Haitian, or Cajun**: *19,562 speakers*
3. **Other Indo-European Languages**: *34,607 speakers*
4. **Other and Unspecified Languages**: *49,377 speakers*

Over 30% of *all* of NYC's Spanish speakers live in Bronx DACs

Language Spoken at Home: Total Number of Speakers (Population 5+)	DACs	Bronx	NYC	NYS
Speak Only English	474,970	564,124	4,226,352	13,097,954
Spanish	597,676	628,625	1,890,388	2,784,045
French, Haitian, Or Cajun	19,562	21,619	188,399	281,762
German Or Other West Germanic Languages	819	1,345	125,818	261,221
Russian, Polish, Or Other Slavic Languages	3,070	5,195	284,035	388,155
Other Indo-European Languages	34,607	43,550	444,576	742,066
Korean	1,061	1,727	61,968	91,429
Chinese (Incl. Mandarin, Cantonese)	4,086	5,440	497,973	602,162
Vietnamese	2,010	2,619	10,530	22,091
Tagalog (Incl. Filipino)	3,815	4,689	49,675	78,814
Other Asian And Pacific Island Languages	2,551	3,320	89,405	177,857
Arabic	6,629	6,915	77,158	117,917
Other And Unspecified Languages	49,377	54,671	155,723	227,034

HOUSEHOLD ENGLISH PROFICIENCY [1]

Household Language and English Proficiency by Household (% of Total HH)					
Household Language	**English Proficiency**	**DACs**	**Bronx**	**NYC**	**NYS**
English Only	N/A	34.6%	37.1%	50.4%	68.2%
Spanish	Limited English Speaking Household	**17.0%**	**15.5%**	**6.5%**	**3.6%**
	Not A Limited English Speaking Household	37.5%	35.8%	17.2%	11.3%
Other Indo-European Languages	Limited English Speaking Household	**1.3%**	**1.4%**	**3.5%**	**2.0%**
	Not A Limited English Speaking Household	3.7%	4.2%	10.4%	7.7%
Asian And Pacific Island Languages	Limited English Speaking Household	**0.3%**	**0.4%**	**3.4%**	**1.8%**
	Not A Limited English Speaking Household	1.0%	1.1%	5.6%	3.6%
Other Languages	Limited English Speaking Household	**0.8%**	**0.8%**	**0.4%**	**0.3%**
	Not A Limited English Speaking Household	3.8%	3.8%	2.5%	1.6%
All Languages	*Limited English Speaking Household*	***19.4%***	***18.1%***	***13.8%***	***7.7%***



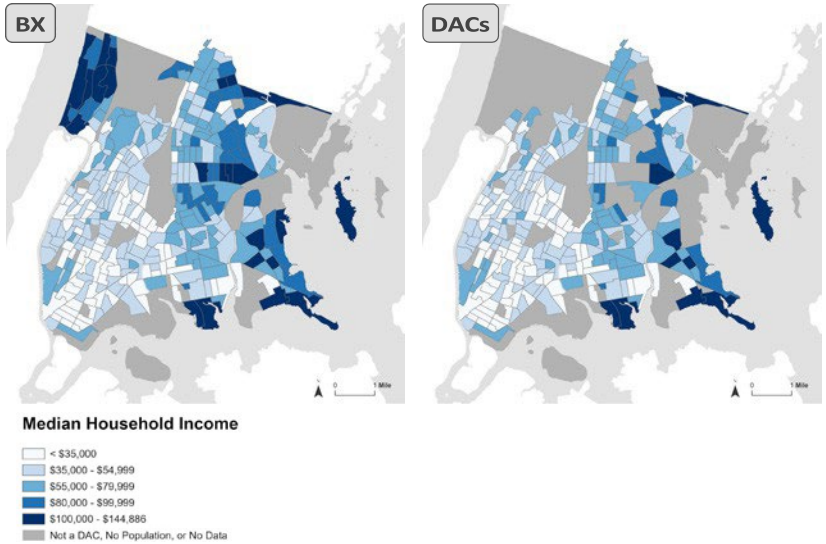
LABOR FORCE: PARTICIPATION [1]

Labor Force	DACs	Bronx	NYC	NYS
In Labor Force	58.3%	58.4%	63.2%	62.9%
In Armed Forces	0.1%	0.1%	0.1%	0.2%
Civilian	58.2%	58.3%	63.2%	62.8%
Employed	51.4%	51.8%	58.4%	58.8%
Unemployed	6.8%	6.5%	4.8%	3.9%
Not in Labor Force	41.7%	41.6%	36.8%	37.1%

Labor Participation Rate *by Race or Ethnicity*				
Race or Ethnicity		**Bronx**	**NYC**	**NYS**
Race	White alone	52.7%	64.9%	62.7%
	Black or African American alone	59.7%	60.2%	61.0%
	American Indian and Alaska Native alone	56.7%	64.8%	62.0%
	Asian alone	61.1%	64.4%	64.3%
	Native Hawaiian and Other Pacific Islander alone	77.6%	65.3%	64.2%
	Some other race alone	58.9%	61.5%	63.3%
	Two or more races	61.3%	64.7%	66.4%
Ethnicity	Hispanic or Latino origin (of any race)	59.4%	61.9%	64.3%
	White alone, not Hispanic or Latino	50.5%	65.6%	62.6%
Overall Labor Participation Rate		*58.4%*	*63.2%*	*62.9%*

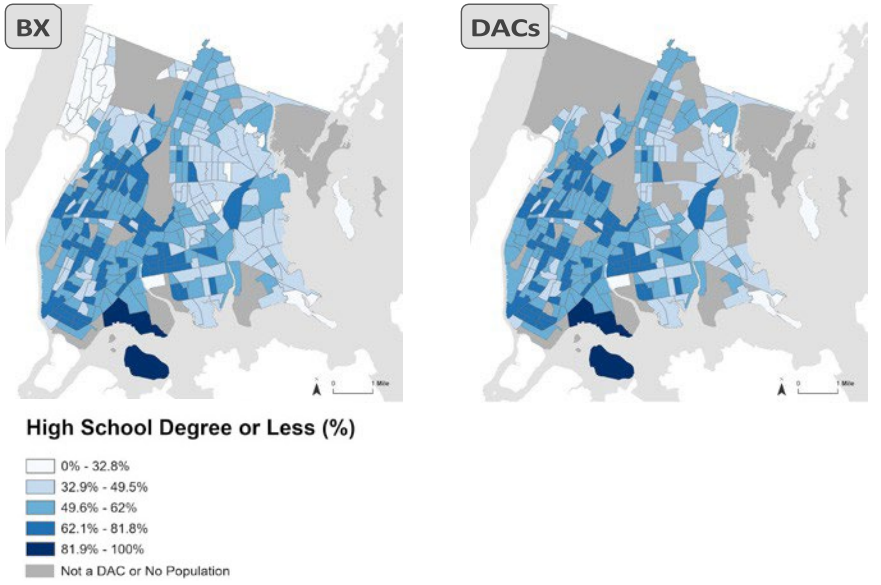
MEDIAN HOUSEHOLD INCOME [1]

Median Household Income *by Race or Ethnicity*					
Race or Ethnicity		**DACs**	**Bronx**	**NYC**	**NYS**
Race	White Alone Householder	$45,017	$55,583	$102,992	$90,866
	Black or African American Alone Householder	$45,483	$47,762	$58,011	$58,805
	American Indian and Alaska Native Alone Householder	$44,825	$46,568	$59,928	$59,483
	Asian Alone Householder	$66,115	$70,275	$84,031	$91,254
	Native Hawaiian and Other Pacific Islander Alone Householder	$35,426	$35,433	$59,792	$57,817
	Some Other Race Alone Householder	$38,557	$39,923	$50,448	$55,421
	Two or More Races Householder	$47,725	$49,348	$70,068	$74,254
Ethnicity	Hispanic or Latino Householder	$39,858	$41,220	$53,670	$61,135
	White Alone Householder, Not Hispanic or Latino	$61,092	$75,289	$110,890	$92,218
Overall MHI		*$43,799*	*$47,036*	*$76,607*	*$81,386*



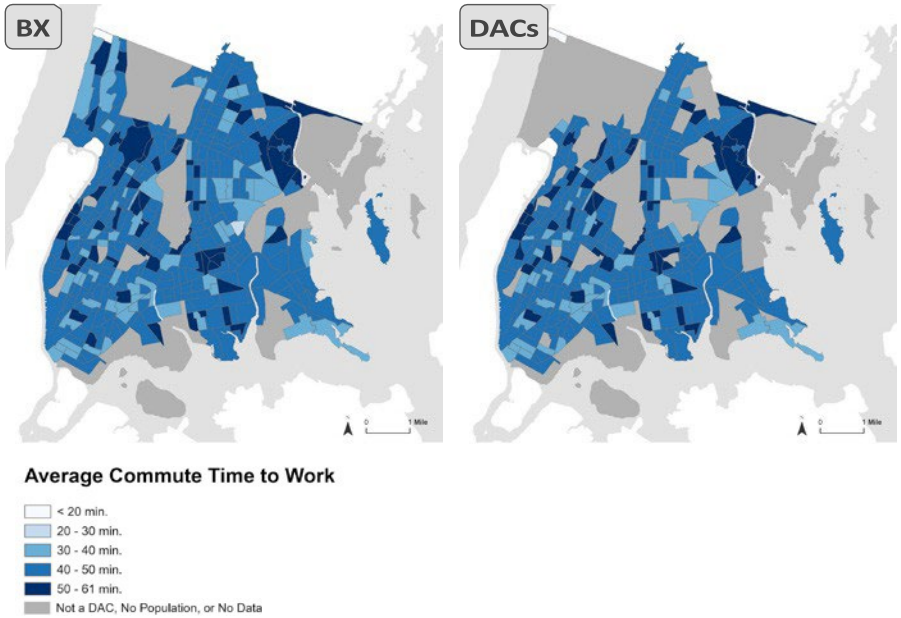
EDUCATIONAL ATTAINMENT [1]

Educational Attainment Level (Ages 25+)	**DACs**	**Bronx**	**NYC**	**NYS**
Less than High School	27.2%	25.5%	16.7%	12.4%
High School Graduate or More (Includes Equivalency)	72.8%	74.5%	83.3%	87.6%
Some College or More	43.8%	46.3%	60.0%	62.7%
Bachelor's Degree or More	18.5%	21.2%	40.2%	38.8%
Master's Degree or More	6.1%	7.7%	17.0%	17.2%
Professional School Degree or More	1.1%	1.7%	5.0%	4.8%
Doctorate Degree	0.4%	0.6%	1.7%	1.7%



COMMUTE TIME [1]

Travel Time to Work (for workers 16+)	DACs	Bronx	NYC	NYS
< 5 min.	1.4%	1.4%	1.2%	2.5%
5 - 14 min.	7.2%	7.3%	8.1%	17.5%
15 - 29 min.	17.4%	17.8%	21.0%	29.6%
30 - 44 min.	23.0%	22.8%	27.0%	22.0%
45 - 59 min.	16.8%	16.8%	16.2%	10.9%
60 - 89 min.	24.6%	24.3%	19.0%	11.9%
90+ min.	9.6%	9.6%	7.5%	5.6%
Average Commute Time	45 min.	45 min.	41 min.	33 min.



MEANS OF TRANSPORT TO WORK [1]

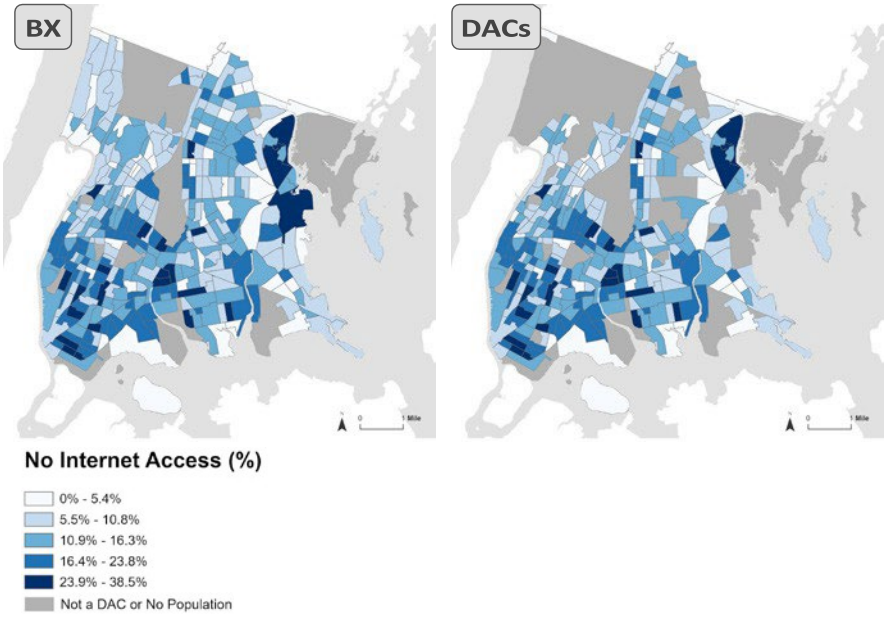
Means of Transport to Work (for workers 16+)	DACs	Bronx	NYC	NYS
Car, Truck, or Van	26.2%	28.1%	26.6%	56.9%
Drove Alone	*22.1%*	*23.7%*	*22.2%*	*50.5%*
Carpooled	*4.1%*	*4.4%*	*4.3%*	*6.3%*
Public Transportation (Includes Taxicab)	58.4%	56.3%	48.5%	24.1%
Motorcycle	0.0%	0.0%	0.1%	0.1%
Bicycle	0.5%	0.5%	1.5%	0.8%
Walked	7.6%	7.4%	9.4%	5.7%
Other Means	1.0%	1.0%	1.0%	0.9%
Worked At Home	6.3%	6.8%	13.1%	11.6%

VEHICLE ACCESS [1]

Vehicle Access by Household (Occupied)	DACs	Bronx	NYC	NYS
No Vehicle Available	63.4%	60.2%	54.7%	29.0%
1 Vehicle Available	27.6%	29.5%	32.0%	33.1%
2 Vehicles Available	7.2%	8.1%	10.2%	25.8%
3 Vehicles Available	1.4%	1.7%	2.4%	8.5%
4 Vehicles Available	0.4%	0.4%	0.6%	2.7%
5 or More Vehicles Available	0.1%	0.1%	0.2%	1.1%

INTERNET ACCESS [1]

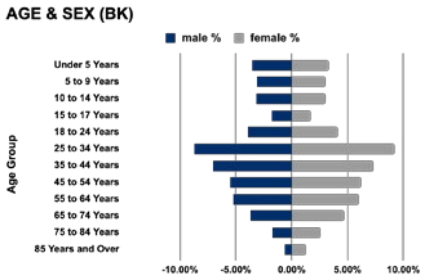
Internet Access by Household	DACs	Bronx	NYC	NYS
With An Internet Subscription	83.3%	83.8%	87.6%	88.4%
Dial-Up Alone	*0.1%*	*0.1%*	*0.1%*	*0.2%*
Broadband (such As Cable, Fiber Optic, or DSL)	*63.6%*	*64.5%*	*73.5%*	*75.6%*
Satellite Internet Service	*4.0%*	*4.0%*	*4.0%*	*4.1%*
Other Service	*2.0%*	*1.9%*	*0.9%*	*0.8%*
Internet Access Without A Subscription	2.9%	2.9%	2.1%	2.3%
No Internet Access	13.8%	13.3%	10.3%	9.4%

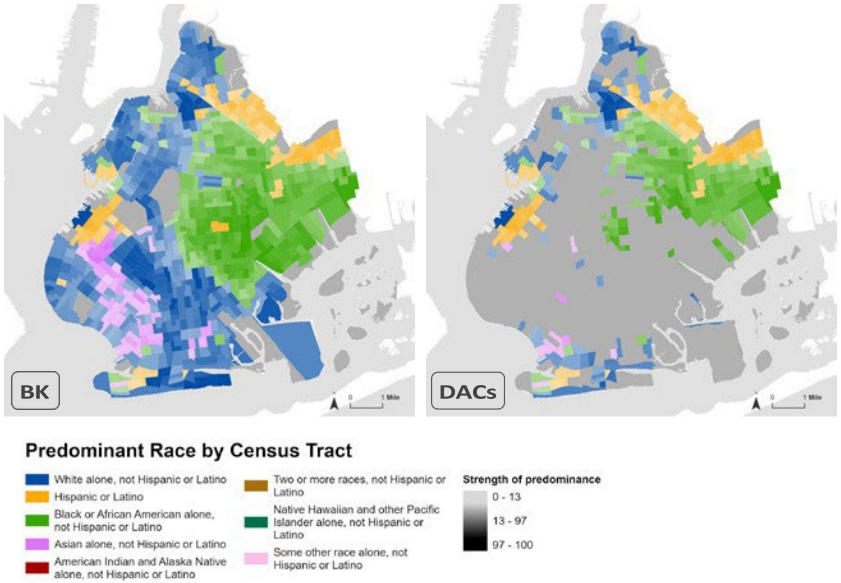


BROOKLYN: OVERVIEW

TOTAL POPULATION [1]
2,679,620

TOTAL POPULATION DAC [1,2]
1,222,191 ***(46% total pop.)***





[1] ACS 5-Year Estimates, 2022
[2] NYSERDA Final Disadvantaged Communities, 2023

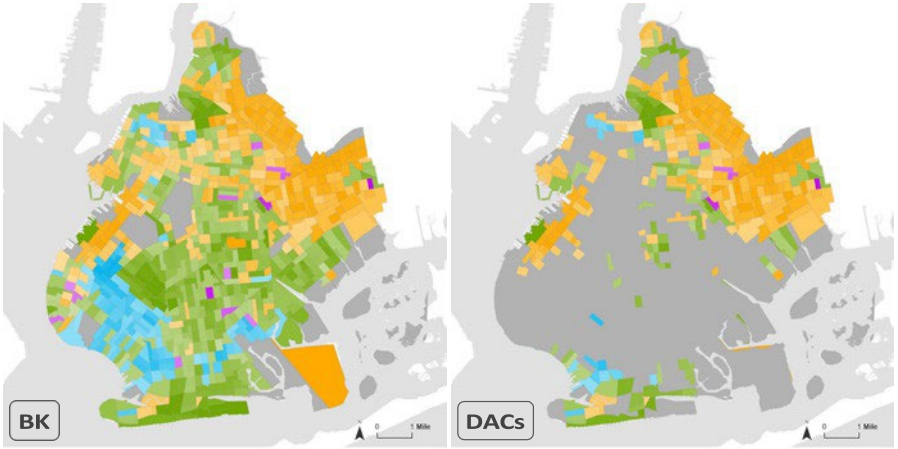
RACE & ETHNICITY

Race	DACs	Brooklyn	NYC	NYS
White Alone	30.0%	40.4%	37.5%	58.8%
Black or African American Alone	39.3%	30.0%	23.1%	15.1%
American Indian and Alaska Native Alone	0.7%	0.5%	0.6%	0.5%
Asian Alone	7.5%	12.0%	14.5%	8.8%
Native Hawaiian and Other Pacific Islander Alone	0.1%	0.1%	0.1%	0.1%
Some Other Race Alone	14.0%	9.8%	15.4%	9.4%
Two or More Races	8.4%	7.3%	8.9%	7.4%

Ethnicity	DACs	Brooklyn	NYC	NYS
Hispanic or Latino	27.2%	18.9%	29.0%	19.5%
White Alone	*6.0%*	*4.3%*	*6.3%*	*4.9%*
Black or African American Alone	*2.7%*	*1.7%*	*2.1%*	*1.2%*
American Indian and Alaska Native Alone	*0.5%*	*0.4%*	*0.4%*	*0.3%*
Asian Alone	*0.1%*	*0.1%*	*0.1%*	*0.1%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*13.2%*	*8.9%*	*14.2%*	*8.6%*
Two or More Races	*4.7%*	*3.5%*	*5.8%*	*4.4%*
Not Hispanic or Latino	72.8%	81.1%	71.0%	80.5%
White Alone	*24.1%*	*36.1%*	*31.2%*	*53.8%*
Black or African American Alone	*36.6%*	*28.3%*	*21.0%*	*13.8%*
American Indian and Alaska Native Alone	*0.1%*	*0.1%*	*0.2%*	*0.2%*
Asian Alone	*7.5%*	*11.9%*	*14.4%*	*8.8%*
Native Hawaiian and Other Pacific Islander Alone	*0.1%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*0.8%*	*0.8%*	*1.1%*	*0.8%*
Two or More Races	*3.6%*	*3.8%*	*3.1%*	*3.1%*

LANGUAGE [1]

Language Spoken at Home (Population 5+)	DACs	Brooklyn	NYC	NYS
Speak Only English	57.4%	55.8%	52.2%	69.4%
Spanish	21.6%	14.6%	23.3%	14.8%
French, Haitian, Or Cajun	2.9%	3.5%	2.3%	1.5%
German Or Other West Germanic Languages	4.1%	4.2%	1.6%	1.4%
Russian, Polish, Or Other Slavic Languages	3.8%	6.2%	3.5%	2.1%
Other Indo-European Languages	2.8%	3.9%	5.5%	3.9%
Korean	0.2%	0.2%	0.8%	0.5%
Chinese (Incl. Mandarin, Cantonese)	3.8%	7.0%	6.2%	3.2%
Vietnamese	0.1%	0.1%	0.1%	0.1%
Tagalog (Incl. Filipino)	0.1%	0.2%	0.6%	0.4%
Other Asian And Pacific Island Languages	0.7%	0.9%	1.1%	0.9%
Arabic	0.8%	1.3%	1.0%	0.6%
Other And Unspecified Languages	1.6%	2.0%	1.9%	1.2%



LANGUAGE [1]

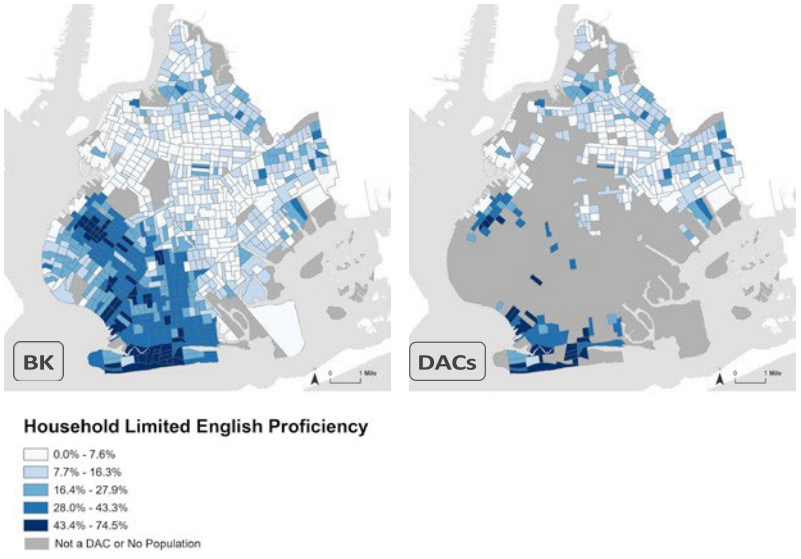
Top non-English languages in DACs *(~10,000 speakers above age 5)*:

1. **Spanish**: *246,383 speakers*
2. **German or West Germanic Languages**: *47,130 speakers*
3. **Russian, Polish, or Other Slavic Languages**: *43,702 speakers*
4. **Chinese (Incl. Mandarin, Cantonese)**: *43,568 speakers*
5. **French, Haitian, or Cajun**: *33,241 speakers*
6. **Other Indo-European Languages**: *31,710 speakers*
7. **Other and Unspecified Languages**: *18,329 speakers*

Language Spoken at Home: Total Number of Speakers (Population 5+)	DACs	Brooklyn	NYC	NYS
Speak Only English	654,040	1,393,047	4,226,352	13,097,954
Spanish	246,383	364,523	1,890,388	2,784,045
French, Haitian, Or Cajun	33,241	86,983	188,399	281,762
German Or Other West Germanic Languages	47,130	105,757	125,818	261,221
Russian, Polish, Or Other Slavic Languages	43,702	154,651	284,035	388,155
Other Indo-European Languages	31,710	97,866	444,576	742,066
Korean	2,764	6,011	61,968	91,429
Chinese (Incl. Mandarin, Cantonese)	43,568	175,423	497,973	602,162
Vietnamese	718	2,978	10,530	22,091
Tagalog (Incl. Filipino)	1,580	5,339	49,675	78,814
Other Asian And Pacific Island Languages	7,840	23,558	89,405	177,857
Arabic	8,566	31,632	77,158	117,917
Other And Unspecified Languages	18,329	48,726	155,723	227,034

HOUSEHOLD ENGLISH PROFICIENCY [1]

Household Language and English Proficiency by Household (% of Total HH)					
Household Language	**English Proficiency**	**DACs**	**Brooklyn**	**NYC**	**NYS**
English Only	N/A	54.6%	53.5%	50.4%	68.2%
Spanish	Limited English Speaking Household	**6.2%**	**3.9%**	**6.5%**	**3.6%**
	Not A Limited English Speaking Household	16.9%	11.8%	17.2%	11.3%
Other Indo-European Languages	Limited English Speaking Household	**4.8%**	**6.4%**	**3.5%**	**2.0%**
	Not A Limited English Speaking Household	9.8%	12.8%	10.4%	7.7%
Asian And Pacific Island Languages	Limited English Speaking Household	**2.0%**	**3.0%**	**3.4%**	**1.8%**
	Not A Limited English Speaking Household	3.2%	5.0%	5.6%	3.6%
Other Languages	Limited English Speaking Household	**0.4%**	**0.6%**	**0.4%**	**0.3%**
	Not A Limited English Speaking Household	2.2%	2.8%	2.5%	1.6%
All Languages	*Limited English Speaking Household*	***13.4%***	***13.9%***	***13.8%***	***7.7%***



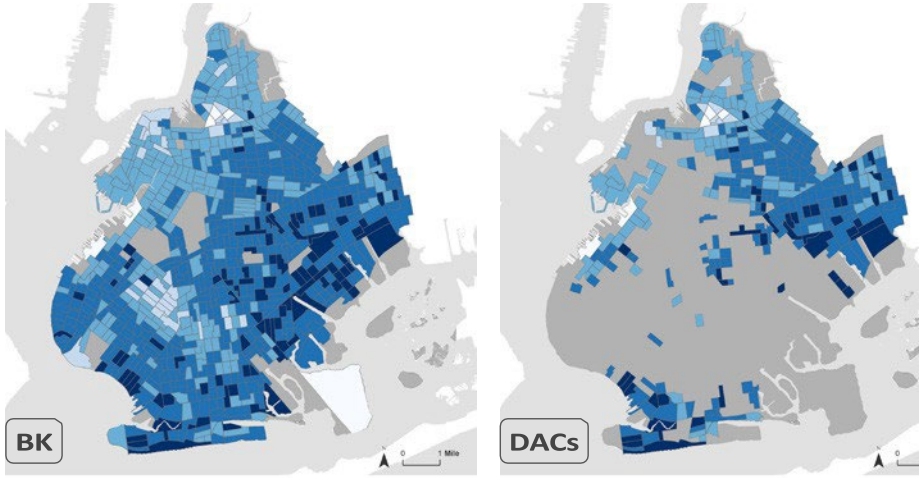
LABOR FORCE: PARTICIPATION [1]

Labor Force	**DACs**	**Brooklyn**	**NYC**	**NYS**
In Labor Force	61.8%	63.7%	63.2%	62.9%
In Armed Forces	0.0%	0.1%	0.1%	0.2%
Civilian	61.7%	63.7%	63.2%	62.8%
Employed	56.4%	59.0%	58.4%	58.8%
Unemployed	5.3%	4.6%	4.8%	3.9%
Not in Labor Force	38.3%	36.3%	36.8%	37.1%

Labor Participation Rate *by Race or Ethnicity*				
Race or Ethnicity		**Brooklyn**	**NYC**	**NYS**
Race	White alone	66.4%	64.9%	62.7%
	Black or African American alone	59.9%	60.2%	61.0%
	American Indian and Alaska Native alone	64.9%	64.8%	62.0%
	Asian alone	64.4%	64.4%	64.3%
	Native Hawaiian and Other Pacific Islander alone	58.5%	65.3%	64.2%
	Some other race alone	61.8%	61.5%	63.3%
	Two or more races	66.3%	64.7%	66.4%
Ethnicity	Hispanic or Latino origin (of any race)	61.9%	61.9%	64.3%
	White alone, not Hispanic or Latino	67.0%	65.6%	62.6%
Overall Labor Participation Rate		*63.7%*	*63.2%*	*62.9%*

COMMUTE TIME [1]

Travel Time to Work (for workers 16+)	DACs	Brooklyn	NYC	NYS
< 5 min.	1.2%	1.2%	1.2%	2.5%
5 - 14 min.	6.9%	7.1%	8.1%	17.5%
15 - 29 min.	15.8%	17.2%	21.0%	29.6%
30 - 44 min.	29.6%	27.7%	27.0%	22.0%
45 - 59 min.	19.7%	19.1%	16.2%	10.9%
60 - 89 min.	19.7%	20.7%	19.0%	11.9%
90+ min.	7.1%	7.0%	7.5%	5.6%
Average Commute Time	43 min.	43 min.	41 min.	33 min.



MEANS OF TRANSPORT TO WORK [1]

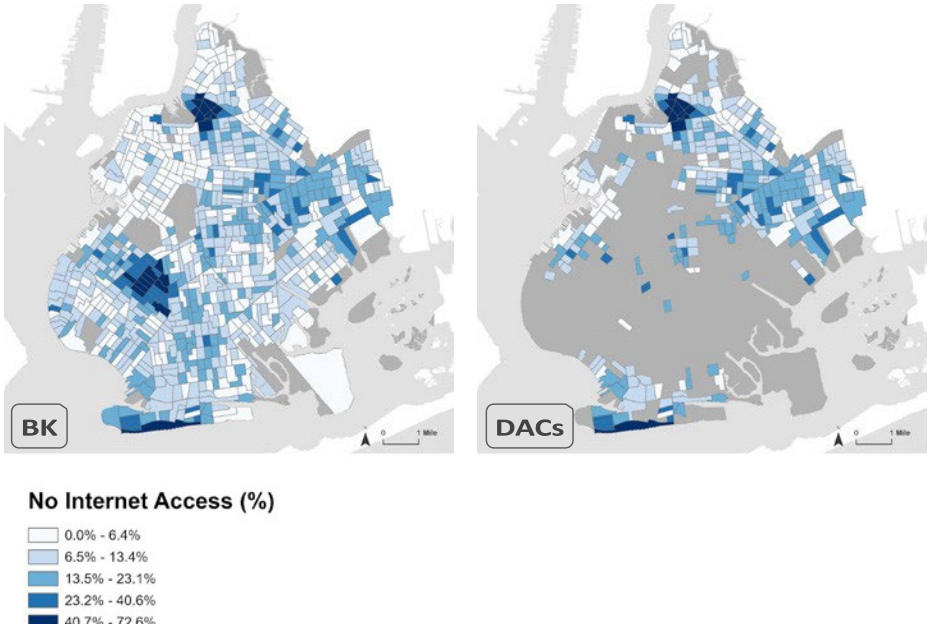
Means of Transport to Work (for workers 16+)	DACs	Brooklyn	NYC	NYS
Car, Truck, or Van	19.6%	22.1%	26.6%	56.9%
Drove Alone	*16.3%*	*18.2%*	*22.2%*	*50.5%*
Carpooled	*3.3%*	*4.0%*	*4.3%*	*6.3%*
Public Transportation (Includes Taxicab)	55.6%	51.6%	48.5%	24.1%
Motorcycle	0.1%	0.1%	0.1%	0.1%
Bicycle	2.4%	2.1%	1.5%	0.8%
Walked	8.5%	8.5%	9.4%	5.7%
Other Means	1.0%	1.0%	1.0%	0.9%
Worked At Home	12.9%	14.6%	13.1%	11.6%

VEHICLE ACCESS [1]

Vehicle Access by Household (Occupied)	DACs	Brooklyn	NYC	NYS
No Vehicle Available	63.7%	55.3%	54.7%	29.0%
1 Vehicle Available	29.9%	35.1%	32.0%	33.1%
2 Vehicles Available	5.2%	7.7%	10.2%	25.8%
3 Vehicles Available	0.9%	1.4%	2.4%	8.5%
4 Vehicles Available	0.2%	0.3%	0.6%	2.7%
5 or More Vehicles Available	0.1%	0.1%	0.2%	1.1%

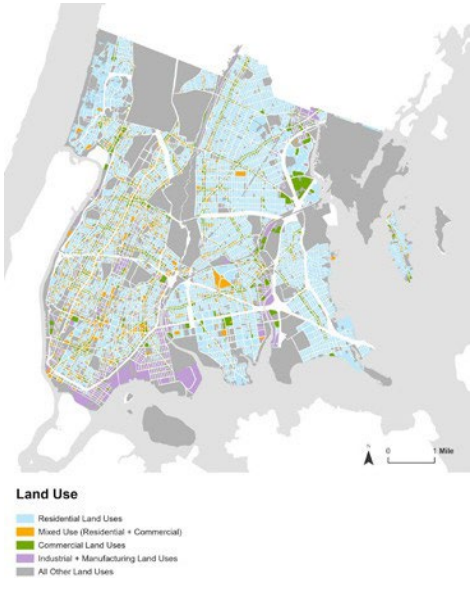
INTERNET ACCESS [1]

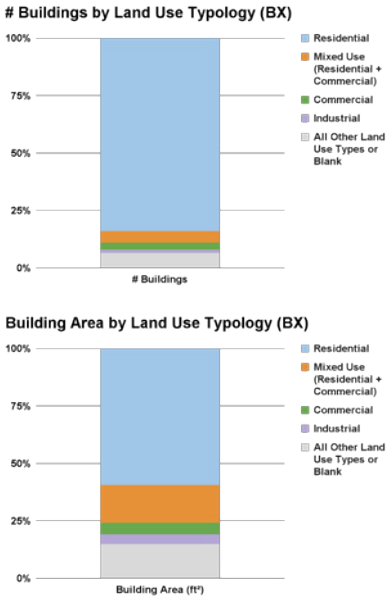
Internet Access by Household	DACs	Brooklyn	NYC	NYS
With An Internet Subscription	83.5%	86.4%	87.6%	88.4%
Dial-Up Alone	*0.1%*	*0.1%*	*0.1%*	*0.2%*
Broadband (such As Cable, Fiber Optic, or DSL)	*69.4%*	*73.7%*	*73.5%*	*75.6%*
Satellite Internet Service	*5.5%*	*4.7%*	*4.0%*	*4.1%*
Other Service	*0.9%*	*0.8%*	*0.9%*	*0.8%*
Internet Access Without A Subscription	2.3%	2.0%	2.1%	2.3%
No Internet Access	14.2%	11.7%	10.3%	9.4%



Appendix B
Complete Buildings & Land Use Data

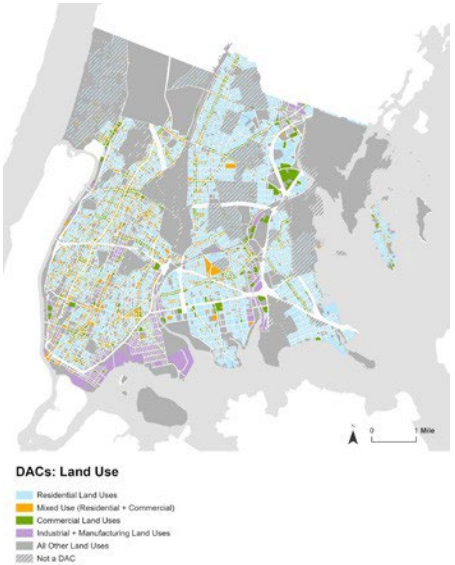
LAND USE (BX): Overall Land Use Typologies

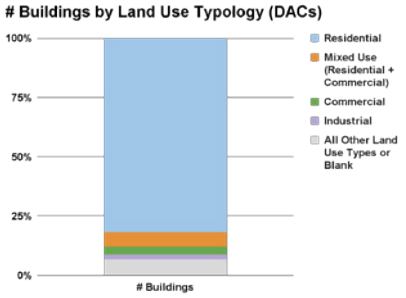


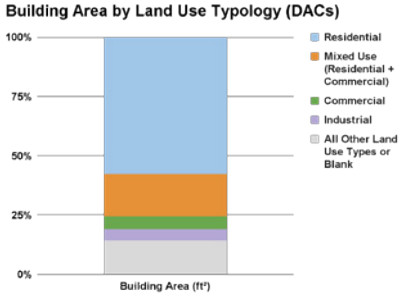


Buildings by Land Use (BX)	# Buildings	% of Total Buildings
Residential*	88,250	84.0%
1-4 Units	77,273	73.5%
5+ Units	10,934	10.4%
0 Units or Blank	*43*	*0.0%*
Commercial*	3,213	3.1%
Small (>25,000 ft²)	2,871	2.7%
Large (<25,000 ft²)	262	0.2%
0 Commercial sq. ft. or Blank	*80*	*0.1%*
Mixed Use (residential + commercial)*	5,327	5.1%
1-4 Units (residential)	2,438	2.3%
5+ Units (residential)	2,634	2.5%
0 Units or Blank	*255*	*0.2%*
Industrial	1,519	1.4%
All Other Land Use Types or Blank	6,774	6.4%
Total	***105,083***	--

LAND USE (DACs): Overall Land Use Typologies

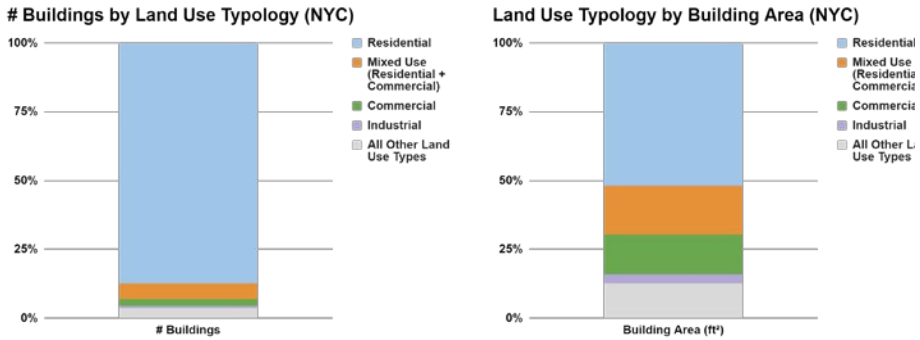






Buildings by Land Use (DACs)	# Buildings	% of Total Buildings
Residential*	67,695	81.8%
1-4 Units	57,364	69.3%
5+ Units	10,298	12.4%
0 Units or Blank	*33*	*0.0%*
Commercial*	2,869	3.5%
Small (>25,000 ft²)	2,547	3.1%
Large (<25,000 ft²)	254	0.3%
0 Commercial sq. ft. or Blank	*68*	*0.1%*
Mixed Use (residential + commercial)*	4,897	5.9%
1-4 Units (residential)	2,142	2.6%
5+ Units (residential)	2,508	3.0%
0 Units or Blank	*247*	*0.3%*
Industrial	1,503	1.8%
All Other Land Use Types or Blank	5,757	7.0%
Total	***82,721***	--

LAND USE (NYC): Overall Land Use Typologies



Buildings by Land Use (NYC)	# Buildings	% of Total Buildings
Residential*	948,999	87.2%
1-4 Unit	859,708	79.0%
5+ Units	89,079	8.2%
0 Units or Blank	*212*	0.0%
Commercial*	23,841	2.2%
Small (>25,000 ft²)	19,214	1.8%
Large (<25,000 ft²)	3,799	0.3%
0 Commercial sq. ft. or Blank	*828*	0.1%
Mixed Use (residential + commercial)*	64,753	5.9%
1-4 Unit (residential)	39,481	3.6%
5+ Units (residential)	22,440	2.1%
0 Units or Blank	*2,832*	0.3%
Industrial	11,778	1.1%
All Other Land Use Types	38,918	3.6%
Total	***1,088,289***	--

LAND USE: Residential Land Use Typologies by # of Residential Units

Bronx

Residential Land Use Typology	# Total Residential Units in BX	% Total Residential Units in BX
1-4 Units	**126,169**	**21.8%**
"Residential" LU	121,954	21.0%
"Mixed Use" LU	4,007	0.7%
Other LU	*208*	*0.0%*
5+ Units	**453,367**	**78.2%**
"Residential" LU	332,186	57.3%
"Mixed Use" LU	115,062	19.9%
Other LU	*6,119*	*1.1%*
Total Residential Units	***579,536***	--

NYC

Residential Land Use Typology	# Total Residential Units in NYC	% Total Residential Units in NYC
1-4 Units	**1,184,132**	**32.2%**
"Residential" LU	1108061	30.1%
"Mixed Use" LU	73083	2.0%
Other LU	*2988*	*0.1%*
5+ Units	**2,491,332**	**67.8%**
"Residential" LU	1,676,891	45.6%
"Mixed Use" LU	781,977	21.3%
Other LU	*32,464*	*0.9%*
Total Residential Units	***3,675,464***	-

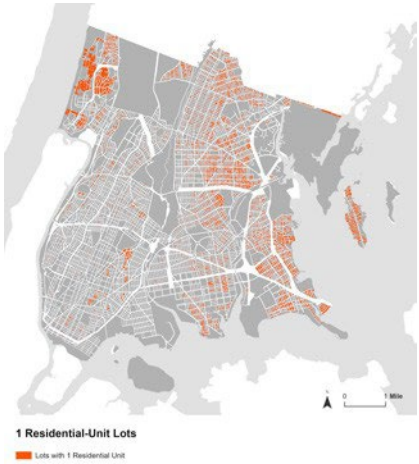
DACs

Residential Land Use Typology	# Total Residential Units in DACs	% Total Residential Units in DACs	% Total Residential Units in BX
1-4 Units	**98,642**	**19.0%**	**17.0%**
"Residential" LU	94,876	18.2%	16.4%
"Mixed Use" LU	3,580	0.7%	0.6%
Other LU	*186*	*0.0%*	*0.0%*
5+ Units	**421,532**	**81.0%**	**72.7%**
"Residential" LU	305,547	58.7%	52.7%
"Mixed Use" LU	110,553	21.3%	19.1%
Other LU	*5,432*	*1.0%*	*0.9%*
Total Residential Units	***520,174***	--	***89.8%***

LAND USE: Residential Land Use Typologies by # of Residential Units

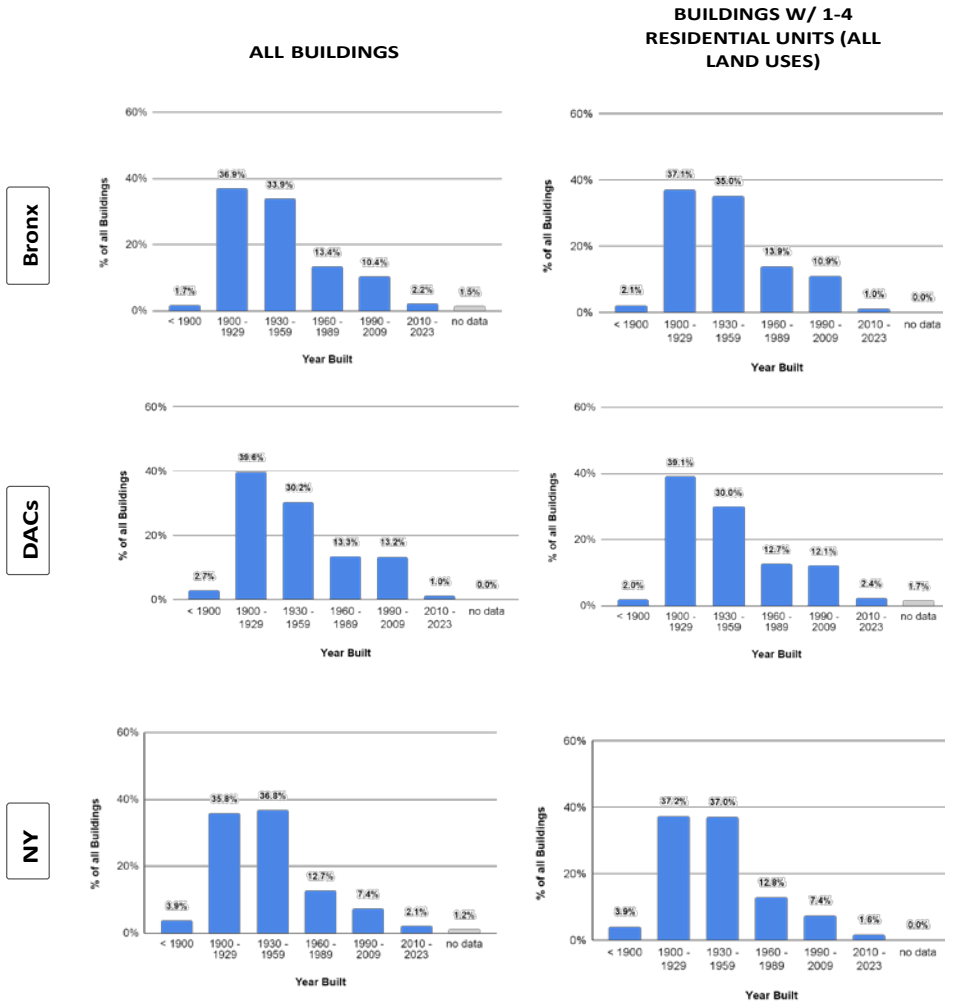
76% *of all buildings are part of a lot that has 1-4 residential units*

LAND USE: Residential Land Use Typologies by # of Residential Units



LAND USE: Residential Land Use Typologies by # of Residential Units

YEAR BUILT



RESIDENTIAL LAND USE: Occupancy, Vacancy, Tenure

Housing Tenure, Occupancy/Vacancy Rates				
	DACs	BX	NYC	NYS
Occupancy Rate	96.0%	95.9%	90.7%	89.5%
Owner-Occupied	**15.3%**	**19.1%**	**29.9%**	**48.6%**
Units in a 1-4-Unit Building	**10.9%**	**12.9%**	**19.7%**	**41.8%**
Units in a 5+-Unit Building	4.3%	6.1%	10.1%	5.5%
Units in a Mobile Home/Boat/RV/etc.	*0.1%*	*0.1%*	*0.1%*	*1.3%*
Renter-Occupied	80.7%	76.8%	60.8%	40.9%
Units in a 1-4-Unit Building	13.1%	13.4%	15.1%	15.0%
Units in a 5+-Unit Building	67.5%	63.2%	45.6%	25.5%
Units in a Mobile Home/Boat/RV/etc.	*0.2%*	*0.2%*	*0.1%*	*0.4%*
Vacancy Rate	4.0%	4.1%	9.3%	10.5%
For Rent	1.7%	1.6%	2.3%	1.7%
For Sale	0.2%	0.2%	0.5%	0.6%
Other Vacant	2.1%	2.3%	6.5%	7.0%

"VACANCY RATES"	DACs	BX	NYC	NYS
"Available Housing Vacancy Rate":	1.90%	1.86%	2.99%	2.47%
"For Sale" + "For Rent":	1.86%	1.83%	2.83%	2.29%

RESIDENTIAL LAND USE: House Heating Fuel by Tenure

Owner-Occupied

House Heating Fuel for Owner-Occupied Households *(as a %age of Total Owner-Occupied Households)*	DACs	Bronx	NYC	NYS
Utility Gas	63.1%	64.2%	73.7%	60.8%
Bottled, Tank, Or Lp Gas	3.4%	3.4%	2.9%	5.8%
Electricity	9.6%	8.9%	8.5%	7.5%
Fuel Oil, Kerosene, Etc.	19.2%	19.9%	12.3%	21.7%
Coal Or Coke	0.1%	0.0%	0.0%	0.3%
Wood	0.1%	0.1%	0.1%	2.4%
Solar Energy	0.3%	0.2%	0.1%	0.1%
Other Fuel	1.4%	1.2%	1.2%	0.9%
No Fuel Used	2.8%	2.2%	1.2%	0.5%

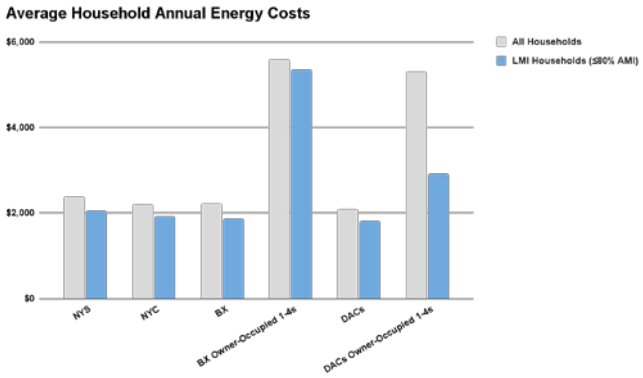
Renter-Occupied

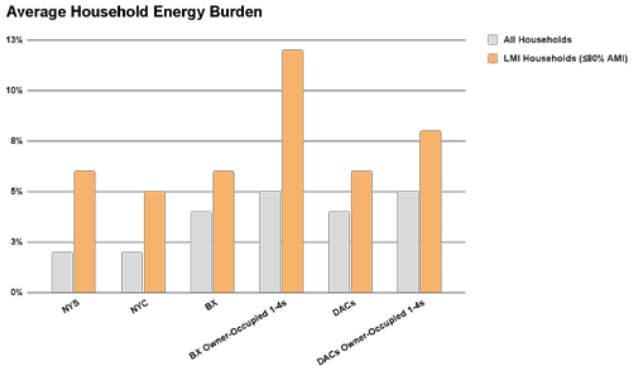
House Heating Fuel for Renter-Occupied Households *(as a %age of Total Renter-Occupied Households)*	DACs	Bronx	NYC	NYS
Utility Gas	45.9%	46.6%	60.9%	57.9%
Bottled, Tank, Or Lp Gas	2.2%	2.3%	2.4%	3.2%
Electricity	15.4%	15.2%	17.1%	20.9%
Fuel Oil, Kerosene, etc.	29.6%	29.3%	14.3%	13.5%
Coal Or Coke	0.1%	0.1%	0.1%	0.1%
Wood	0.0%	0.0%	0.0%	0.2%
Solar Energy	0.1%	0.1%	0.1%	0.1%
Other Fuel	1.6%	1.5%	1.8%	1.6%
No Fuel Used	5.1%	4.9%	3.4%	2.6%

ENERGY COST & BURDEN

	Annual Energy Cost		Energy Burden	
	All	LMI	All	LMI
NYS	$2,391	$2,041	2%	6%
NYC	$2,201	$1,928	2%	5%
BX	$2,224	$1,871	4%	6%
BX Owner-Occupied 1-4s	$5,591	$5,356	5%	12%
DACs	$2,088	$1,805	4%	6%
DACs Owner-Occupied 1-4s	$5,305	$2,909	5%	8%

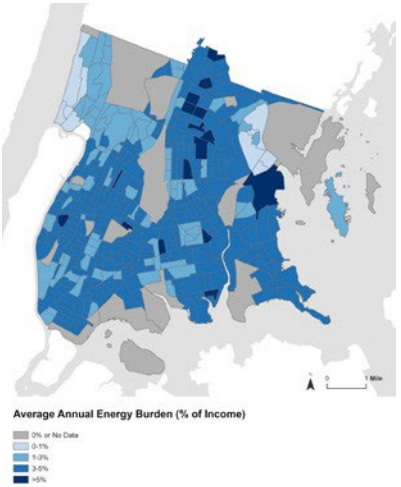
DOE LEAD Tool, 2018. https://www.energy.gov/scep/slsc/lead-tool

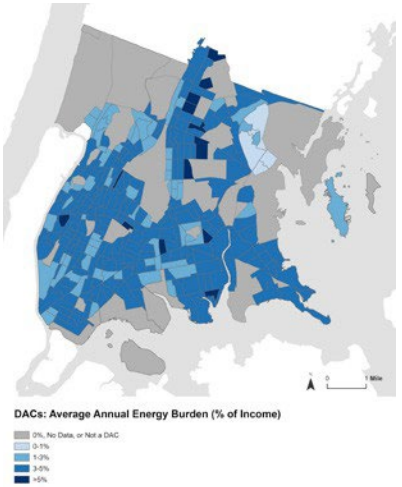




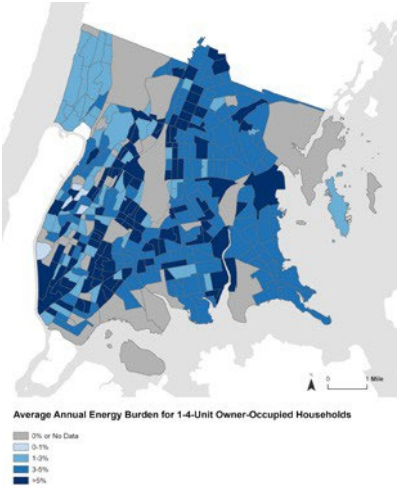
ENERGY COST & BURDEN

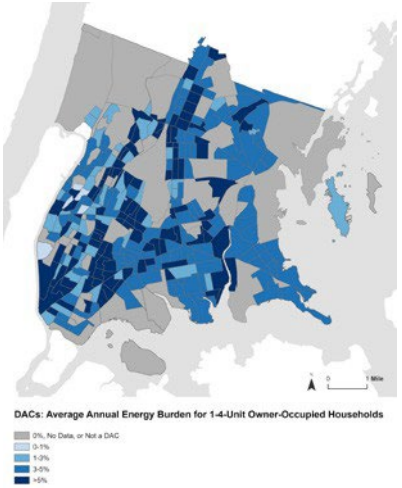
All Households



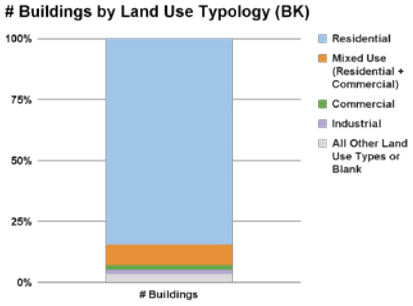


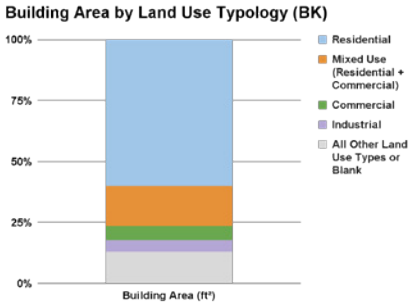
1-4-Unit Owner-Occupied Households





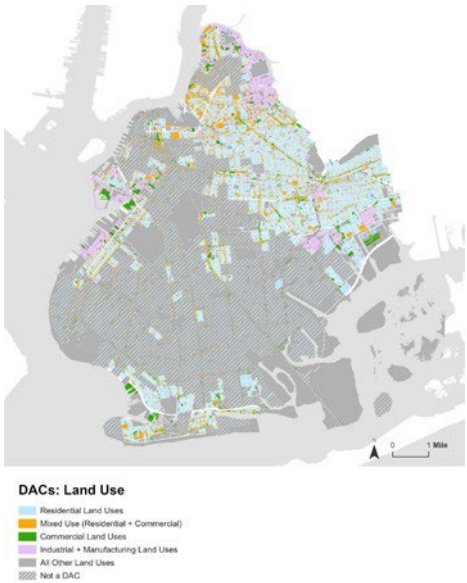
LAND USE (BK): Overall Land Use Typologies

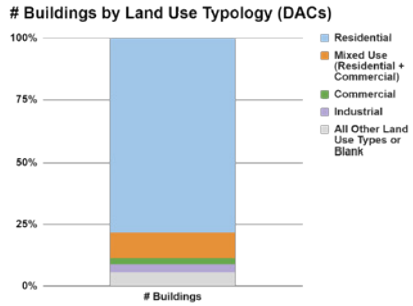


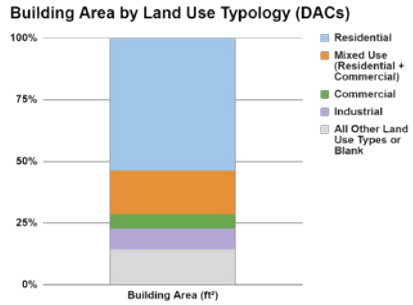


Buildings by Land Use (BK)	# Buildings	% of Total Buildings
Residential*	281,461	84.6%
1-4 Units	253,941	76.3%
5+ Units	27,473	8.3%
0 Units or Blank	*47*	*0.0%*
Commercial*	6,321	1.9%
Small (>25,000 ft²)	5,536	1.7%
Large (<25,000 ft²)	617	0.2%
0 Commercial sq. ft. or Blank	*168*	*0.1%*
Mixed Use (residential + commercial)*	27,937	8.4%
1-4 Units (residential)	19,870	6.0%
5+ Units (residential)	6,844	2.1%
0 Units or Blank	*1,223*	*0.4%*
Industrial	4,928	1.5%
All Other Land Use Types or Blank	12,121	3.6%
Total	***332,768***	--

LAND USE (DACs): Overall Land Use Typologies

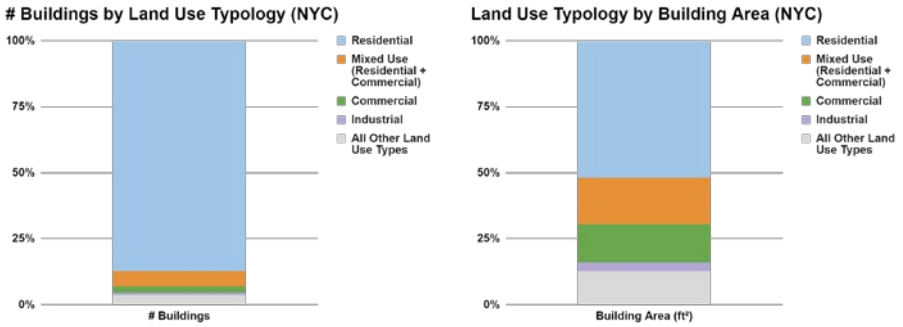






Buildings by Land Use (DACs)	# Buildings	% of Total Buildings
Residential*	89,333	78.3%
1-4 Units	74,557	65.3%
5+ Units	14,764	12.9%
0 Units or Blank	*12*	*0.0%*
Commercial*	2,693	2.4%
Small (>25,000 ft²)	2,267	2.0%
Large (<25,000 ft²)	309	0.3%
0 Commercial sq. ft. or Blank	*117*	*0.1%*
Mixed Use (residential + commercial)*	11,855	10.4%
1-4 Units (residential)	7,863	6.9%
5+ Units (residential)	3,456	3.0%
0 Units or Blank	*536*	*0.5%*
Industrial	3,850	3.4%
All Other Land Use Types or Blank	6,419	5.6%
Total	***114,150***	--

LAND USE (NYC): Overall Land Use Typologies



Buildings by Land Use (NYC)	# Buildings	% of Total Buildings
Residential*	948,999	87.2%
1-4 Unit	859,708	79.0%
5+ Units	89,079	8.2%
0 Units or Blank	*212*	0.0%
Commercial*	23,841	2.2%
Small (>25,000 ft²)	19,214	1.8%
Large (<25,000 ft²)	3,799	0.3%
0 Commercial sq. ft. or Blank	*828*	0.1%
Mixed Use (residential + commercial)*	64,753	5.9%
1-4 Unit (residential)	39,481	3.6%
5+ Units (residential)	22,440	2.1%
0 Units or Blank	*2,832*	0.3%
Industrial	11,778	1.1%
All Other Land Use Types	38,918	3.6%
Total	***1,088,289***	--

LAND USE: Residential Land Use Typologies by # of Residential Units

Brooklyn

Residential Land Use Typology	# Total Residential Units in BK	% Total Residential Units in BK
1-4 Units	**438,492**	**40.2%**
"Residential" LU	398,983	36.6%
"Mixed Use" LU	38,467	3.5%
Other LU	*1,042*	*0.1%*
5+ Units	**651,416**	**59.8%**
"Residential" LU	480,689	44.1%
"Mixed Use" LU	162,909	14.9%
Other LU	*7,818*	*0.7%*
Total Residential Units	***1,089,908***	--

NYC

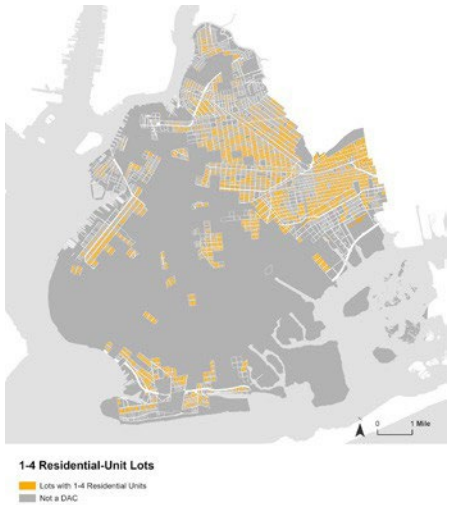
Residential Land Use Typology	# Total Residential Units in NYC	% Total Residential Units in NYC
1-4 Units	**1,184,132**	**32.2%**
"Residential" LU	1108061	30.1%
"Mixed Use" LU	73083	2.0%
Other LU	*2988*	*0.1%*
5+ Units	**2,491,332**	**67.8%**
"Residential" LU	1,676,891	45.6%
"Mixed Use" LU	781,977	21.3%
Other LU	*32,464*	*0.9%*
Total Residential Units	***3,675,464***	-

DACs

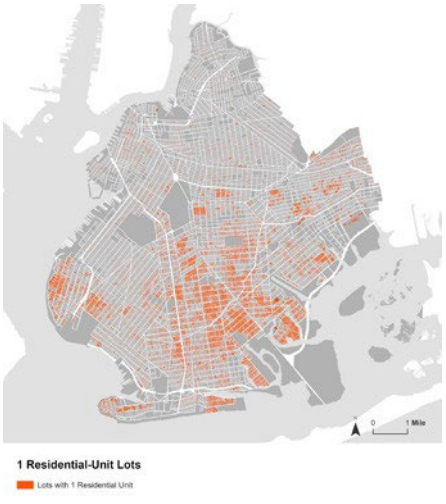
Residential Land Use Typology	# Total Residential Units in DACs	% Total Residential Units in DACs	% Total Residential Units in BK
1-4 Units	**163,527**	**32.8%**	**15.0%**
"Residential" LU	146,872	29.5%	13.5%
"Mixed Use" LU	16,178	3.2%	1.5%
Other LU	*477*	*0.1%*	*0.0%*
5+ Units	**335,184**	**67.2%**	**30.8%**
"Residential" LU	243,616	48.8%	22.4%
"Mixed Use" LU	86,318	17.3%	7.9%
Other LU	*5,250*	*1.1%*	*0.5%*
Total Residential Units	***498,711***	--	***45.8%***

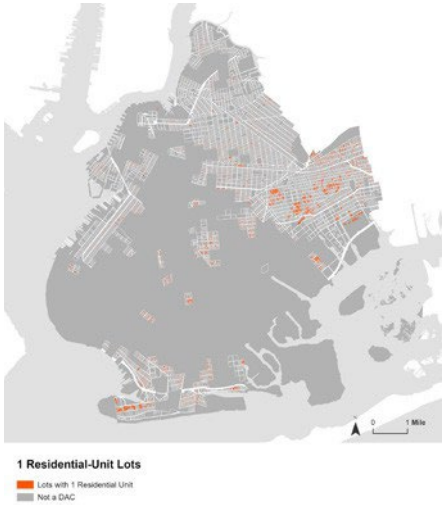
LAND USE: Residential Land Use Typologies by # of Residential Units

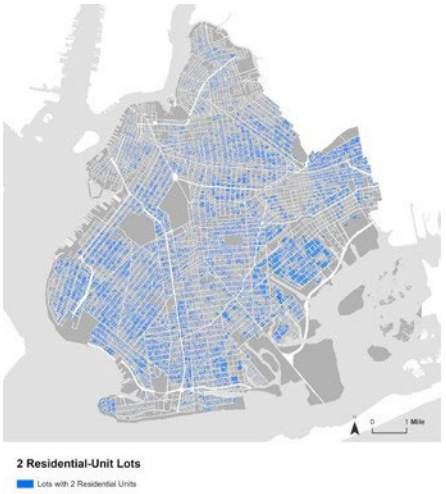
***82.5%** of all buildings are part of a lot that has 1-4 residential units*

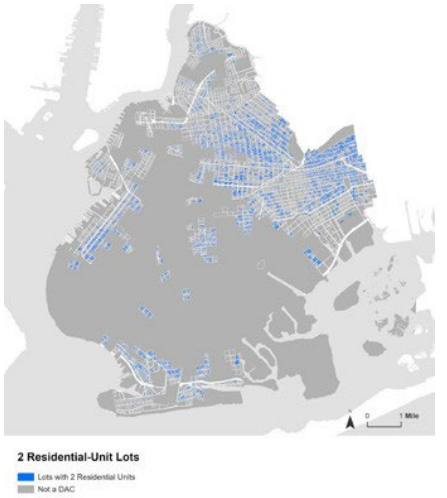


LAND USE: Residential Land Use Typologies by # of Residential Units



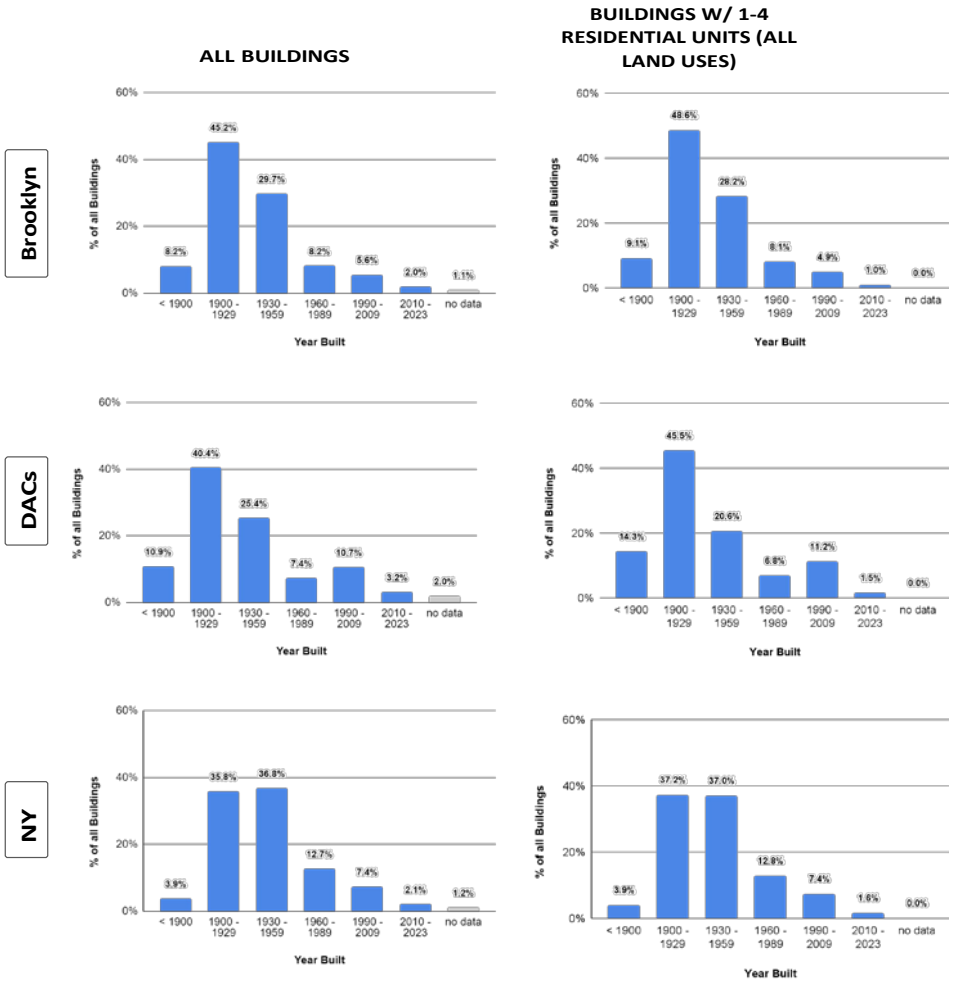






LAND USE: Residential Land Use Typologies by # of Residential Units

YEAR BUILT



RESIDENTIAL LAND USE: Occupancy, Vacancy, Tenure

Housing Tenure, Occupancy/Vacancy Rates				
	DACs	BK	NYC	NYS
Occupancy Rate	92.9%	92.4%	90.7%	89.5%
Owner-Occupied	**18.8%**	**28.0%**	**29.9%**	**48.6%**
Units in a 1-4-Unit Building	**14.7%**	**20.9%**	**19.7%**	**41.8%**
Units in a 5+-Unit Building	4.1%	7.1%	10.1%	5.5%
Units in a Mobile Home/Boat/RV/etc.	*0.1%*	*0.1%*	*0.1%*	*1.3%*
Renter-Occupied	74.2%	64.4%	60.8%	40.9%
Units in a 1-4-Unit Building	21.7%	20.8%	15.1%	15.0%
Units in a 5+-Unit Building	52.4%	43.5%	45.6%	25.5%
Units in a Mobile Home/Boat/RV/etc.	*0.1%*	*0.1%*	*0.1%*	*0.4%*
Vacancy Rate	7.1%	7.6%	9.3%	10.5%
For Rent	2.3%	2.0%	2.3%	1.7%
For Sale	0.3%	0.4%	0.5%	0.6%
Other Vacant	4.5%	5.2%	6.5%	7.0%

"VACANCY RATES"	DACs	BK	NYC	NYS
"Available Housing Vacancy Rate":	2.64%	2.55%	2.99%	2.47%
"For Sale" + "For Rent":	2.54%	2.44%	2.83%	2.29%

RESIDENTIAL LAND USE: House Heating Fuel by Tenure

Owner-Occupied

House Heating Fuel for Owner-Occupied Households *(as a %age of Total Owner-Occupied Households)*	DACs	Brooklyn	NYC	NYS
Utility Gas	80.9%	81.1%	73.7%	60.8%
Bottled, Tank, Or Lp Gas	2.9%	2.9%	2.9%	5.8%
Electricity	7.6%	6.9%	8.5%	7.5%
Fuel Oil, Kerosene, Etc.	6.9%	7.4%	12.3%	21.7%
Coal Or Coke	0.1%	0.0%	0.0%	0.3%
Wood	0.0%	0.1%	0.1%	2.4%
Solar Energy	0.1%	0.1%	0.1%	0.1%
Other Fuel	0.6%	0.6%	1.2%	0.9%
No Fuel Used	0.8%	0.8%	1.2%	0.5%

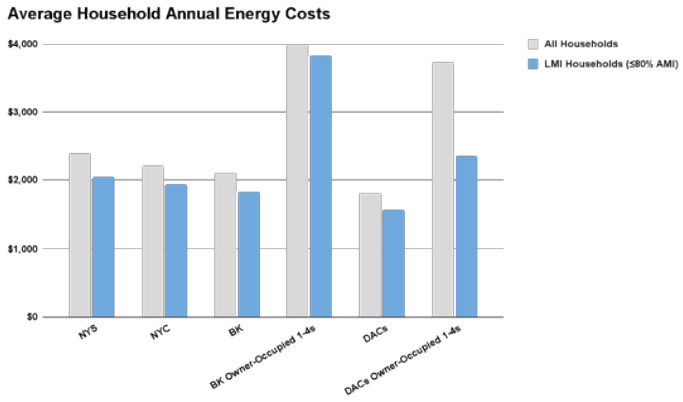
Renter-Occupied

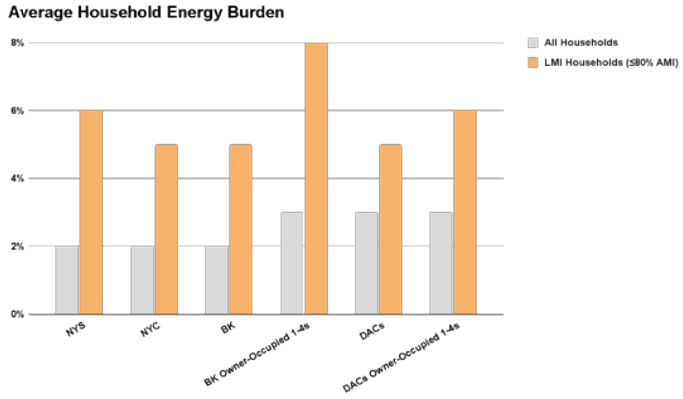
House Heating Fuel for Renter-Occupied Households *(as a %age of Total Renter-Occupied Households)*	DACs	Brooklyn	NYC	NYS
Utility Gas	71.3%	71.7%	60.9%	57.9%
Bottled, Tank, Or Lp Gas	2.6%	2.8%	2.4%	3.2%
Electricity	14.6%	13.1%	17.1%	20.9%
Fuel Oil, Kerosene, etc.	6.6%	7.6%	14.3%	13.5%
Coal Or Coke	0.0%	0.0%	0.1%	0.1%
Wood	0.0%	0.0%	0.0%	0.2%
Solar Energy	0.0%	0.1%	0.1%	0.1%
Other Fuel	1.4%	1.6%	1.8%	1.6%
No Fuel Used	3.3%	3.0%	3.4%	2.6%

ENERGY COST & BURDEN

	Annual Energy Cost		Energy Burden	
	All	LMI	All	LMI
NYS	$2,391	$2,041	2%	6%
NYC	$2,201	$1,928	2%	5%
BK	$2,099	$1,823	2%	5%
BK Owner-Occupied 1-4s	$3,989	$3,822	3%	8%
DACs	$1,808	$1,577	3%	5%
DACs Owner-Occupied 1-4s	$3,731	$2,350	3%	6%

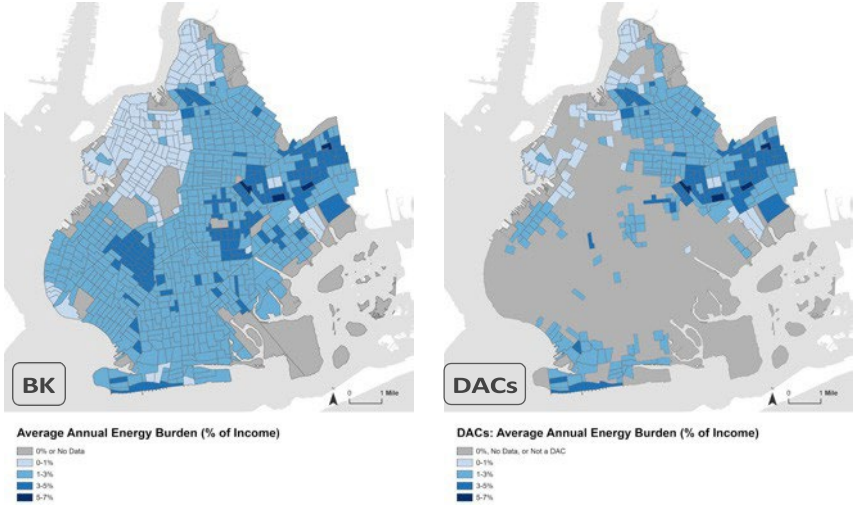
DOE LEAD Tool, 2018. https://www.energy.gov/scep/slsc/lead-tool



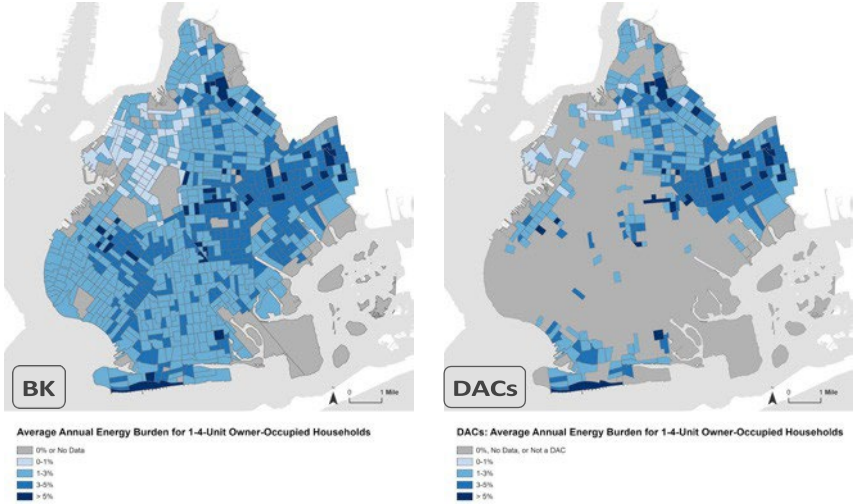


ENERGY COST & BURDEN

All Households



1-4-Unit Owner-Occupied Households



Appendix C
Full Potential Partners

The below spreadsheet is a small excerpt of Appendix C. The full partners list is hosted online and is available for Hub partners' use. Email Pratt Center at info@prattcenter.net if you'd like access to this Appendix.

	A	B	C	D	E	F	G	H
1	**Entry type**	**Name**	**Website**	**Geography**	**Sector**	**Focus area (1)**	**Focus area (2)**	**Focus area (3)**
29	Organization	Brooklyn Defenders	https://bds.org/home	Brooklyn	Nonprofit	Social servic		
30	Organization	Erasmus Neighborhood Federation	https://www.erasmusfederation.net/	Brooklyn	Nonprofit	Social servic		
31	Organization	Grow Brooklyn	https://growbrooklyn.org/	Brooklyn	Nonprofit			
32	Organization	Food and Water Watch	https://www.foodandwaterwatch.org/	NYC	Nonprofit			
33	Organization	Mothers out Front	https://www.mothersoutfront.org/team/n	NYC	Nonprofit			
34	Organization	South Bronx Unite	https://www.southbronxunite.org/	The Bronx	Nonprofit	Sustinability/I	Civic associa	
35	Organization	ACE NY	https://www.aceny.org/	NYC	Nonprofit			
36	Organization	Spring Street Climate Fund	https://www.springstreetclimate.org/	NYC				
37	Organization	YMCA		NYC				
38	Organization	Sunset Park Redevelopment Committee	https://www.sprcinc.org/about/	Brooklyn	Nonprofit	Sustinability/I	Contractor	Green emplo
39	Organization	Sixth Street Youth	http://www.sixthstreetcenter.org/ssyp.ht	NYC	Nonprofit	Sustinability/I		
40	Organization	CUNY	cuny.edu	NYC	Government	Community ir	Workforce de	
41	Organization	The Point CDC	https://www.thepoint.org/	NYC	Government	Workforce de	Sustinability/I	
42	Organization	Urban Knights LLC		Brooklyn				
43	Organization	Bronx Overall Economic Development Corporation	https://www.bxedc.org/	The Bronx				
44	Organization	South Bronx Economic Development Corporation	https://www.sobro.org/	The Bronx				
45	Organization	Central Brooklyn Economic Development Corporation	https://cbedc.org/	Brooklyn				
46	Organization	NYC DOE schools	schools.nyc.gov	NYC	Government	Community ir		
47	Organization	Muslim American Society	masnewyork.org	NYC	Nonprofit	Community ir	Congregatior	Cultural/immi
48	Network	Green Faith	greenfaith.org	NYC	Nonprofit	Congregatior	Sustinability/I	
49	Organization	Catholic Charities	catholiccharitiesny.org	NYC	Nonprofit	Social servic	Cultural/immi	
50	Organization	Neighborhood Restore	neighborhoodrestore.org	NYC	Nonprofit	Housing	Contractor	
51	Category	Food pantries	Various	NYC	Nonprofit	Social servic		
52	Organization	NYC EDC	edc.nyc	NYC	Government	Business inte	Workforce de	Sustinability/I
53	Category	BIDs	nyc.gov/site/sbs/neighborhoods/bid-dire	NYC	Nonprofit	Business inte		
54	Network	NYC Employment and Training Coalition	nycetc.org	NYC	Nonprofit	Workforce de	Sustinability/I	

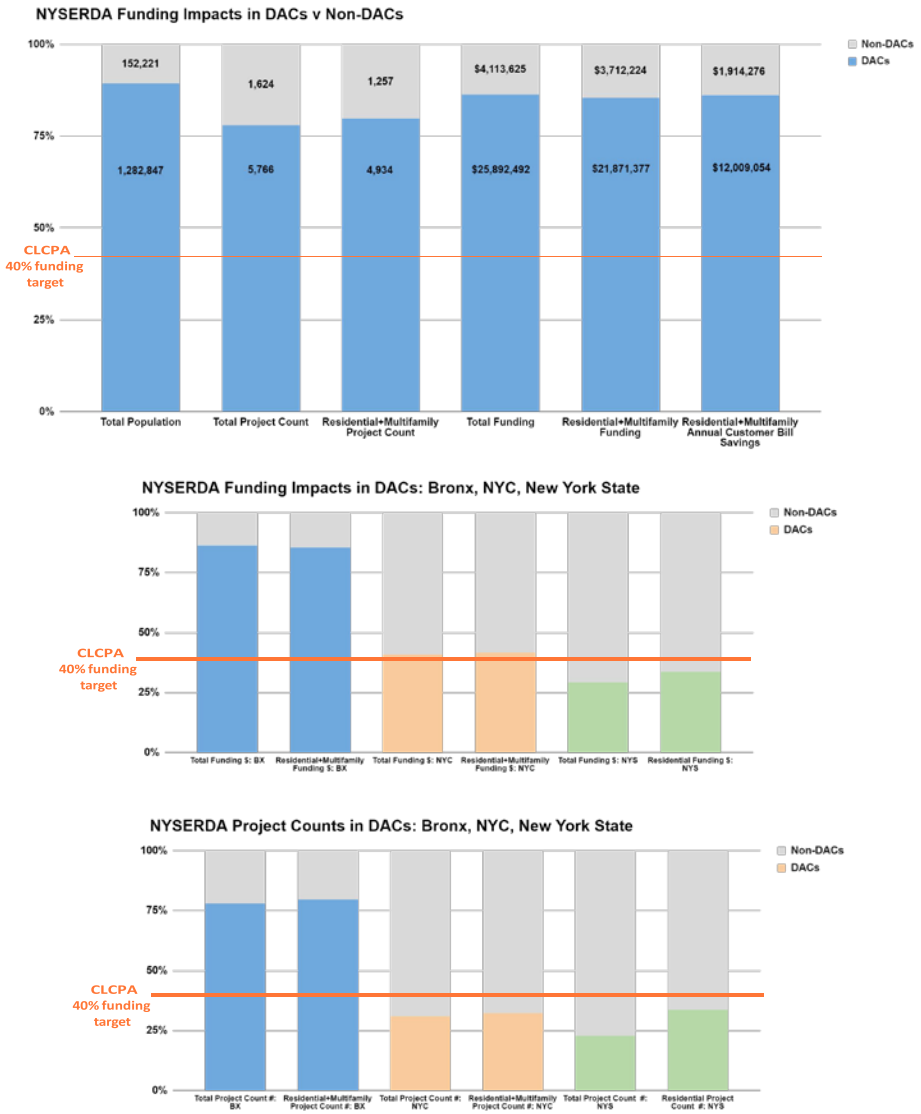
Appendix D
Regional Clean Energy Programs

The below spreadsheet is a small excerpt of Appendix D. The full partners list is hosted online and is available for Hub partners' use. Email Pratt Center at info@prattcenter.net if you'd like access to this Appendix.

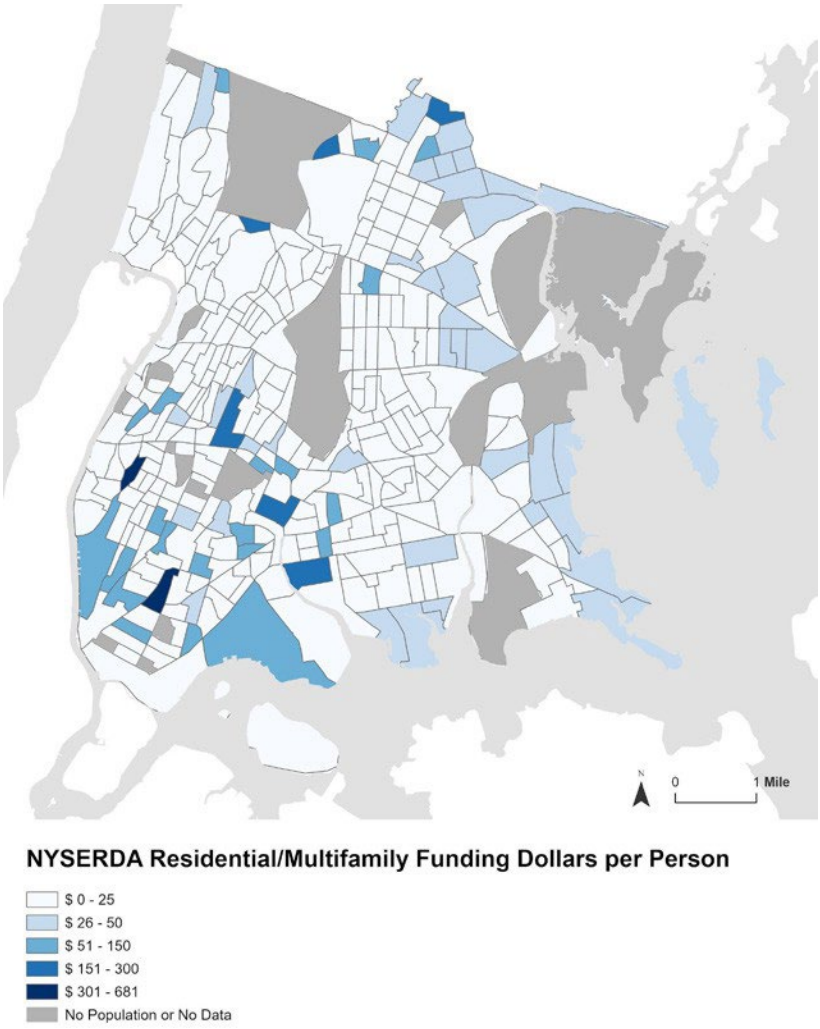
	A	B	C	D	E	F	G
1	**Program Name**	**Geographic service area**	**Location**	**Eligibility criteria/target populations**	**Brief description**	**Organization(s)**	**Source/website**
2	NYC CoolRoofs	Citywide	Remote	Anyone	10 to 11 weeks of full-time, paid work experience installing energy saving reflective rooftops at a starting wage of $16 per hour Opportunity to earn credentials in the construction sector, including 4-Hour Flagger, 4-Hour Scaffold User, Fireguard, CPR/First Aid, and Construction Site Safety Training (SST) certification at no cost.	NYC Department of Small Business Services (SBS) ; Workforce1 Industrial & Transportation Career Center ; the Mayor's Office of Climate and Environmental Justice ; HOPE Program.	
3	Civilian Climate Corps	Citywide	Brooklyn/ Remote	Formerly incarcerated, BIPOC and women preferred	Paid 3 month foundational training plus two months of building trade: construction/carpentry, low voltage electrical, plumbing , HVAC , building energy efficiency auditing	BLOCPower ; Mayor's Office of Criminal Justice	
4	Green Maintenance for Buildings Training Program	Citywide	Brooklyn	Anyone	Free full-time 9-week training program designed to provide entry-level skills necessary to work as a janitor, custodian, or porter in residential and commercial buildings.	CUNY ; CityTech	
5	SolarOne Green Workforce Program	Citywide	Queens/NYC metro area	Minorities encouraged/ preferred	4-6 weeks training in energy efficiency, renewable energy, green construction, and green building operations and maintenance.	SolarOne ; Mayor's Office for Economic Opportunity	
6	NYCHA Clean Energy Academy	Citywide	Cross-borough NYCHA complexes	NYCHA residents	16-week (280 hour) course where NYCHA residents develop the skills to install solar panels, transform heating and cooling systems, install and maintain heat pumps and learn various construction duties. Stipend provided.	NYCHA ; Public Housing Community Fund ; Laguardia Community College Funders include NYSERDA	
7	Intervine	Citywide	Bronx		10 week paid program provides foundational training for green infrastructure projects.	The HOPE Program	
8	SSBx	Citywide	Bronx		14 week classroom-based and hands-on green jobs training program. Throughout the training, our students green the local community through hands-on projects such as tree surveys, water quality testing and shoreline restoration.	The HOPE Program ; Sustainable South Bronx	
9	Green and Clean HVAC	Citywide	Bronx		12 week program on installation and maintenance of efficient heating and cooling equipment	The HOPE Program	
10	GCF Service Corps	Citywide	Cross-borough NYCHA complexes	18-24 year old NYCHA residents with GED/high school diploma	Americorps Program for NYCHA young adults. "Service initiatives respond to needs in public housing communities: cultivating and distributing fresh produce, building sustainable green infrastructure... Initiatives also include visits and service with environmental partner organizations. Classroom training includes eco-literacy and applied environmental education." Corps Members receive site safety and the OSHA-40 certification.	Green City Force	https://greencityforce.org/service-corps/
11	Willdan Clean Energy Academy	Citywide	Remote		Free courses in things like HVAC, lighting, building envelope, heating systems, EVs that offer certifications. Works to fill skill gaps identified by employer partners.	NYSERDA, Willdan, ConEd, Soulful Synergy, NYIT, others	https://www.cleanenergyacademy.org/
12	CUNY Building Performance Lab	Citywide	Mostly remote, various in person locations	facility managers, building operators, and energy professionals, CUNY students	Offers courses to building professionals to help buildings become more energy efficient and sustainable. NY Center for Energy and Carbon Management Training (E-CMT): comprehensive education in building performance and operations. Offers pathways to various professional certifications. Couples academic instruction with real-world internships through the WAP sub-grantee network.	CUNY, NYS HCR	
	RETI Center Sollar		Red Hook,				

Appendix E
NYSERDA Equity Analysis Charts

NYSERDA FUNDING DOLLARS



NYSERDA FUNDING DOLLARS



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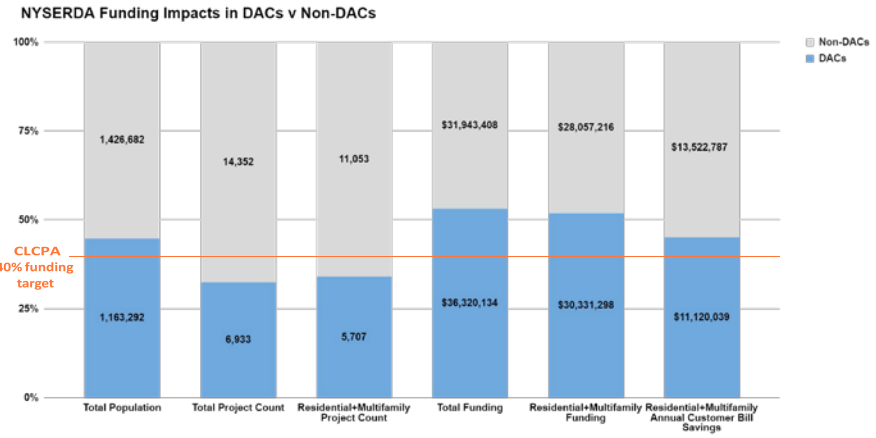
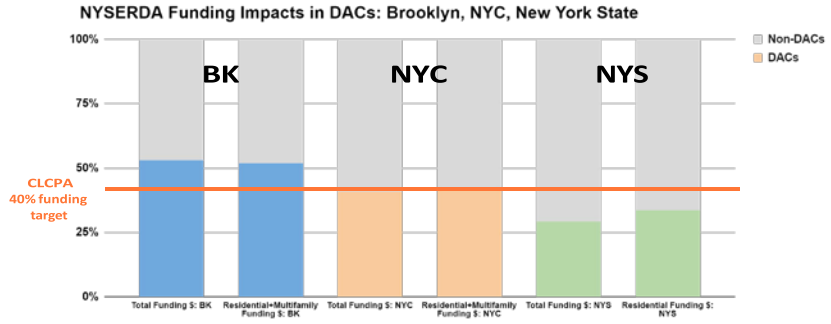
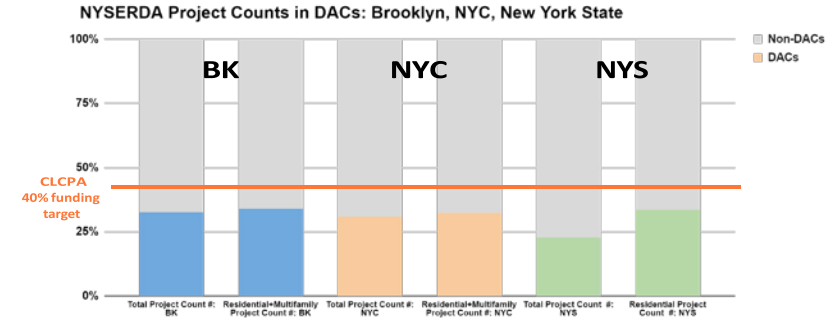
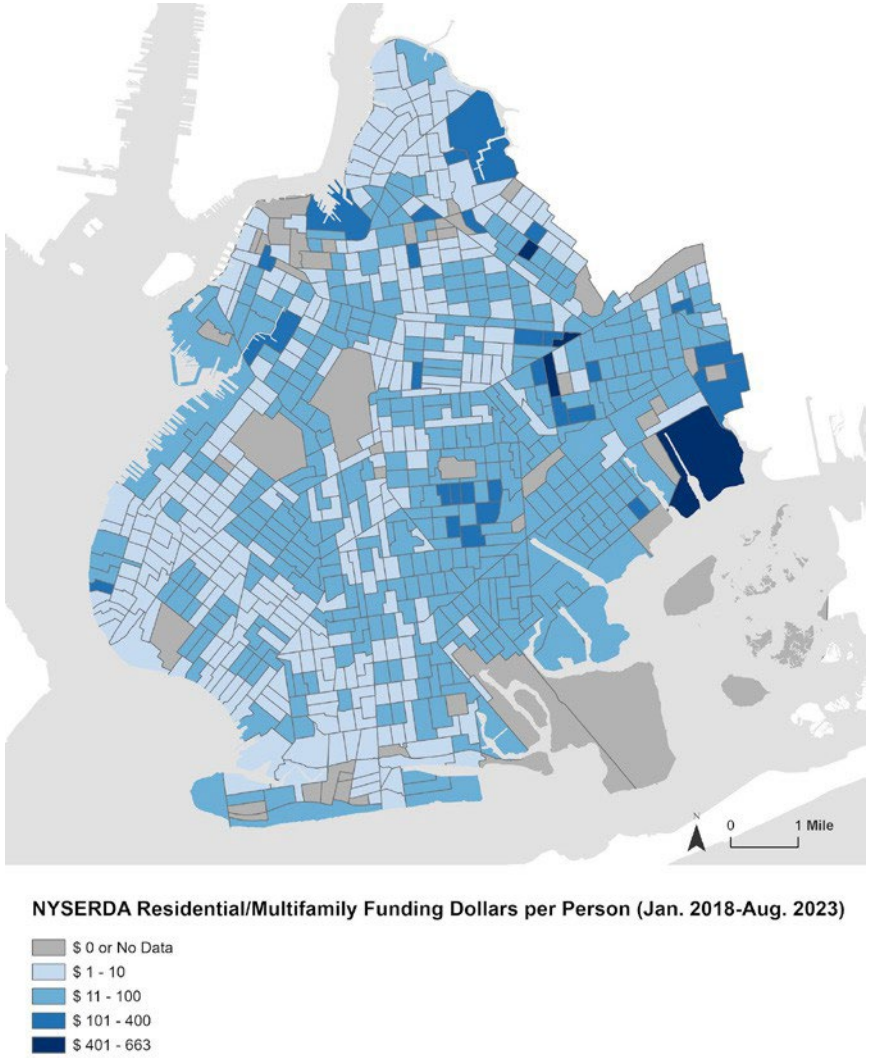
NYSERDA FUNDING DOLLARS







NYSERDA FUNDING DOLLARS

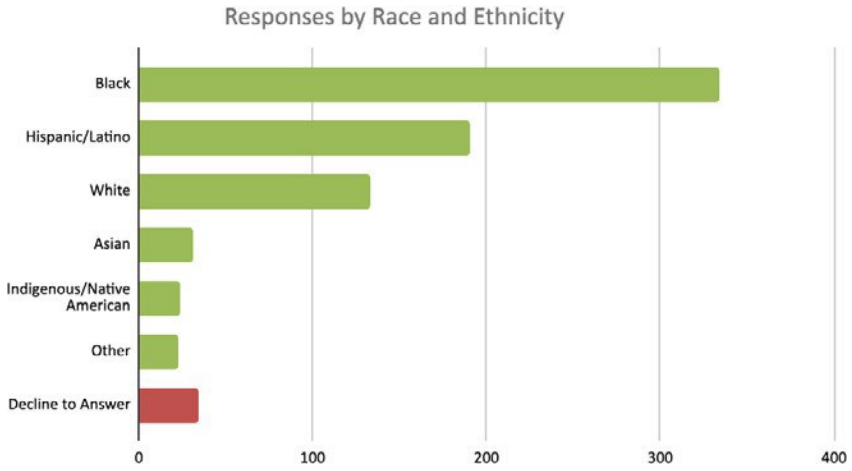


Appendix F
Public Engagement Interviews & Focus Groups

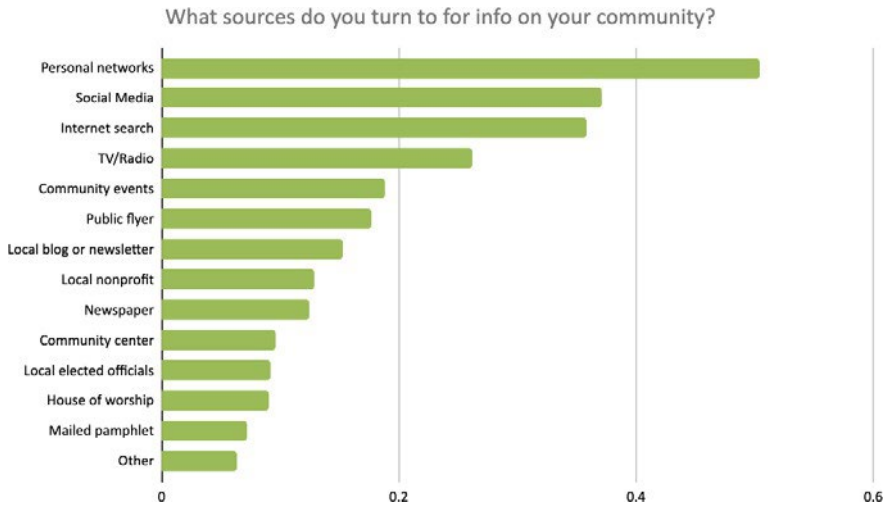
RABA Interview Organizations				
Organization	Borough	Description	Participants	Date
AEA	NYC	Provides a variety of programming and direct services to residents, businesses, and landlords around sustainability, resilience, and clean energy upgrades. AEA also has a weatherization agenc. AEA also provides workforce development training in the green economy.	Pedro Barry, Tania Hidalgo, John Ahrens, Luis Guillermo Garcia, Diane Gonzalez	2/8/2024
Solar One	NYC	Offers workforce development training programs in clean energy, solar panel technical assistance, sustainability and resiliency education for students K-12 and their teachers, coordinator for Clean Energy Communities Program (NYSERDA) and steward of Stuyvesant Cove Park in Lower Manhattan.	Max Levitzke, Rachel Fleischer, Gretchen Bradley, Shakira Hart, Patience Otun, Anika Wistar-Jones	2/27/24
NHS Brooklyn	Brooklyn	Provides services for first-time homebuyers, foreclosure prevention and intervention, insurance education, issues grants and loans for home rehabilitation, mortgage counseling. They also provide services to landlords and tenants with housing location assistance, mediation, and other resources	Angella Davidson	2/28/24
Bronx NHS	Bronx	Provides services for first-time homebuyers and foreclosure prevention.They also provide services to landlords and tenants with housing location assistance, mediation, and other resources. They also provide tax filing services for individuals	Sheril Hall	2/28/24
Center for New York City Neighborhoods (CNYCN)	NYC	Promote and protect affordable homeownership, specifically for Black & Brown homeowners in New York City. They also do work on a state level with homeowner and mortgage assistance. They also manage HomeFIX 2.0, a City-funded program that provides home improvement services. They also are a Community Development Fund Institution (CDFI), entering into lending specifically for green retrofits.	Robert McCool, Jessica Castro, Jennifer Leisure, Rabyaah Althaibani	2/26/24
Bronxworks	Bronx	Provides various social services such as literacy, and RAD/PACT services (NYCHA), workforce development programs, tax services and financial counseling, and summer youth employment (one of the largest summer youth employers in NYC)	Marie Edwards	2/23/24
CAMBA	NYC	Provides social services to all ages, emergency services (migrant assistance, food distribution), legal services, and develops various types of housing	Michelle Humphrey White, Melisa Clarke	2/13/24

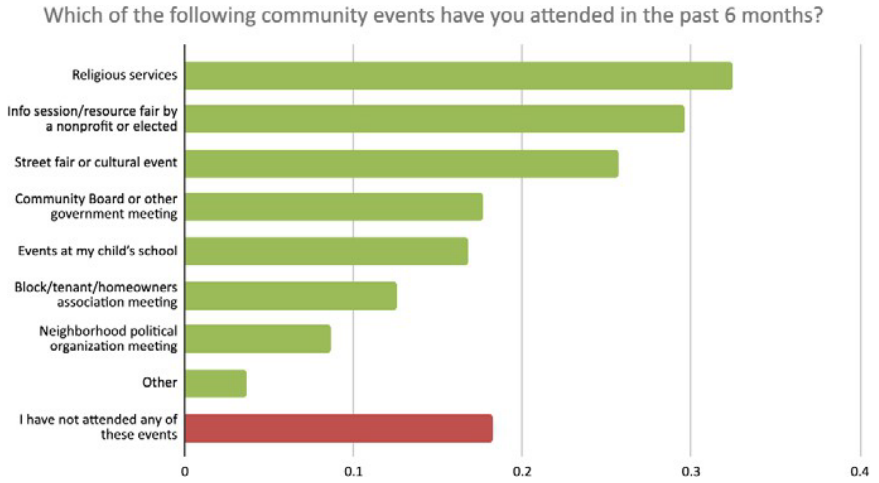
Focus Group	Description	Date	Corresponding Hub Team Organizations	# of Participants
Small Businesses	We wanted to learn from small businesses what challenges and opportunities exist to engage them on clean energy and the green economy. 212 Print is a print shop located in Brownsville Brooklyn. Pitkin Avenue BID is a Business Improvement District which services Tierra Mack is the Executive Director of Pitkin Avenue BID, which services businesses across 14 blocks in Brownsville, Brooklyn.	6/6/24	AEA	2

Appendix G
Full Survey Results



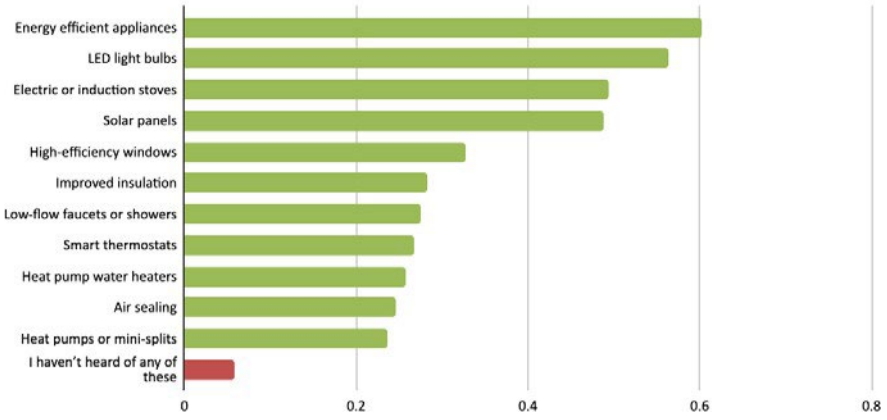
Information Sources



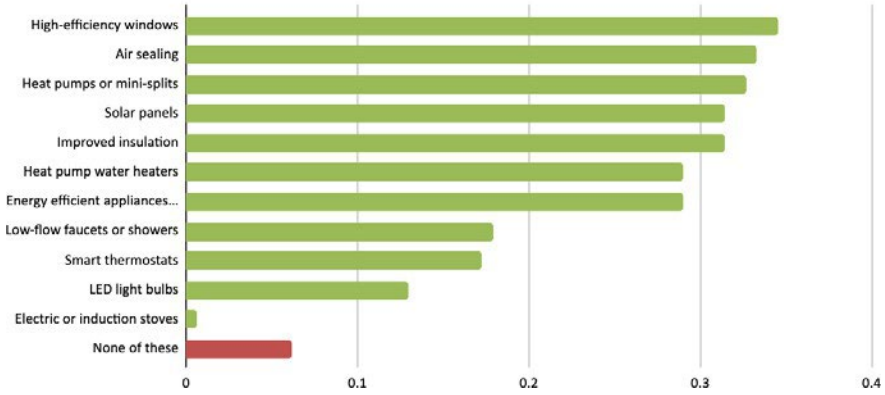


Home Energy Upgrades

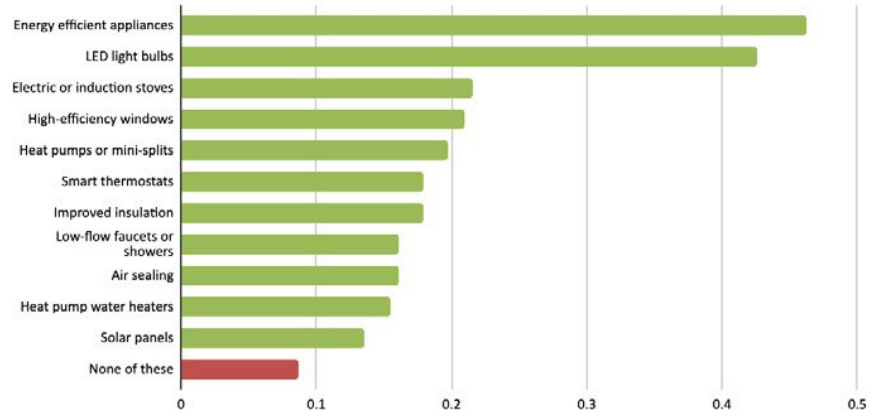
Which of the following clean energy upgrades have you heard of?



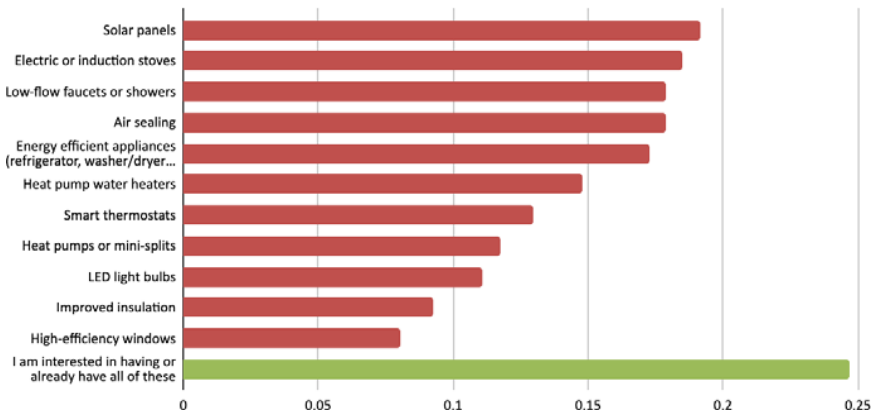
Which of the following clean energy upgrades do you want, but not know how to access/afford?

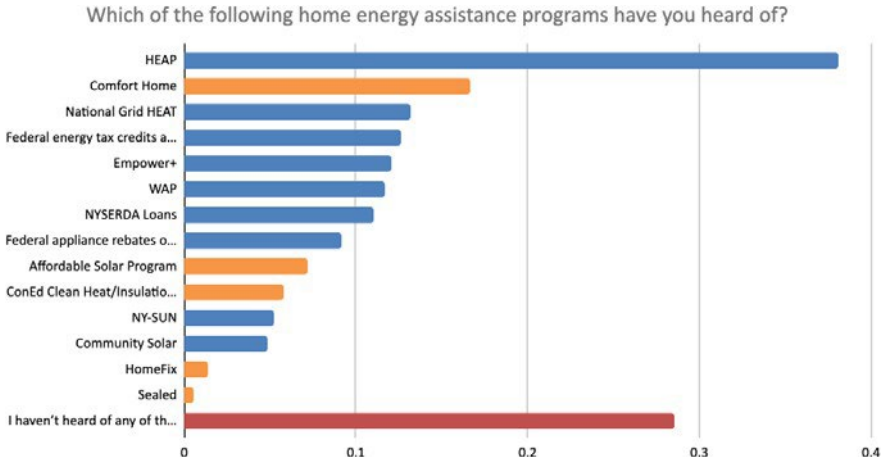


Which of the following clean energy upgrades do you already have or plan to have?

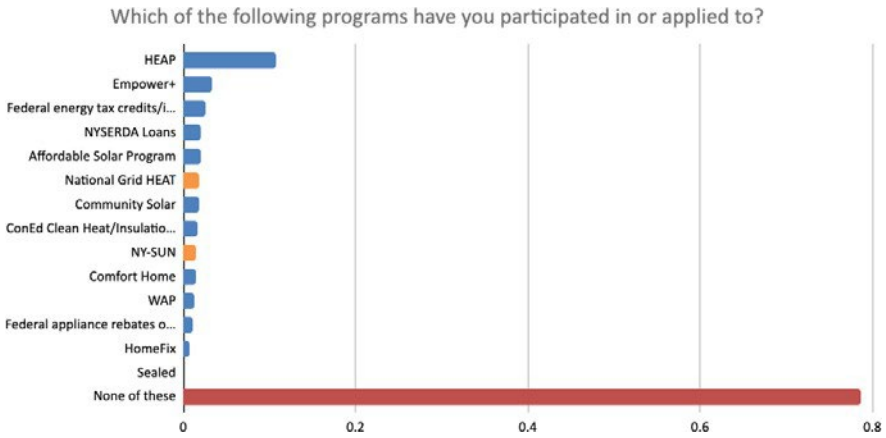


Which of the following clean energy upgrades are you not interested in having?





*Bars in orange only asked to homeowners

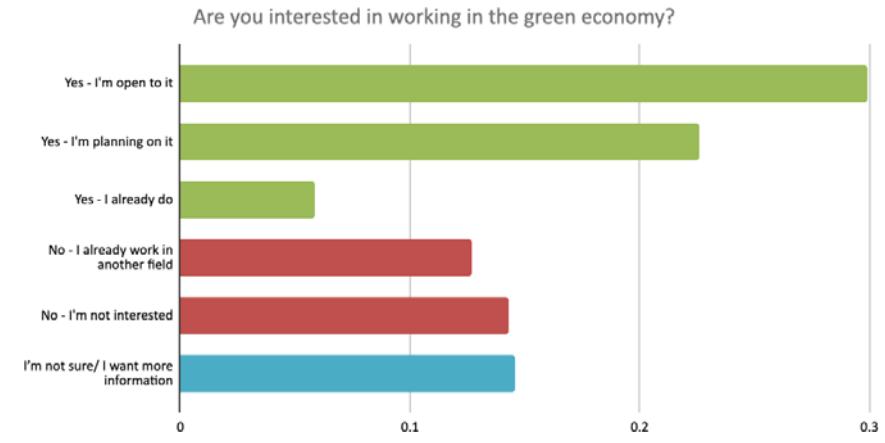


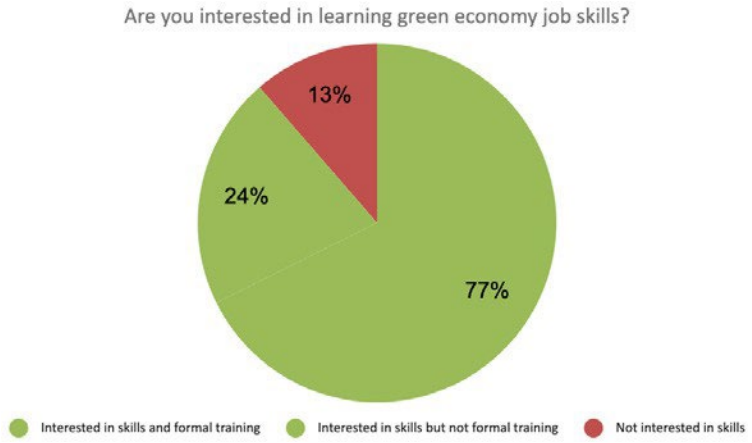
*Bars in orange only asked to homeowners

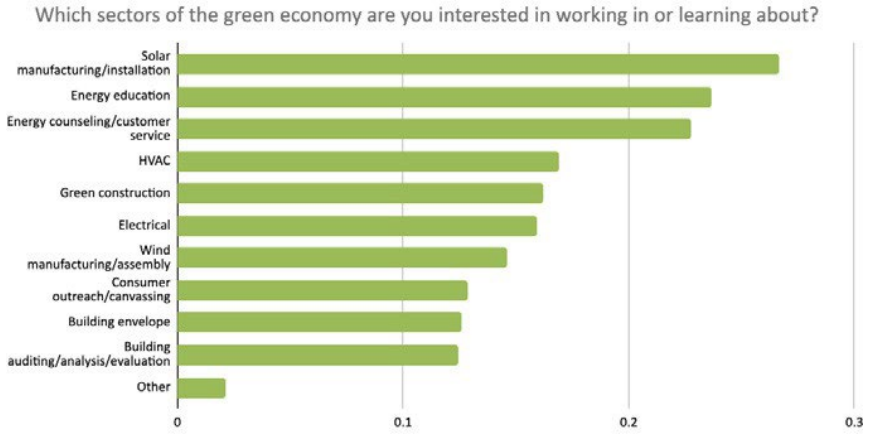
How much would this motivate you to make a clean energy upgrade? (Scale of 1-5)	**Average**
Lowering my utility bills	4.3
Making the temperature in my home more comfortable	4.2
Making needed home repairs like a roof replacement or mold/lead abatement as part of the upgrade	4.0
Protecting my home from damage from natural disasters and avoid power outages	4.1
Improving indoor air quality in my home	4.1
Fighting climate change/improving the environment	3.9
Addressing tenant complaints about their apartment being too cold/hot	3.8

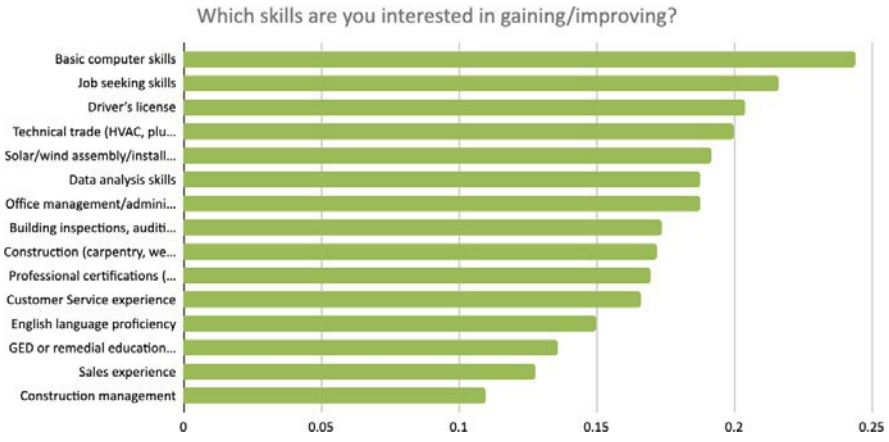
How big of an obstacle would these be to making a home energy upgrade? (Scale of 1-5)	**Average**
I cannot make the upgrades I'm interested in on my own as a renter. (ONLY RENTERS)	4.1
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do as a renter	3.6
Other home repairs or upgrades are a bigger priority for me (ONLY HOMEOWNERS)	3.3
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do	3.2
I can't afford the upfront cost of the upgrades I'm interested in	3.9
The process of receiving upgrades (getting permission from landlord, how to access incentive programs, etc.) is complicated. (ONLY RENTERS)	3.8
The process of receiving upgrades (how to find a contractor, how to access incentive programs, etc.) is complicated. (ONLY HOMEOWNERS)	3.6
I don't want people coming into my home to install upgrades.	2.4

Workforce


Are you interested in working in the green economy?
Yes - I'm open to it
Yes - I'm planning on it
Yes - I already do
No - I already work in another field
No - I'm not interested
I'm not sure/ I want more information
0
0.1
0.2
0.3


Are you interested in learning green economy job skills?
13%
24%
77%
Interested in skills and formal training
Interested in skills but not formal training
Not interested in skills


Which sectors of the green economy are you interested in working in or learning about?
Solar manufacturing/installation
Energy education
Energy counseling/customer service
HVAC
Green construction
Electrical
Wind manufacturing/assembly
Consumer outreach/canvassing
Building envelope
Building auditing/analysis/evaluation
Other
0
0.1
0.2
0.3


Which skills are you interested in gaining/improving?
Basic computer skills
Job seeking skills
Driver's license
Technical trade (HVAC, plu...
Solar/wind assembly/install...
Data analysis skills
Office management/admini...
Building inspections, auditi...
Construction (carpentry, we...
Professional certifications (...
Customer Service experience
English language proficiency
GED or remedial education...
Sales experience
Construction management
0
0.05
0.1
0.15
0.2
0.25

How much would the following encourage/enable you to participate in a green jobs training program? (Scale of 1-5)	Average
Payment for participation	4.4
Free childcare during the program	3.7
Online option (no in-person requirement)	4.2
Possibility of earning better wages and benefits	4.6
Learning new skills	4.6
Doing work that helps my community and the environment	4.4
Hearing positive experiences from people who completed the program	4.3
Someone I trust recommending the program to me	4.4

How big of an obstacle would this be for you to participate in a green jobs training program? (Scale of 1-5)	Average
Work schedule / Taking time off work	2.8
The need for childcare or other caretaking responsibilities while in a training program	2.2
I don't know how to find a green job training program	3.0
I'm worried I don't have the right skills	2.6
Travel time to get to/from a training program	2.4

Regional Assessment & Barriers Analysis

Manhattan Clean Energy Hub

November 2024

MANHATTAN CLEAN ENERGY HUB

NEW YORK STATE | Regional Clean Energy Hub
Partnering Organization

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Thank you to everyone who helped shape this report.

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I. Executive Summary

The Manhattan Regional Assessment and Barriers Analysis (RABA) examines the conditions that present both key challenges and opportunities to expanding access to clean energy in disadvantaged communities (DACs) in the borough of Manhattan. The Manhattan Clean Energy Hub and this report are focused on clean energy upgrades in small (1-4 unit) homes and businesses, and expanding access to green jobs.

The report provides a baseline characterization of Manhattan's demographic, economic, built environment, and civic landscape, as well as current clean energy program participation. It shows that Manhattan is a densely populated and built region with a diverse and growing but highly unequal economy. Low- and moderate-income (LMI) communities and communities of color demonstrate less participation in clean energy upgrades, jobs, and other economic opportunities.

Yet, the borough's DACs are rich in community-based and non-profit organizations with a range of expertise in housing and workforce development and strong local networks. Using these findings, this report identifies strategies for the Manhattan Clean Energy Hub and NYSERDA to leverage local assets to overcome obstacles to a clean energy transition in Manhattan and expand equitable access to green jobs and retrofits of homes and businesses.

Key Takeaways

- **Baseline Regional Characterization and Baseline Assessment of Clean Energy Program Participation**

Sociodemographics
Manhattan is more racially and linguistically diverse than the rest of the State, but less than the City as a whole. Per 2021 5-Year ACS estimates, 47% of Manhattan's residents are non-Hispanic white people, compared to 32% citywide. Manhattan is highly segregated; within Manhattan DACs, 71% of the population identifies as a race other than white, and median household income in DACs ($50,353) is approximately 45% lower than the borough median.

Building and Sector Assessment
Manhattan is a densely-built region made up of mostly mixed-use neighborhoods; 43% of the borough's housing units are in mixed use buildings, compared to 23% citywide, the vast majority of which are in buildings with 5 or more units. Small residential buildings (1-4 units) are clustered in a few neighborhoods. The building stock in Manhattan is older than it is in NYC as a whole. The majority of Manhattan households are renters. It is widely accepted that there is a housing crisis in New York City and in Manhattan; less than 1% of units renting below $2,400 per month are available for rent.

Clean Energy Workforce
Manhattan is the economic center of New York City, home to 2.2 million jobs, more than half of the city's total. Yet most Manhattan DAC residents have to commute out of the borough for work. Manhattan, like the city and the state, has a relatively small but fast-growing clean energy economy. The region is currently the center of the city's green jobs; NYSERDA estimates that Manhattan has 65% of the entire city's clean energy jobs, which have been steadily growing each year. More than half of the city's green jobs are in the buildings trades. Many green jobs pay higher wages than other sectors, especially for people without a college degree, yet this sector is overrepresented by white workers.

Baseline Assessment of Clean Energy Program Participaton
NYSERDA spending in Manhattan is proportionate to the size of Manhattan's population relative to the state's. However, Manhattan receives less residential and multifamily program funding; it gets 12.0% of NYC's residential program funding, though it has 25.8% of the City's total residential units. Total NYSERDA residential and multifamily funding and projects in Manhattan are meeting the CLCPA target of 40% going to DACs, though spending is uneven across census tracts in DACs.

• Barriers

Based on the assessment of Manhattan's regional characteristics, we identify barriers to participation in the clean energy economy across four categories identified by NYSERDA: Physical and Economic Structures and Conditions; Financial and Knowledge Resources and Capacity; Perspectives and Information; and Programmatic Design and Implementation.

Physical and Economic Structures and Conditions
Barriers to clean energy home upgrades in Manhattan and its DACs include: the borough's aging and historic building stock, where upgrades are complex and costly, especially for LMI homeowners; most residents are renters and many owner-occupiers live in cooperative apartments, both of which present challenges to program eligibility and decision-making. Barriers to expanding access to green jobs include limited formal education and the need for basic jobs skills training among DAC residents. Across all programs, unequal internet access can present a barrier to engagement and participation.

Financial and Knowledge Resources and Capacity
Barriers to clean energy home upgrades in Manhattan and its DACs include: high housing and energy cost burden across renters and homeowners, especially for residents of color; high costs of construction in the region; lack of financing options that meet the need of affordable housing owners and LMI residents; high-turnover among property managers amidst complex and lengthy projects; and a dearth of expertise and capacity for retrofits in the affordable small homes market. The high cost of living also poses barriers to expanding access to green jobs for LMI jobseekers, who may be juggling multiple jobs and childcare, and face other financial barriers to participation in workforce training programs.

Perspectives and Information
Barriers to clean energy home upgrades and green jobs in Manhattan and its DACs include: lack of awareness of programs; negative perceptions of program complexity or eligibility constraints; distrust of utility companies; and the need for regulations to incentivize upgrades.

Programmatic Design and Implementation
Barriers to clean energy home upgrades include the range of programs and lack of clarity about how to navigate their complex requirements, split incentives for landlords and tenants, and restrictive and exclusionary eligibility requirements. Across programs, lack of language access is a barrier.

• Opportunities

Opportunities to address these barriers include partnering with the borough's robust nonprofit and civic infrastructure, such as community-based non-profit organizations focused on low-income housing and workforce development, who can leverage existing relationships with local communities to improve program outreach and help navigate program improvements.

• Recommendations

The report identifies a range of short-term, mid-term, and long-term strategies that NYSERDA and Hub partners can engage to address current barriers to participation in the clean energy economy across Manhattan and its DACs. These include revising and investing in program messaging, eligibility, and financial incentives tailored to the needs of LMI tenants and homeowners in DACs; making and advocating for policy changes related to program income eligibility and energy costs; and investing in and empowering Hub organizations to deepen community partnerships and outreach across languages.

Baseline Regional Characterization

A. Baseline Regional Sociodemographics

Manhattan is a densely populated and diverse but highly unequal and segregated part of New York City and State. This section summarizes baseline sociodemographic characteristics for the region in terms of race and ethnicity, languages spoken, income, and labor and education. Data analyses and visualizations on these topics can be found in Appendix B.

• Disadvantaged Communities

Nearly 45% of Manhattan's population lives in Disadvantaged Communities (DACs), as defined by NYSERDA (as compared to 36% of the population statewide, and in line with 49% of the citywide population).[1] In Manhattan, DACs are concentrated in three main areas: Harlem/Upper Manhattan (Morningside Heights, Hamilton Heights, Washington Heights, Inwood); Hell's Kitchen, Hudson Yards, Chelsea, parts of Midtown/the Garment District; and the Lower East Side/ Chinatown, each with their own distinct characteristics, discussed throughout this section of the RABA.

• Racial and Ethnic Diversity and Segregation

Manhattan is more racially and linguistically diverse than the rest of the State, but less than the City as a whole. Per 2021 5-Year ACS estimates, 47% of Manhattan's residents are non-Hispanic white people, compared to 32% citywide. (See Fig. 1 for the region's population by race and ethnicity.) Manhattan is highly racially segregated. As shown in Figure 2, which shows predominant race by census tract, most of Manhattan's neighborhoods are predominantly white, except in some DACs.

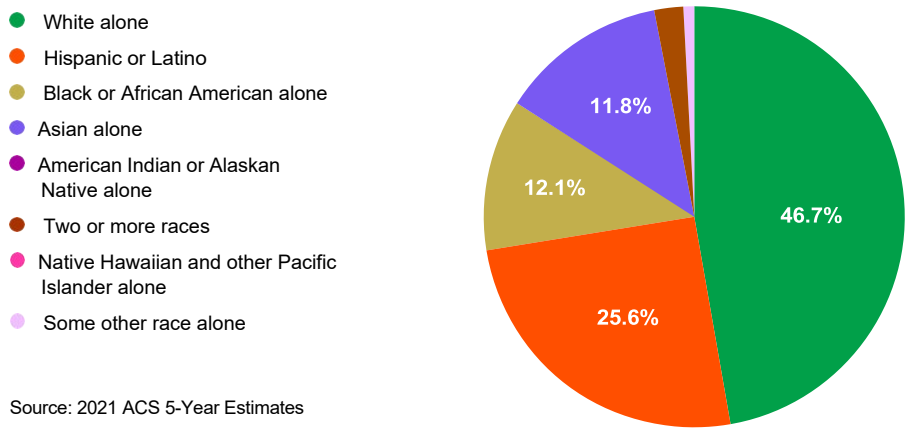
Within Manhattan DACs, 71% of the population identifies as a race other than white. Black residents make up 26% of the population in DACs compared to 14% of Manhattan as a whole. In DACs, roughly 34% of the population is non-white Hispanic, compared to 19% borough-wide and 21% citywide. Asians represent a similar portion of the population in DACs as borough-wide (11% and

12%, respectively), but the only Manhattan census tracts where a plurality of the population is Asian are located in the Lower East Side/Chinatown DAC. The Harlem/Upper Manhattan DAC is predominantly Black or Hispanic/Latino, the
Midtown West DAC is predominantly White, and the Lower East Side/Chinatown DAC is predominantly Hispanic/Latino and Asian.

• Languages Spoken

Most Manhattan residents are proficient in English, both in and outside of DACs. Per 2021 ACS 5-Year data, most Manhattan households (62%) speak only English at home. In DACs, slightly more than half of households speak languages other than or in addition to English at home. Among households in Manhattan DACs, 15.7% have limited English proficiency; in some DAC census tracts, over half of households have limited English proficiency. The top three non-English languages spoken in DACs are Spanish, Chinese (including Mandarin and Cantonese), and French/Haitian/Cajun.[2]

Figure 1. Race and Ethnicity in Manhattan (Source: 2021 ACS 5-Year Estimates)



Source: 2021 ACS 5-Year Estimates

Figure 2. Predominant Race by Census Tract, with DAC Boundaries

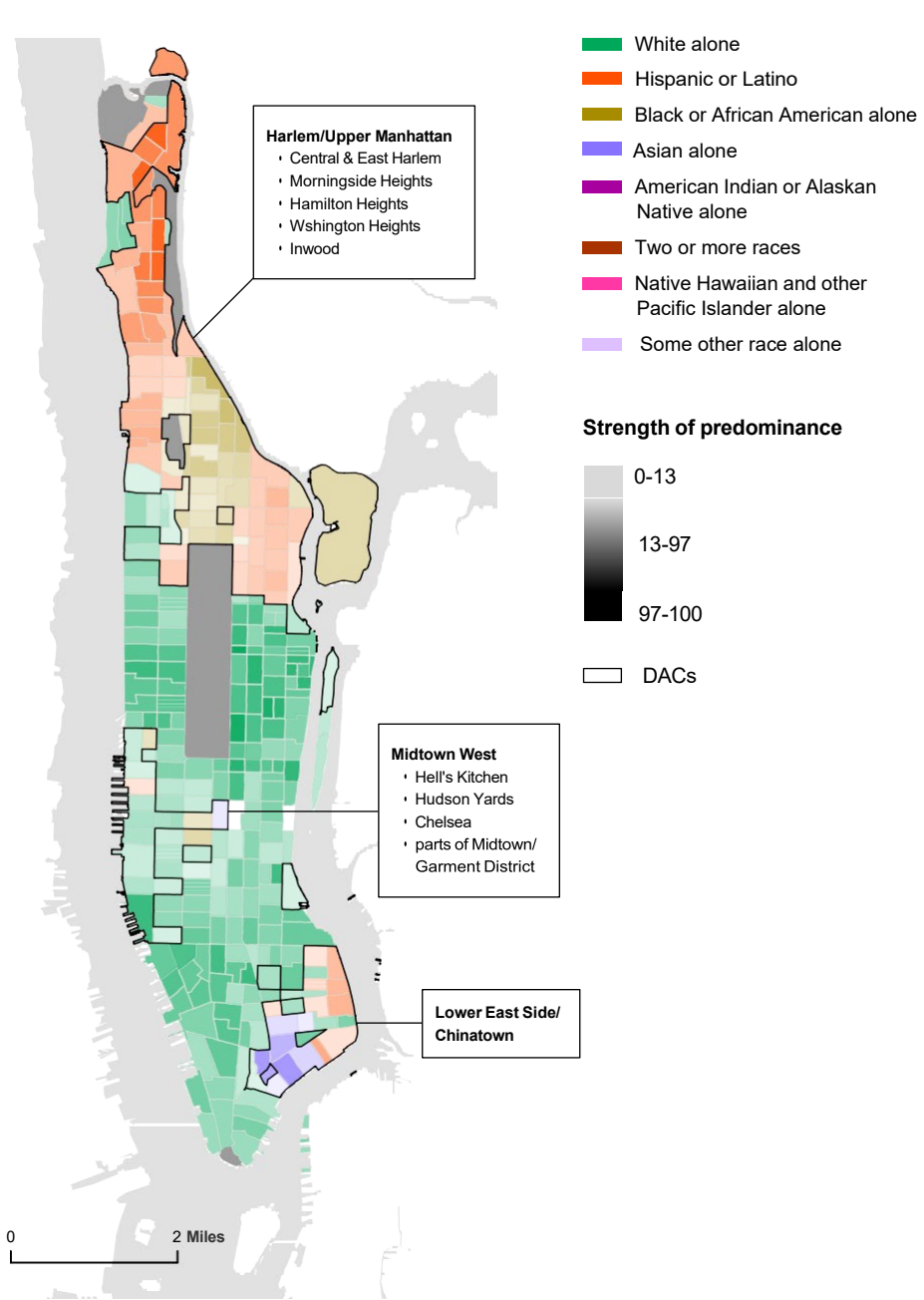
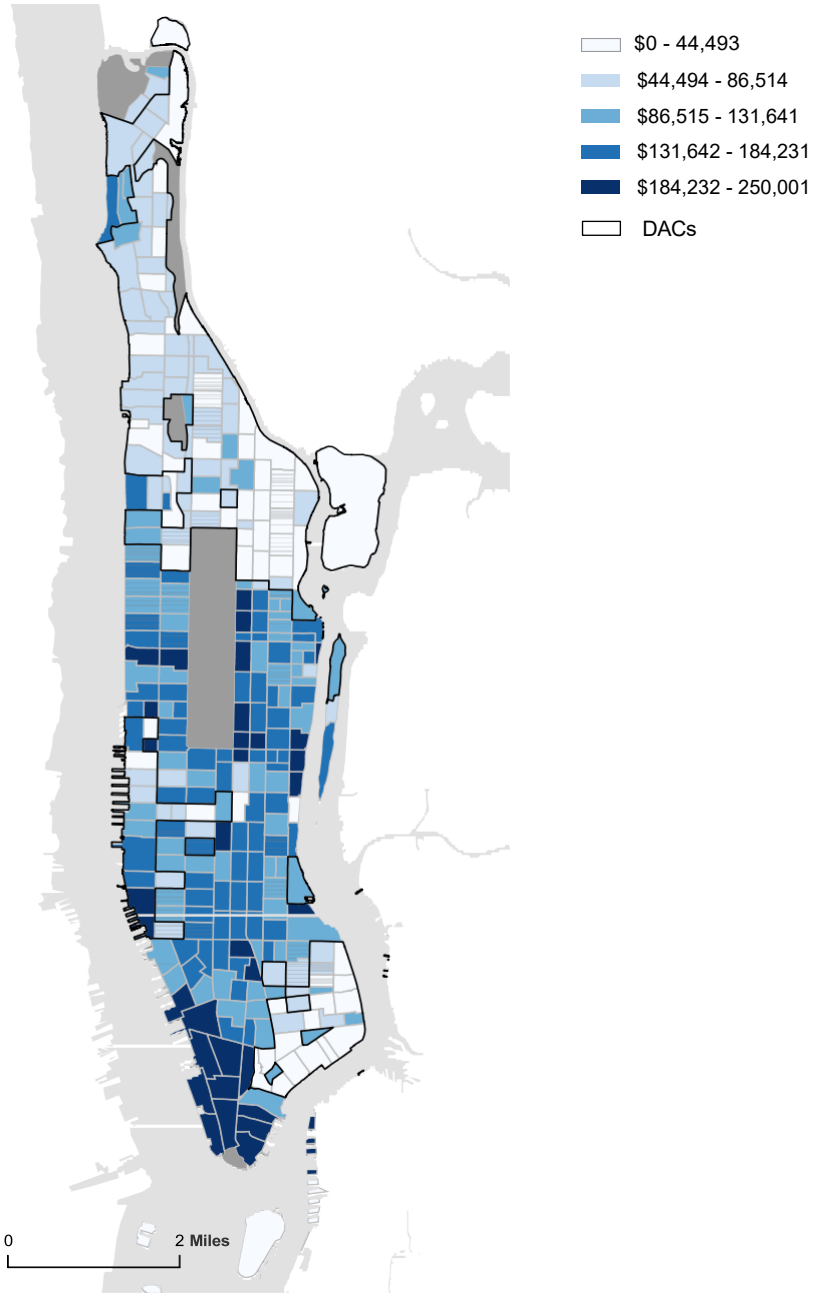


Figure 3. Median Household Income by Census Tract, with DAC Boundaries



Source: 2021 ACS 5-Year Estimates

Income

Manhattan has profound and racialized income inequality. Manhattan's median annual household income is $93,956, compared to $70,663 citywide (2021 ACS 5-Year Estimates). Median household income in DACs ($50,353) is approximately 45% lower than the borough median. (See Fig. 3 for a map of median household income by census tract).

Data on income by race suggests that for Black populations, income disparities are more correlated with race than geography. The Manhattan median household income for Black households is $42,341, less than one-third of the median household income for non-Hispanic white Manhattanites ($136,386). In Manhattan DACs, where median incomes are lower for all racial and ethnic groups, the median income for a Black household is still roughly 38% of the median income for non-Hispanic whites. Among white and non-Black POC, however, income is more correlated with geography. Asian households see the greatest disparity in incomes by geography; the median income for Asians in DACs is less than half of the median Asian household income borough-wide. Non-Hispanic white household income is 32.4% higher boroughwide than in DACs, and Black income is 8.5% higher boroughwide than in DACs.

Workforce: Jobs and Commutes

Manhattan is the economic center of New York City, home to 2.2 million jobs, more than half of the city's total (U.S. Census Bureau, 2021). The vast majority (80%) of those jobs are held by workers commuting from outside the borough. Among Manhattan residents, two-thirds work in the borough and one-third commute elsewhere. Within DACs however, just one-fifth of residents both live and work within the borough, and the majority commutes outside the borough. The main job destinations for DAC residents are Brooklyn, Queens, and the Bronx. DAC residents have longer average commute times (38 minutes) than the population of Manhattan as a whole (32 minutes).

New York City commuters take public transportation to work at double the rate that the State does overall. This is true in Manhattan and even more so in DACs, in which 60% of commuters take public transit. Among DAC residents, 14.1% walk to work, which is less than in the borough as a whole (18.9%) but more than citywide (9.5%) and statewide (5.8%). Manhattan sees a higher percentage of its residents work from home (17%) than citywide (10.7%), but this is less common in Manhattan DACs (12.7%). A small percentage of commuters based in Manhattan and its DACs (2.3% in both) commute to work by bicycle, at a slightly higher rate than citywide (1.4%) and statewide (0.7%) (ACS 5-Year Estimates, 2021).

Workforce: Labor Participation, Unemployment, and Educational Attainment

Manhattan residents have highly unequal labor participation, unemployment, and educational attainment rates. In both Manhattan and DACs, the population skews slightly towards the 25-34 year old age group as compared to the rest of the City and State. This would indicate that a larger proportion of the population is likely to be in the labor force, but this is not reflected in DACs' labor participation rates. Manhattan DACs have a lower labor participation rate than the City and State, while Manhattan as a whole has a higher labor participation rate. Manhattan also has a larger disparity in labor participation rates by race and ethnicity than the rest of the City and State, both in and outside of DACs. The lowest labor participation rates are among the Black population and Hispanic and Latino populations.

The overall unemployment rate is higher in DACs than in Manhattan. However, the unemployment rate among the Black and American Indian/Alaska Native populations remains the same within DACs and borough-wide (a trend maintained at the City and State level as well), suggesting that disadvantages by race in the employment sector are independent of geography. Hispanic/Latino, Two or More Races, and Some Other Race categories also have high unemployment rates in both DACs and the borough as a whole. Overall, Manhattan has higher levels of educational attainment than the City and State, but DACs have lower levels of educational attainment than the rest of the borough. The percentage of the population in Manhattan DACs with a bachelor's degree or higher (39.6%) is remarkably lower than Manhattan as a whole (62.6%), but is on par with the City and State averages.[4,5]

Internet Access

In Manhattan's DACs, 15% of households do not have access to the internet, compared to 8.8% borough-wide and 10.5% statewide. This disparity is particularly stark in Chinatown and East Harlem, where nearly 50% of households are without internet access in some census tracts. These areas correspond with some of the highest levels of limited English proficiency in the borough, with the predominant languages being Asian and Pacific Islander languages and Spanish, respectively.

B. Buildings and Sector Assessment

• Land Use

Manhattan is a densely-built region made up of mostly mixed-use neighborhoods with diverse building typologies and uses.

In New York City, properties (identified by tax lots) are each assigned one land use category such as residential, commercial, industrial, or mixed-use. Mixed-use refers to buildings that have both residential and commercial uses, typically with ground floor businesses and housing units above, and are a defining feature of Manhattan's landscape. Two main commercial areas/central business districts exist in Midtown and in Lower Manhattan, with residential and mixed uses making up the majority of the rest of the borough.

Manhattan has the highest proportion of mixed-use buildings in the city compared to other boroughs, with nearly 30% of buildings classified as mixed use by the Department of City Planning. Of all of Manhattan's housing units, 43% are in mixed use buildings, compared to 23% of housing units citywide. Mixed use buildings vary greatly in size, from containing as few as 1-4 housing units, to containing over 50 housing units in high-rise buildings; however, the vast majority (98.3%) of housing units in mixed-use buildings are in buildings with 5 or more units.
In both Manhattan and DACs, half of all buildings are categorized as residential only (not including mixed use), compared to the citywide rate of 87%. Lots with 1-4 residential units, whether they be categorized as residential or mixed use, make up just over one-fifth of both Manhattan's total land use, and one-third of all residential uses.[6]

Properties with 1-4 residential units are clustered in clearly defined areas in Manhattan: in DACs, these are Marble Hill, Harlem, and Chinatown. In Chinatown and East Harlem, many of these 1-4-unit lots are mixed use. In non-DAC areas, 1-4 unit lots are found concentrated in the Upper East Side, the Upper West Side, and the West Village/Greenwich Village/Chelsea neighborhoods.

The total commercial square footage of all commercial uses in Manhattan (including that in mixed use buildings) comes to 32% of Manhattan's total building area. The majority of that square footage comes from commercial and mixed-use lots that are considered "large" with over 25,000 square feet[8] of commercial space: large commercial spaces make up 28% of Manhattan's total building area.

Table 1. Manhattan Buildings by Land Use Category

Land Use (MN)	# of Buildings	% of Total Buildings
Residential	22,301	48.8%
1-4 Unit[7]	6,958	15.2%
5+ Units	15,325	33.5%
0 Units or Blank	18	0.0%
Commercial*	4,990	10.9%
Small (>25,000 ft²)	2,571	5.6%
Large (<25,000 ft²)	2,093	4.6%
0 Commercial sq. ft. or Blank	326	0.7%
Mixed use (residential + commercial)*	13,590	29.7%
1-4 Unit (residential)	2,760	6.0%
5+ Units (residential)	10,105	22.1%
0 Units or Blank	725	1.6%
Industrial	233	0.5%
All Other Land Use Types	4,622	10.1%
Total	**45,736**	--

• Building Age

The building stock in Manhattan is older than it is in NYC as a whole. The majority of buildings in both Manhattan and in DACs were built before 1930 (74% for both), compared to 40% of buildings citywide. Buildings with 1-4 residential units in DACs skew older, with 89% built before 1930.[9]

Relatedly, Manhattan also has many Historic Preservation Districts and landmarked sites, which come with more stringent regulations on building alterations. These regulations may require review and approval by the Landmarks Preservation Commission for renovation and retrofit projects, and place limitations on cutting through exterior walls, obscuring or altering historic elements (from decorative

features to types of windows), or other alterations (such as installing heat pump equipment outside of the building) that make improvements such as HVAC upgrades and weatherization more complex. The construction of older buildings, such as the use of masonry walls, makes insulation and other retrofits extremely challenging.[10] Further, buildings that are on the State or National Historic Registry are exempt from energy codes.[11] Manhattan has a total of 82 historic districts, and 49% of its 1-4-unit lots are landmarked either singularly or as part of a historic district. In DACs, this percentage is smaller but still significant (31%), with a total of 1,200 landmarked 1-4-unit lots. New York City has worked to revise policy to make it easier to retrofit historic buildings, but challenges remain.[12]

• Housing Market and Tenure

It is widely accepted that there is a housing crisis in New York City and in Manhattan.[13] Vacancy rates, or the percentage of housing units that are vacant and available on the market to rent at any given time, are at historic lows.[14] The most recent NYC Housing and Vacancy Survey (NYCHVS) findings for 2023 show that the citywide vacancy rate is a mere 1.4%, the lowest in decades. Among lower-cost units, vacancy rates are even lower, at less than 1% for units renting below $2,400 per month.[15] Data from the 2023 NYCHVS is not yet available at the borough-level, but according to 2021 ACS data, the vacancy rate in DACs (4.2%) is lower than in Manhattan as a whole (4.9%). The 2021 Manhattan vacancy rate was higher than the Citywide and Statewide vacancy rates (3.0% and 2.6%, respectively),[16] but this reflects the higher vacancy rates seen in New York City in the immediate aftermath of the COVID-19 pandemic, which more recent NYCHVS data indicate was temporary.

The majority of Manhattan households are renters. This majority is even greater in DACs, where 80% of housing units are renter-occupied, compared to 63% across the entire borough. According to 2021 ACS data, only 1.9% of housing units in Manhattan (and 1.4% in DACs) are owner-occupied in 1-4-unit buildings, compared to nearly 20% in NYC and over 40% Statewide. Within DACs, owner-occupied housing units in a 1-4-unit building are concentrated in Central Harlem and Marble Hill.

City- and state-wide, there is a huge disparity in homeownership rates among BIPOC groups compared to white households; while rates of ownership are much lower in Manhattan overall, this trend still holds. One-third of non-Hispanic white householders in Manhattan live in owner-occupied housing, while just 11% of Black householders and 8% of Hispanic/Latino householders are homeowners, with even lower rates in DACs. Over half of homeowners in Manhattan are over the age of 55.

• Energy Use and Burden

In New York City as a whole, utility gas is the most commonly used form of home heating fuel for owner-occupied households, at 74% of households (as compared to 61% statewide). In Manhattan, however, just under 50% of owner-occupied households in both Manhattan and DACs use utility gas. About 23% use fuel oil, and approximately one-fifth heat their homes with electricity.

Manhattan owner-occupied 1-4-unit households have the highest annual energy costs, and these costs are even higher in DACs than they are in the borough as a whole. This suggests inefficiencies in heating smaller buildings, potentially influenced by these buildings' older average age. The largest energy burdens are felt by 1-4 unit owner-occupied LMI households, and this figure is even higher for homes located in DACs. Energy bills are costing Manhattan's LMI homeowners in 1-4 unit buildings 9% to 10% of their annual income, while statewide the average energy burden is only 2% of annual income.

Table 2. Annual household energy costs and burden for all households and LMI households

	Annual Energy Cost		Energy Burden	
	All	**LMI**	**All**	**LMI**
NYS	$2,391	$2,014	2%	6%
NYC	$2,201	$1,928	2%	5%
Manhattan	$1,434	$1,151	1%	5%
Owner-Occupied 1-4s	$4,784	$4,154	2%	9%
DACs	$1,261	$1,085	2%	4%
Owner-Occupied 1-4s	$5,127	$3,617	3%	10%

Source: U.S. Department of Energy's Energy Burden tool, 2018

C. Regional Clean Energy Workforce

Manhattan, like the city and the state, has a relatively small but fast-growing clean energy economy. The region is currently the center of the city's green jobs; NYSERDA estimates that Manhattan had 47,907 clean energy jobs in 2022,[17] or 65% of the entire city's clean energy jobs. As government and industry define this emerging sector, differing research and data on the clean energy workforce produce different estimates of the size of the workforce. Overall, however, the data shares similar findings related to the growth of the buildings, transportation, and consulting sectors. Data at the borough-level is very limited, so this section relies primarily on citywide reports.

The City of New York estimates that the city had 133,000 "green economy" jobs across 21 sectors in 2021, representing 3% of all jobs citywide and $16 billion in earnings.[18] Nearly half of these jobs are in building decarbonization (49% of green economy jobs), among which roughly half are in HVAC and renewable heating and cooling, nearly a third are in ENERGY STAR, efficient lighting and reduced water consumption products, 11% are in green building management and operations, and 6% are in advancing materials and insulation.[19] Approximately 9% of green economy jobs are in energy, of which 37% are in solar, 20% are in hydropower, and 16% are in on-shore wind, and the remainder are in a range of other subsectors.[20] The citywide clean energy workforce landscape aligns with statewide trends; building decarbonization and energy efficiency represented nearly three-quarters of all clean energy jobs in the state in 2022.[21]

Many jobs in the green economy pay higher wages than other large sectors in New York City, especially among jobs accessible to people without a college degree.[22] Jobs in the building trades in particular tend to be unionized and offer relatively high wages for people with less formal education: many building trades jobs that do not require a college degree have average salaries above $73,000 and into six-figures.[23] Some buildings trades jobs that are expected to see growth, such as electricians, roofers, solar installers, maintenance/repair workers, and construction workers see slightly lower median annual salaries ($53,300-$52,500). The City's Green Economy Action Plan will prioritize education, training, and outreach for those occupations in the green economy that pay living wages of $63,000 per year (in today's dollars) or more.[24] Many of these jobs do not require significant new skills training or education specific to green technologies or policies.

Today's green economy workforce is predominantly white, with white workers overrepresented in green sectors as compared to the overall workforce, and disproportionately working in higher-paying jobs. Black, Latinx, and Asian workers are overrepresented in lower-paying jobs, including building trades jobs that do not require a college degree. Women are underrepresented in the green economy, particularly in the building, design, and engineering trades, where less than 2% of jobs are held by women. This is consistent with statewide clean energy workforce demographic disparities as well.[25]

Green economy jobs have grown approximately 5% per year between 2016 and 2021, driven primarily by 1) local climate and energy policy, including new buildings and energy regulations and targets, 2) federal and other government investment in resiliency and infrastructure projects and green technologies, 3) consumer market demand for sustainable products, and 4) increased private investment in clean energy technology.[26] As these trends continue, the City projects ongoing rapid growth in the green economy to 400,000 jobs (or 7% of all jobs) by 2040, primarily in buildings (an estimated 85,000 jobs) and finance and consulting (an estimated 80,000 jobs). The majority of these jobs will be in existing professions adopting sustainable practices and an estimated 30% will be in new jobs.[27] (Other estimates for job growth include the State's Just Transition Working Group's projection that the city will see an increase of 43,000 green jobs by 2030,[28] and Green Economy Network's projection of 90,000 new green jobs between 2021 and 2030.[29]) Much of this growth is projected to be driven by Local Law 97, which establishes building decarbonization regulations, and creates new demands for robust technical assistance, policy and compliance, and building trades. Other policies driving clean energy job growth include New York's Climate Leadership and Community Protection Act (CLCPA), the federal Infrastructure Investment and Jobs Act, and the federal Inflation Reduction Act, as well as other local laws and policy targets for decarbonization and sustainability.[30]

D. Regional Partners

Manhattan and New York City are home to a range of institutions that will be important partners in Clean Energy Hub Program implementation. This section provides an overview of the many types of organizations that create a wide variety of opportunities for the Hubs to leverage as potential partners in Manhattan.

Civic institutions and community centers
A range of community and civic institutions provide Manhattan residents with public space to gather, access information, and attend events, including public libraries, senior centers, New York City Housing Authority community centers, Parks Department recreation centers, and public parks. These spaces and the agencies and organizations that manage them are important partners for Hub outreach.

Social Services and Community-Based Organizations
Manhattan has a robust social services and nonprofit sector across the borough, including many organizations with decades-long histories in the neighborhoods they serve. Manhattan and its DACs are home to many settlement houses, which are neighborhood-based providers of services including job training and counseling, early childhood services, senior services, housing counseling, legal services, benefits counseling, ESL education, and other programs. Settlement Houses typically have strong relationships with local city agencies and elected officials and other neighborhood services organizations, are connected to one another through United Neighborhood Houses, which can help disseminate information about initiatives and opportunities across its membership. The City of New York maintains a list of community-based organizations, as do large philanthropic institutions focused on the City's social services sector such as Robin Hood Foundation and New York Foundation.

Educational institutions
Manhattan's K-12 public and charter schools and related programs are important partners for Hub outreach by leveraging space and resources where many Manhattan residents expect to receive information about opportunities and services in their communities. Higher education institutions, including the public City University of New York campuses (such as City College in the Northern Manhattan DAC and Borough of Manhattan Community College in lower Manhattan) and private colleges also provide community space and programming to conduct outreach to young people about green jobs as well as other clean energy programs. Universities also conduct climate-related research and join environmental initiatives such as the NYC Climate Justice Hub.

Religious congregations and organizations including churches, mosques, synagogues, and faith-based community organizations provide regular meeting places and serve as trusted information sources in communities, especially among older residents, making them important Hub outreach partners.

Advocacy and service organizations in housing and environment
Neighborhood-based and borough-wide housing organizations in DACs are important partners in outreach to tenants and LMI homeowners, co-op residents, as well as for knowledge about the local housing stock. Examples of organizations include Met Council, Cooper Square Committee, Housing Conservation Coordinators, Community Voices Heard, East Harlem/El Barrio CLT, Hope Community Inc, Good Old Lower East Side (GOLES), and CAAAV. Some of these nonprofit housing organizations are owners and managers of housing themselves, or have experience working with nonprofit property managers and key partners in housing maintenance and retrofits. Environmental advocacy groups will be important partners for engaging residents with knowledge and interest in the clean energy economy who can then engage their neighbors, as well as for identifying other firms and organizations working in the clean energy economy who may be partners in making upgrades or providing green jobs. Environmental groups, in addition to Hub partners, include the New York City Environmental Justice Alliance, ALIGN, Lower East Side Ecology Center, Urban Green Council and Earth Matter NY.

Workforce development programs
In addition to job training and placement programs run by settlement houses and other social services organizations (referenced above), Manhattan is home to organizations focused on workforce development including the New York City Employment and Training Coalition, Soulful Synergy, Wildan, JobsFirstNYC, Rebuilding Together NYC, Nontraditional Employment for Women, and SBS Workforce1 Centers, among others. These partners will be important outreach partners for the Hub to advance green job training and employment opportunities for jobseekers.

Business associations and networks
Neighborhood-level Business Improvement Districts, local Chambers of Commerce, and trade associations representing Manhattan businesses will be important partners for the Hub to reach potential green employers and small businesses to participate in upgrades.

Construction, retrofit, HVAC, other building trades
Firms will be important partners in implementing clean energy upgrades and as targets for green workforce development, especially MWBEs located in DACs.

Government agencies and entities

These are important partners in programmatic implementation and outreach. This includes public agencies such as the Mayor's Office of Climate and Environmental Justice, Mayor’s Office of Climate and Environmental Justice, Department of Small Business Services, Department of Housing Preservation and Development, NYC Economic Development Corporation, and New York City Housing Development Authority. City Council, State legislators, the Manhattan Borough President, and local Community Boards will be important outreach partners.

Utilities

Con Edison and National Grid are important partners to ensure that referrals for clean energy incentives are coordinated to improve program participation and success. Hub organizations could partner with the utilities for outreach events and collaborate with utility staff on sharing resources and information.

E. Regional Assets

Manhattan has a number of significant assets for advancing the clean energy economy in the region. These include public policy and advocacy efforts, civic infrastructure and social services, physical infrastructure, residents' knowledge and networks, and a diverse and strong local economy, further detailed below.

• Local Climate and Housing Policy

State and local regulations and investments to advance building decarbonization and building preservation create significant opportunities for clean energy upgrades and workforce development. Practitioners in the field of multifamily retrofits, particularly in the affordable housing sector, highlighted the impact of Local Law 97 and other regulations and associated penalties in advancing clean energy projects and compelling the integration of additional technologies and incentives into construction and rehab projects. In addition, affordable housing preservation financing and programs such as Year 15 refinancing provide some of the most successful opportunities for implementation of upgrades when combined with retrofit programs.

• Civic Engagement and Information Infrastructure

Government entities and outreach at the hyper-local level are important resources for community engagement. Local representatives of city, state, and congressional legislators maintain offices in the neighborhoods they represent, often offering strong constituent services and programming in partnership with city agencies and organizations. Community Boards are volunteer, resident-led government bodies that play an important role in relaying information about developments and programs in the community between residents, the government, and other stakeholders. Community-based groups such as civic associations, block associations, NYCHA tenant associations, and local social service and grassroots organizations all play leadership roles in tracking, analyzing, and sharing information about public policy and programs in their communities. Manhattan is also host to a range of public and shared spaces that are essential for community gatherings and outreach, including neighborhood parks and large public parks, recreation centers, libraries, Older Adult Centers, and schools. In addition to these community resources, Manhattan residents have strong personal and neighborhood networks for sharing and accepting information. Finally, New York City agencies maintain robust data on the built environment, economy, and population that are essential for understanding and improving the reach of programs.

• Environmental Justice, Climate, Housing and Economic Justice Advocacy, Organizing, and Social Services

New York City has a sustained legacy of social and economic justice organizing and advocacy, including on the issues of housing, labor, and environmental justice. Today, tenant organizations, public policy research groups, climate organizations, workers centers' and unions, and social services organizations often collaborate on local, city, and state-level campaigns and initiatives at the intersection of these issues. These collaborations ensure that initiatives leverage neighborhood-level knowledge and networks alongside expertise in relevant policy, regulations, and technologies.

• Large Real Estate, Building Trades, and Related Sectors, Including Nonprofit Organizations

As a populous, densely built city and center of the international real estate market, New York City is home to development and construction-related businesses and organizations ranging from small-scale MWBE firms to citywide nonprofits to large global corporations. These include developers; engineering, architecture, and design firms; law firms and financial institutions specializing in real estate; environmental and zoning consulting firms; construction managers; construction, plumbing, electrical, and other building trades businesses; and property managers, among others. Many of these businesses are specialized in particular building typologies (e.g. 1-4 family homes, historic buildings, new large-scale multifamily and mixed use buildings), geographies (neighborhoods and boroughs), sectors (e.g. nonprofit, owner-occupied, cooperatively-owned, private non-rent-regulated rental housing), and local law and policy. This robust sector is well-poised to take on clean energy home upgrade projects, and offers significant new opportunities for green jobs, as outlined in Section II.C.

Diverse Local Economy

New York City's economy is not dependent on one or even a few industries, but rather is a national and global center of a number of industries including finance, law, arts and entertainment, real estate, and technology. The City also has large-scale education, healthcare, retail, arts and culture, hospitality and tourism, and public and nonprofit sectors, among others. The city has maintained some manufacturing and seen growth of new boutique makers. In nearly all of these sectors, employers include multinational corporations, government agencies, mid-size firms, small businesses and independent contractors. Manhattan serves as a central business district for the metropolitan area, but each neighborhood has multiple commercial corridors and many neighborhoods are hubs for particular industries. The Upper Manhattan DAC, for instance, is home to a number of large public and private universities and hospitals. This diversity of sectors and scales of businesses and organizations creates ample opportunity for participants in clean energy upgrades and workforce development, and also helps attract a large and diverse workforce.

Labor and Workforce Development Organizations

Manhattan and New York City as a whole has a number of organizations providing workforce development services, from local social service organizations to citywide groups such as the New York City Employment and Training Coalition, the Workforce Development Institute, Nontraditional Employment for Women, Workforce 1 Centers, and many others. Many of these, such as Green City Force, focus on green jobs training, often tailored to LMI and BIPOC communities, and have long-established partnerships with City and State agencies.

Educational Institutions

Higher education institutions in Manhattan and across New York City are important partners in city- and nonprofit-led workforce development initiatives, such as the City University of New York's Green Jobs Training Program and green workforce initiatives across CUNY schools. A number of universities such as Columbia University have introduced climate education curricula and centers. The New York Climate Exchange, to be developed by 2028 on Governor's Island just south of Manhattan, will be an education and training consortium led by Stony Brook University and 15 other university and industry partners.

Jobseekers' Local Knowledge, Relationships, and Relevant Skills Including Languages

A valuable skillset many Manhattan workers and jobseekers can bring to jobs in the clean energy economy, according to workforce development practitioners interviewed for this report, is their knowledge of their neighborhood's residents and social networks, building stock, businesses and organizations, and geography. Some may bring knowledge of local government agencies and policies. In addition, given the size of Manhattan's multilingual population and the diversity of languages spoken, as outlined in Section II, many Manhattan jobseekers speak languages necessary to communicate with other workers and community members. Practitioners emphasized that local knowledge, relationships, and language skills are all important skills for implementing clean energy projects, though some employers may need education and/or experience hiring locally to recognize it as a competitive advantage.

Public Transportation Infrastructure

New York City's 24-hour public transportation network of subways and buses is the largest in the nation, and is the means by which the majority of residents of the City (51%), borough of Manhattan (53%), and Manhattan DACs (61%) access jobs (2021 ACS 5-Year Estimates). The City offers reduced-fare options for public school students, seniors, and qualifying low-income people. While not all areas of the city are well-served by the city's subway network, particularly in parts of the outer-boroughs, public transportation is a significant asset for connecting jobseekers to green jobs and for conducting community outreach and engagement across the borough.

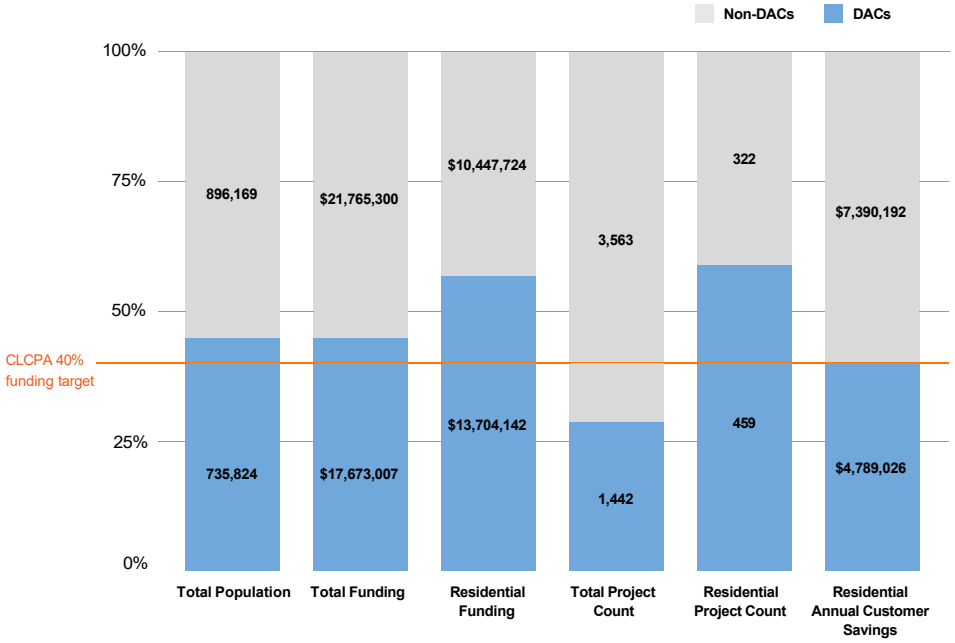
Baseline Assessment of
Clean Energy Program Participation

Baseline Assessment of Regional Clean Energy Programs

Overall NYSERDA spending in Manhattan is representative of population size; Manhattan has 15.7% of NYC's total NYSERDA funding and 18.6% of the city's population. However, Manhattan receives less Residential and Multifamily program funding; it gets 12.0% of NYC's residential program funding, though it has 25.8% of the City's total residential units. (A detailed breakdown of this funding by program can be found in Appendix B).

Total NYSERDA residential and multifamily funding and projects in Manhattan are meeting the CLCPA target of 40% going to DACs. DACs receive more NYSERDA residential program funding dollars per person than the borough as a whole, and residential funding tends to be higher in neighborhoods with lower median household income. That said, many census tracts in DACs see little residential program funding or projects. (See Fig. 4)

Figure 4. NYSERDA Program Impacts in DACs and non-DAC parts of the region, against CLCPA targets (2019)



Existing NYSERDA Community Campaigns

There are no existing NYSERDA community campaigns.

Figure 5. NYSERDA Residential Program Funding Dollars per Household

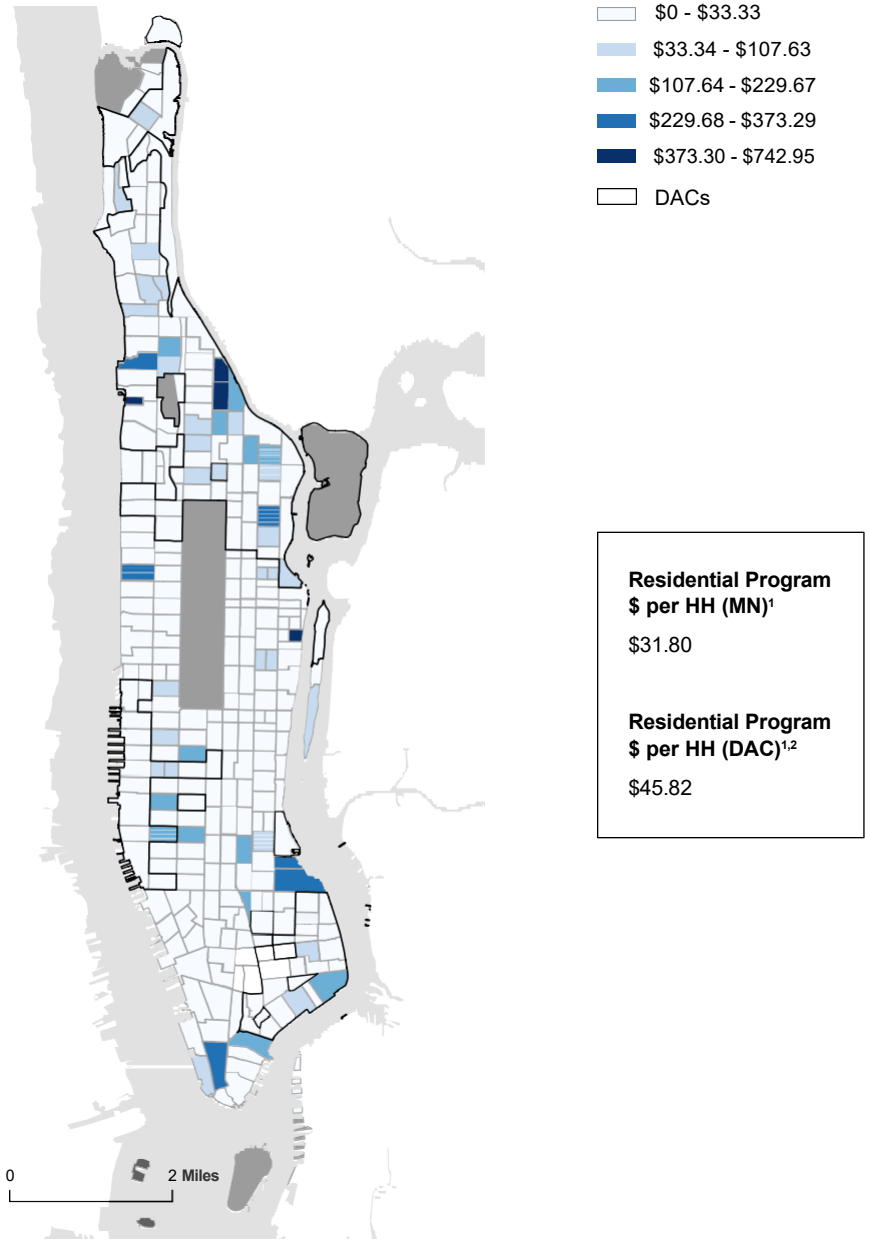
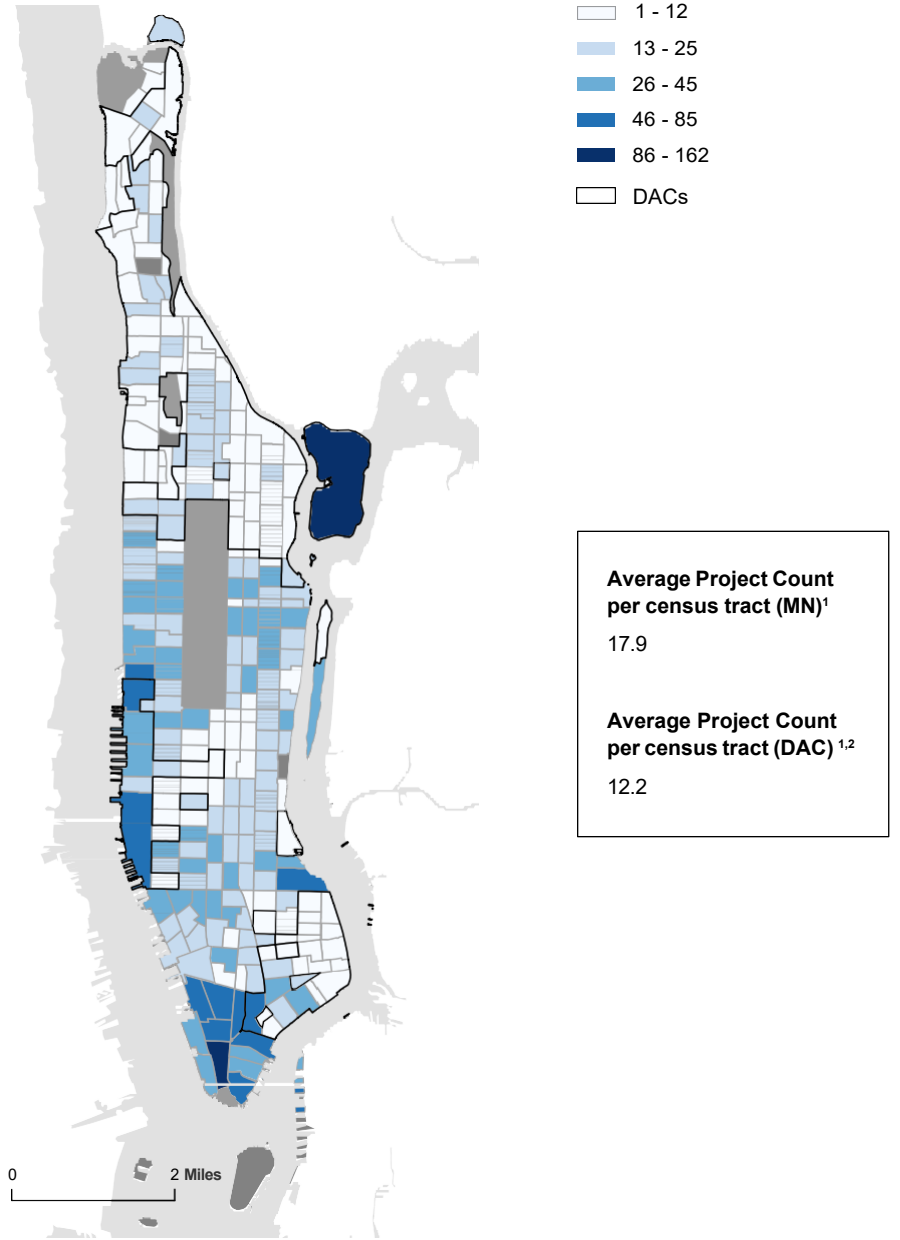


Figure 6. NYSERDA Project Count per Census Tract



Stakeholder and Community Engagement

F. Outreach Tools and Methods

Community engagement and stakeholder research were central to our analysis of regional assets, barriers, and opportunities in Manhattan. Research and engagement methodologies included individual interviews with people working in the clean energy economy and community engagement and surveys of residents and jobseekers.

• Interviews

Practitioners in the clean energy economy–including those coordinating and doing outreach for home upgrade and retrofit programs, providing workforce development trainings, and engaging small businesses and community organizations in clean energy programs in the region–have important first-hand knowledge of the barriers and opportunities facing tenants, homeowners, contractors, building owners and property managers, jobseekers, employers, and community partners. Pratt Center conducted interviews first with Hub organization staff and then with organizations referred by Hub partners as key partners working in the region. Some of these organizations serve other parts of New York City, but all operate in Manhattan.

• Surveys

Pratt Center designed a survey for Manhattan renters and jobseekers on their knowledge, perspectives on, and participation in the clean energy economy and programs. The survey was made available online, via the platform TypeForm, in English and Spanish, as well as on paper for in-person engagement in English. Appendix A provides details on the survey design, outreach, and key findings.

Figure 7. Manhattan Clean Energy and Community Outreach Practitioner Interviews

Organization	Description	Participants	Date
Green City Force	Workforce development	• Chief Program Officer • Executive Director	5/2/23
WE ACT	Environmental justice organizing and advocacy, clean energy upgrades and workforce development	• Clean Energy Program Manager • Director of Policy	7/19/23
Association for Neighborhood and Housing Development (ANHD)	Community engagement, Clean Energy Upgrades (Multi-Family), small business and industrial business policy, housing policy	Director of Programs	7/31/23
Soulful Synergy	Offers workforce development training programs, including in green industries	• Co-founder and COO • Co-Founder • Director of Decarbonization	8/3/23
Neighborhood Restore	Creates affordable housing through restoring abandoned properties for LMI homeowners	Construction Project Manager	8/10/23
KC3	Clean Energy Upgrades (Multi-family affordable)	• Program Manager • Program Manager	11/27/23
ANHD	Clean Energy Upgrades (Multi-family affordable)	Contract Project Management for AMEEP	11/30/23
USL Technology Consulting	Sustainability and technology consulting to small businesses, property owners and developers; workforce	• CEO and Founder • Director, Brand & Digital Marketing	11/30/23

G. Stakeholder and Community Engagement Feedback

Key findings regarding Manhattan stakeholders' information, perspectives, and participation in clean energy programs are summarized below. Survey results are detailed in Appendix A.

• Clean Energy Upgrades

Resident surveys and interviews with people working on home upgrade programs all emphasized that a central barrier to participation facing both renters and homeowners is the complexity of various programs and their processes. Practitioners emphasized that building age and deferred maintenance, combined with a lack of accessible financing options were significant barriers to retrofits and upgrades, especially in small homes, cooperatively-owned apartment buildings, and rent-stabilized apartment buildings. They find the biggest motivators to making upgrades for owners of multifamily housing are local laws with non-compliance penalties and opportunities to integrate upgrades into other renovation projects with public financing or incentives attached.

For renters, their lack of authority to make upgrades is a top barrier. More renters than homeowners identified not knowing what upgrades and technologies are available to them as a major barrier. Practitioners emphasized that homeowners are often deterred by competing home improvement priorities and the extensiveness and inconvenience of construction work; survey results did not emphasize this as significantly but did not contradict this perception. High costs for materials and labor along with insufficient homeowner financial resources are also significant barriers. High utility costs are both a motivator and barrier for renters and homeowners to make upgrades. Renters are most interested in upgrades that improve the health and comfort of their homes, according to surveys, while homeowners are most interested in cost savings and preserving their home and its value.

• Workforce Development Training and Green Jobs

Providers of workforce development training and job placement services emphasized that LMI jobseekers often lack the financial resources, baseline education, or interest required to gain highly technical skills. These job seekers also lack information about the range of jobs in the clean energy economy that are a closer match to their skillsets and interests or how to find them. Those working in job placement find that a lack of soft skills (interview skills, professional norms) and basic computer and communication skills can be barriers to securing jobs. Those working in job training, however, emphasized structural barriers (such as lack of time due to childcare and balancing multiple jobs) as well as jobseekers mistaken perceptions that their skills (such as sales experience from retail and service sector jobs, speaking multiple languages) are not relevant or that they cannot develop new skills (such as data entry software). Survey results indicate that training in basic skills with computers, job-seeking, and driving are needed by some jobseekers, and that job-seekers are not familiar with the range of roles in the sector but are interested in many of the benefits and learning more. Both job training providers and jobseekers indicated that increased stipends and free childcare would address financial barriers to participation in trainings.

• Information Sources

For information about housing, jobs, and their neighborhood, Manhattan survey respondents across all age groups primarily rely on personal networks, local cultural and community events, information sessions held by local organizations or elected officials, and internet searches. Social media is widely used, but several respondents commented on the proliferation of unreliable information and accounts on social media, and the need to rely on trusted organizations and government sources. Practitioners' outreach methods include these channels, as well as email newsletters and direct mail, which may be less effective especially for reaching older and less engaged residents. Other widely-used sources include newspaper, civic association/local political organization and community board meetings, and flyers posted locally. Mailers are not widely relied upon by respondents for information. Surveys and interviews indicate the effectiveness of having credible messengers from the community who have successfully participated in home upgrade or job training programs to speak to their networks or prospective participants.

Barriers and Opportunities

Based on Manhattan's regional characteristics outlined in Sections II and III, input from residents and communities discussed in Section IV, and building on the Disadvantaged Communities Barriers and Opportunities report released in December 2021, we identify the following barriers and opportunities to advancing an inclusive clean energy economy across the borough. Where relevant, we highlight which market segments, Low- and Moderate Income (LMI) or Market-Rate (MR), are affected by a given barrier.

While regional and Manhattan Clean Energy Hub organization assets provide many significant opportunities, it must be noted that these alone are not sufficient to address the barriers identified here. The Recommendations identified in Section V highlight additional strategies to address barriers to participation in the clean energy economy in Manhattan.

1. Physical and Economic Structures and Conditions

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER

Clean Energy Upgrades

1.1. Aging and historic building stock

1.1 a The building stock is older in Manhattan than citywide, and older in Manhattan DACs than the borough as a whole; 88% of 1-4 unit buildings in Manhattan DACs were built before 1930. Age of buildings expands project scope, complexity, cost (Market segment: LMI, MR). Buildings may require additional renovations before upgrades can be implemented (roof replacement, mold remediation, updating electrical systems, etc). Existing home repair programs (e.g. HomeFix, RESTORE) are vastly underfunded and inadequate, and multi-family affordable housing preservation programs typically have a 1+ year waiting list; health and safety upgrades (asbestos, lead, mold remediation) must be self-funded by the building owner.

1.1.b. Manhattan DACs contain historic preservation districts; renovations to some homes may need to conform with individual landmarking or historic preservation district requirements. (See Appendix B)

1.1. New York City nonprofit organizations, project managers, and contractors with experience in preservation and retrofit programs are knowledgeable about strategies for engaging homeowners, managing projects, and navigating programs to address the complexity and cost associated with older buildings. (It must be noted, however, that challenges persist with availability of contractors to perform this work.) Housing and social service organizations often have staff dedicated to homeowner and rental outreach and financial and legal counseling. For 5+ unit buildings, city housing preservation programs offer a good opportunity for integrating retrofits into renovations and refinancing if they are fully funded and expanded (see Recommendations). The NYC Accelerator program also provides opportunities for the Hub to collaborate with the City.

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
1.2 Most Manhattan residents are renters, who have perceived and actual physical limitations in their ability to implement upgrades. In DACs, 88.8% of all households are in rental housing, in Manhattan as a whole, 75.4% are renter households. Black and Hispanic households are even more likely to rent. 1.2a Renters do not have authority to make major physical alterations to their apartments nor to require the owner to make optional building-level upgrades. 1.2b Electrification may increase renters' energy burdens, as tenants in buildings with gas heat do not directly pay their heat bill but those whose heat is powered by electricity do. (Market segment: LMI, MR)	**1.2. Based on our Manhattan survey findings and interviews, many renters are interested in having clean energy upgrades in their homes.** Surveyed Manhattan tenants indicated that benefits of clean energy upgrades, including fighting climate change, making indoor temperature more comfortable, and improving indoor air quality were all highly motivating for having upgrades in their housing. (See Section V for Recommendations on how to leverage this opportunity through marketing.)
1.3. Many Manhattan owner-occupiers live in cooperative apartment buildings, where building-level retrofits and some in-unit projects require approval of a majority of shareholders, and where there may be deferred maintenance, especially in LMI communities.	1.3. a Hub organizations and partner/ally organizations have experience working with affordable cooperative apartment buildings on preservation and other projects, better positioning them to help cooperatives navigate decision-making on clean energy projects. 1.3.b. Surveyed Manhattan homeowners included co-op residents, who expressed interest in home energy upgrades
1.4. Most Manhattan small businesses are renters, and may not know whether or how to work with the landlord to navigate programs. (Market segment: LMI, MR)	1.4 Hub organizations have experience working with energy-intensive small businesses, such as grocery stores and barber shops/beauty salons, to participate in clean energy programs. Their knowledge of these small businesses' energy challenges, common perceptions of and challenges with landlords, utility companies, and government agencies, and the communities in which they work better enables them to engage small business owners and help them navigate their options.
Clean Energy Jobs	
1.4.a. The population living in DACs has less formal education than the borough as a whole; 21.9% of residents in DACs who are 25 or older have less than a high school education.	**1.4a Many of the borough's region's workforce development programs and organizations currently serve populations in DACs including those without a college degree.** For example, Green City Force and Soulful Synergy, two

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
Clean Energy Jobs	
	organizations providing workforce development services in Manhattan, train participants without college degrees. 1.4b Many buildings trades jobs, including green jobs, do not require a college degree and offer living wages, as outlined in Section II.C.
1.5. Some Manhattan jobseekers need to develop basic job skills before or alongside more specialized training to qualify for green jobs. Among survey respondents, this includes job seeking skills (using job search sites, resume/ cover letter writing, interview skills) (17% of respondents), office management and administrative skills (17%), basic computer skills (14%), obtaining a driver's license (14%), GED or remedial education programs (11%) and gaining English language proficiency (8%). Lack of soft skills and basic skills can be a barrier to job placement.	1.5.a Many of the region's workforce development programs and organizations include or can make referrals to programs to provide basic skills training, and have knowledge of the green jobs landscape and skill requirements for different roles. 1.5.b There are qualified local Mechanical, electrical and plumbing (MEP) designers, architects, and contractors that are MWBE firms in Manhattan including in DACs that would make good partners for workforce development programs. The Hub can target outreach to these firms and forge connections with community-based organizations to address workforce development gaps for those without a college degree. The New York City School Construction Authority's workforce development partnerships, for instance, provides a useful model.
1.6. Most Manhattan residents commute to work by public transportation; jobseekers may face barriers to green jobs that require a car or driver's license or are located two to three transfers away. In addition, unemployed, low-income, and student jobseekers may be unable to pay the transit fare to participate in job training programs.	1.6 Workforce development practitioners report that offering transportation stipends reduces barriers to participation. (See Recommendations for discussion of the need to expand this resource.)
All Programs	
1.7 Unequal internet access, particularly in DACs. 15% of households in DACS lack at-home internet subscriptions (higher than borough- and statewide)	1.7.a. Manhattan residents rely on a range of communication channels for information, including local community events and trusted community partners. Hub partners can build on their success conducting outreach and engagement for other programs in their communities using diverse communication channels.

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
	1.7.b. The hub website is mobile-responsive, enabling easier engagement for residents who rely on their phones to access the internet via public networks or data subscriptions.

2. Financial and Knowledge Resources and Capacity

Clean Energy Upgrades

2.1. Manhattan has the highest cost of living in New York City for renters and homeowners, limiting residents' financial resources for implementing upgrades, especially for residents of color in DACs. 2.1.a. High housing cost burden: 43% of all New York City renters are rent-burdened (paying more than 30% of monthly income on rent. The vast majority of New Yorkers earning $50,000/month or less are moderately or severely rent-burdened (paying more than 30% or more than 50% of their income on rent, respectively), per the 2023 NYCHVS. 34% of Manhattan homeowners with mortgages are also cost-burdened. Aging homeowners on fixed or low incomes are often asset-rich but cash-poor. Housing cost burdens are higher among people of color; Black households have the highest rent burdens citywide. 2.1.b. The racial income and wealth gap persists in the region, including in DACs. In DACs, the median income of Black households is less than half of the median income of white households. 2.1.c. Household annual energy costs are highest among 1-4 family homes, and energy burdens are highest among LMI households in 1-4 unit homes.	2.1. Clean energy upgrades and programs that reduce household energy costs could help relieve living costs and motivate participation for homeowners, especially LMI homeowners in DACs, if sufficient financing for upfront costs is available (see recommendations). (See Recommendations for discussion of additional strategies to address cost of living-related barriers for Manhattan residents. We note, however, that this is multi-layered systemic challenge that Opportunities and Recommendations for the Hub will not be able to overcome.)
2.2. Construction and retrofit projects in New York City are more costly than those in the rest of the state, largely due to labor, logistics, and competition. Projects require designers, builders, and consultants with expertise working in a complex regulatory environment and many different assistance/incentive programs	2.2 Hub organizations and partners have experience engaging homeowners, property managers, tenants, and relevant agencies on construction and retrofit projects including those targeting LMI residents

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
2.3. Financial products and incentives do not effectively serve LMI homeowners and multi-family affordable building owners 2.3.a Clean energy program financial incentives and benefits are insufficient and not tailored to needs of LMI homeowners or owners of buildings with significant debt: rebates do not serve LMI homeowners who cannot afford upfront costs, tax credits don't work for households with no tax liability, and information about cost-sharing and levels of benefits are often unclear to homeowners (an issue exacerbated by age of buildings, which can make project scope unpredictable - see 1.1). 2.3.b Lenders and other financial institutions often reject nonprofit landlords and other applicants for retrofit applications because they want to see higher cashflow, which would require increasing rents (which would often run counter to organizational mission and/or the law); many LMI homeowners are already mortgage-burdened; both multifamily building owners and homeowners may be denied by lenders if they already have too much debt.	2.3. Hub organizations can help set expectations for homeowners and building owners given their experience and expertise with these programs, and build more feasible scopes and pursue programs based on better information. Hubs can also provide a conduit of feedback to NYSERDA to improve program design. (See Recommendations for strategies to more meaningfully address this significant financial barrier.)
2.4. High turnover among property manager staff and other key partners amidst long project timelines, largely resulting from byzantine and slow government program administration, can set back/restart projects.	2.4.a. Nonprofit organizations managing programs provide consistency and are persistent in reengaging property managers and new staff 2.4 b. Organizations know of other local resources and can help building owners / property managers braid together resource that are siloed, such as Homefix and EmPower+.
2.5 Many organizations working on retrofits in Manhattan are focused on multifamily housing, and many NYC organizations with experience doing retrofits for small homes are focused on outer-boroughs and/or market-rate/high-wealth homeowners.	2.5. Hub organizations are familiar with the housing retrofit landscape and can help broker new connections and partnerships via the Hub.

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
Clean Energy Jobs	
2.6.a. LMI job-seekers may be juggling multiple jobs, childcare, school, and other obligations with little flexibility, which impedes their enrollment in or completion of workforce development/job training programs. 2.6.b. Job training programs with application fees, training costs, and/or certification fees present additional financial barriers for LMI jobseekers.	2.6 Manhattan jobseekers indicated that they would be highly motivated to participate in a job training program that provided stipends; for some, free childcare during the program would be an important motivator.

3. Perspectives and Information

Clean Energy Upgrades	
3.1. The Manhattan renter population lacks widespread awareness of clean energy upgrade programs for renters (42% of surveyed renters had not heard of any clean energy programs), and the vast majority had not adopted any clean energy technologies in their homes (Market segment: LMI, MR).	3.1. Building owners can be engaged by the Hub to implement upgrades that benefit themselves and their tenants. Hub organizations routinely engage property managers of multifamily affordable rental housing on clean energy opportunities. Surveyed Manhattan homeowners have awareness of and interest in at least some clean energy upgrade programs, which can be leveraged to benefit tenants.
3.2. Renters and homeowners report perceptions of difficulty, complexity, and lack of information regarding the process of receiving upgrades, and identify this as a significant barrier to their interest in and ability to make upgrades (Market segment: LMI, MR).	3.2. Manhattan renters and homeowners may be motivated to participate in programs and implement upgrades if given clear information about what programs are available, how to access them, and how these programs will make their homes more comfortable, lower utility bills, and help fight climate change. In addition, as Hub partners' proven track records show, renters and homeowners benefit from receiving ongoing energy advisement and support in applying for and participating in programs and the upgrade process.
3.3. Given rising utility costs, many residents and small businesses do not trust utility companies to offer benefits/incentives.	See Recommendations.

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
3.4. Building owners and property managers are more motivated to complete retrofits and other projects in order to comply with regulations and avoid fines than by the prospect of potential future savings on operating costs.	3.4. Local environmental and other building regulations, as well as refinancing programs, create opportunities to fold additional clean energy upgrades into other retrofits or renovation projects.
Clean Energy Jobs	
3.4 Jobseekers do not know where to find information about green jobs and workforce development programs. 48% of surveyed Manhattan residents reported this as a barrier to participating in a green jobs program. (Market segment: LMI).	3.4.a. Jobseekers are interested in working in the green economy; 65% of Manhattan survey respondents said they currently work or are interested in working a green job, and 11% said they were unsure or would need more information. 3.4.b. Manhattan residents seek and are open to information about career opportunities from local cultural and community events, information sessions held by local organizations and officials, internet searches, social media accounts of trusted sources (organizations, government agencies, etc.), and personal networks. 3.4.c. Hub organizations are experienced with and well-poised to outreach to jobseekers in DACs and across the borough about green job training opportunities.
3.5 Jobseekers lack clear information about the clean energy economy, and may assume most jobs are physical or technical and that they cannot gain the skills or interest for these jobs, and opt-out. (Market segment: LMI).	3.5. Workforce development organizations in the region have developed messaging and materials on the range of job opportunities and skill requirements in the clean energy economy.
All Programs	
3.6 Manhattan residents, especially in DACs, rely primarily on their personal networks for information, and are most motivated to participate in programs based on first-hand reports from people they trust, rather than media channels. Many people are concerned about false or unreliable information or scams on social media; many residents get information through local events and organizations, though this may skew towards already highly-engaged residents; residents may mistrust government agencies and utility companies, but have more trust toward some elected officials, civic associations, and community groups.	3.6. Manhattan residents and jobseekers are savvy and discerning in which information sources they trust, and are open to information about programs and services that will benefit them and their communities, especially financially and health-wise, when delivered by trusted sources; the Hub can establish credible messengers and work with participants to connect with others in their community, as well as building on the trust of local organizations and leaders.

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER

4. Programmatic Design and Implementation

Clean Energy Upgrades

4.1. Clean energy programs are numerous, intersecting, have different eligibility requirements and timelines, require various lengthy and complicated applications, and are overseen by different entities that do not communicate with one another.	4.1 The Hub and its member organizations and allies are experienced with helping owners navigate programs; building owners and property managers who have completed retrofits with the support of these organizations have reported back to them that they never could or would have completed the program without their support.
4.2. Renters and landlords have split incentives for making clean energy upgrades: surveyed renters indicated that upgrades that make their homes healthier, and more comfortable were highly motivating; renters do not benefit from rebate and incentive programs, and in fact could see utility costs increase after electrification. homeowners were more motivated by cost savings and making the home resilient to natural disasters. Homeowners in owner-occupied homes with tenants may have more aligned interests with tenants.	4.2 Hub organizations can target outreach to owner-occupied 1-4-unit homes with tenants.
4.3. Programs may have restrictive eligibility requirements that exclude some housing typologies by housing tenure. For example, EmPower+ does not recognize the condo structure, in which a multi-family building's units are separately owned and may contain both owner-occupied and rental units, and can require tenants in the building to qualify as low-income in order for a single owner to participate.	4.3 Hub partners are highly knowledgeable about New York City housing types and programs, have experience encountering obstacles and exclusions as a result of clean energy program design, and can provide feedback and Recommendations to NYSERDA to reduce these barriers. (See Recommendations.)
4.4. EmPower+ uses State Median Income (SMI) instead of local Area Median Income (AMI) to determine income eligibility for the low income incentive, creating a big eligibility gap.	4.4. Hub organizations have already conducted research and identified policy recommendations to address income eligibility barriers. (See Recommendations.)

REGIONAL BARRIERS IDENTIFIED	OPPORTUNITY TO ADDRESS BARRIER
Clean Energy Jobs	
4.5. Many current NYSERDA programs target colleges, which leaves out adults without college degrees and who are not pursuing higher education, and are highly technical or focused on manual labor, which survey respondents and practitioners emphasized is not a fit for many jobseekers interested in the green economy.	4.5. Hub organizations have and will build relationships with partners (K-12 schools, social services organizations, workforce development partners, community centers, religious institutions) that enable outreach to diverse jobseekers, utilizing messaging and messengers that emphasize accessible green careers outside of manual and technical labor.
All Programs	
4.6. Clean Energy programs and materials are largely in English, while more than half of households in DACS speak a language other than English at home, and 15.7% have limited English proficiency.	4.6.a. Hub organizations and potential partner organizations have multilingual staff, largely targeted to the communities they serve. 4.6.b. Community-based and other translation and interpreter services in a range of languages are available in the region, with adequate resources (see recommendations).

Next Steps

Recommendations to address barriers and expand opportunities include, as well as their priority-level and general timeline, are outlined below. Priority is rated 1-3, with 1 being the highest priority. High priority recommendations (rated “1”) have the most potential impact and feasibility, whereas lower priority recommendations (rated “3”) are more complex to implement or may have lesser impact, or both. Timeline includes short-term, medium-term and long-term categories, with short-term defined as within the next year, medium-term defined as during the first Hub contract (through mid-2026), and long-term being beyond this period.

Priority

1. Most potential impact and feasability
2. High-impact, requires increased funding
3. More complex to implement or may have lesser impact

Timeline

Short term	Medium term	Long term
Within the next year	Through mid-2026	Post-2026

Recommendation

Clean Energy Upgrades

NYSERDA should partner with the Hub to create program messaging and outreach materials tailored to priorities of target populations, including:

- Financial benefits, long-term resiliency, and availability of support to navigate programs for homeowners
- Financial benefits, long-term resiliency, reduced tenant complaints, and availability of support to navigate programs for owners of rental buildings

1 2 3

(Ongoing)

NYSERDA should support the Hub to increase landlord engagement strategies, including requiring tenant (residential and small business), landlord, and co-op board engagement strategies in NYSERDA-funded programs in order to make some retrofits more cost-effective and to move projects forward.

1 2 3

(Ongoing)

Increase LMI program accessibility and reduce enrollment barriers by expanding income verification options. For example, a HEAP award letter is needed for EmPower+ customers seeking heat pump installation funds; allowing other HEAP documents to be proof of awardee would make it easier for residents to enroll. As another example, for EmPower+ programs administered by Hub partners with public housing residents, NYSERDA has allowed a waiver for individual income verification, accepting proof from the New York City Housing Authority that participants are LMI residents.

1 2 3

NYSERDA should immediately change the income threshold for the EmPower+ low-income incentive from 60% of State Median Income to the greater of 60% SMI or 60% AMI, and in the long run change how they define low-income to match the Federal government’s IRA definition at 80% AMI.

1 2 3

NYSERDA should increase investments in renter programs, such as increasing the number of slots for community solar, as well as expanding education and outreach for these programs.

1 2 3

(Ongoing)

NYSERDA should partner with federal, state, and city housing agencies to expand accessible financing and financial incentives for capital improvements and clean energy retrofits in affordable housing and for LMI homeowners, including providing no/low-interest loans and grants aligned with affordability goals.

1 2 3

Expand renter financial incentives. Examples could include helping renters get induction stoves and energy efficient appliances, better engaging landlords and helping residents do the same.

(Ongoing)

NYSERDA should advocate for and with state policymakers to update habitability law and other housing and utility regulations and programs to ensure that electrification does not increase renter energy burdens.

Clean Energy Upgrades

NYSERDA partner with Hub to create program messaging and outreach materials focused on priorities and information gaps of target popula-tions, including: high wages in green jobs, types of roles and educa-tion/skills required to access them – emphasizing non-technical roles, and skills training offered.

(Ongoing)

NYSERDA and Hub should focus on educating employers about the benefits of hiring a diverse and local workforce with language skills and knowledge of the local community and built environment.

(Ongoing)

Partner with workforce development/job skills training programs including outside of the clean energy economy to provide basic skills training.

(Ongoing)

NYSERDA and city agencies funding workforce development increase childcare and stipend incentives for job training program participants.

(Ongoing)

NYSERDA-funded programs could mandate local hiring to boost local workforce development opportunities.

All Programs

NYSERDA expand and dedicate funding for multilingual materials, resources, and interpretation services , to be utilized by the Hubs and partners.

(Ongoing)

Invest in establishing credible messengers for programs, including creat-ing incentives for program participants to amplify Hub and program in-formation to their networks. Credible messengers include those who have successfully participated in clean energy programs (home upgrades, job training, etc.) and other community members who understand and share relationships and identities with target participants.

(Ongoing)

Support investments in public broadband and internet benefits to LMI renters and shelter and supportive housing residents

As the Hub partners continue to partner with NYSERDA and key regional partners in the Manhattan Regional Clean Energy Hub, the Hub will continue to identify new opportunities and recommendations and update prioritization for moving these forward to address barriers to Manhattan DAC residents' participation in the clean energy economy.

Notes

1. Pratt Center analysis of American Community Survey 5-Year Estimates, 2021, and NYSERDA Final Disadvantaged Communities, 2023.
2. DACs have many Spanish speakers, with over 250,000 people over the age of 5 speaking Spanish at home. Thirty percent of Spanish-speaking households in DACs have limited English proficiency–or 10% of all households in DACs. Spanish makes up the predominant non-English language spoken in much of Upper Manhattan; in Central Harlem, other Indo-European languages predominate, which corresponds to areas of predominantly Black population. Overall, over 18,000 people ages 5+ speak French, Haitian, or Cajun at home in DACs. The Lower East Side is split into two geographic areas, one with a predominance of Spanish speakers and one with a very strong predominance of Asian languages. Forty-eight percent of AAPI-speaking households in DACs have limited English proficiency (which is 4.3% of all DACs households). Over 48,000 people speak Chinese in DACs. (Note: the U.S. Census Bureau groups Mandarin and Cantonese into a single category for Chinese in the ACS.)
3. Labor participation refers to people in the workforce who are either working or actively looking for work; unemployment refers to people who are actively seeking work and are unemployed ("labor participation" is the denominator).
4. NHPI population sample size is very small in DACs.
5. This data is from the U.S. Census Bureau's 2021 ACS 5-Year Estimates, the most recent ACS estimates at the time of data collection for this report; a report from The New School Center for New York City Affairs shows updated statistics taken from the Current Population Survey, detailing how NYC unemployment rates have gone down since the onset and immediate aftermath of the COVID-19 pandemic but have actually recently gone up again for Black workers since 2022.
6. Note that this is referring to the number of buildings, not the total square footage of these buildings. See Appendices for a detailed breakdown of buildings and square footage by land use.
7. Note that the "land use" typology is referring to the typology of the tax lot, not to individual buildings. For example, "1-4 units" refers to the total number of units contained within the tax lot. Unfortunately, there is no way to accurately separate the units within each tax lot (for example, there could be a tax lot containing 20 units, with three total buildings, but there is no way to know how these units are distributed within the buildings).
8. The size threshold for compliance with Local Law 97, the city's flagship building decarbonization regulation.
9. Note: these categories of year built come from MapPLUTO, the New York City Department of City Planning's definitive resource of land uses.
10. Municipal Arts Society of New York, "Greening NYC's Historic Buildings Green Rowhouse Manual," 2012
11. 2020 NYC Energy Conservation Codes
12. NYC Mayor's Office of Sustainability, "One City Built to Last: Technical Working Group Report;" NYC Mayor's Office, "Press Release: Mayor Adams, Speaker Adams Celebrate Passage of Zoning Changes that Fights Climate Change by Opening Doors to Cleaner Air, Lower Energy Costs, December 6, 2023"
13. See NYC HPD's recent press release regarding the newest Housing & Vacancy Survey results (pg. 21-22 of HVS results).
14. Vacancy rates are understood in the housing policy sector as an important measure of housing affordability and opportunity, as low vacancy rates are correlated with higher housing costs and mean that current or prospective residents have few housing options. New York State's Emergency Tenant Protection Act of 1974, which enacted rent-stabilization laws in localities with housing emergencies, establishes a 5% vacancy rate as the maximum threshold for a "housing emergency."
15. 2023 Housing and Vacancy Survey, Selected Initial Findings
16. The ACS metric "Available Housing Vacancy Rate" is defined as *[(vacant for sale only + vacant for rent) / (occupied units + vacant for sale only + vacant for rent + vacant sold but not occupied + vacant rented but not occupied)]* (see page 44 of ACS definitions). The basic ACS "Vacancy Rate" is calculated as a percentage of total housing units, and includes "other vacant" categories such as seasonal housing, appearing higher than the rates reported by the HVS and its own "Available Housing Vacancy Rate." This data was utilized in order to analyze vacancy rates in DACs.
17. NYSERDA, "New York Clean Energy Industry Report 2022," p.66
18. New York City Economic Development Corporation, "Green Economy Action Plan," March 2024, p. 21
19. New York City Economic Development Corporation, "Green Economy Action Plan," March 2024, p. 23

20. New York City Economic Development Corporation, “Green Economy Action Plan,” March 2024, p. 23
21. NYSERDA, “New York Clean Energy Industry Report 2023,” p.9
22. New York City Economic Development Corporation, “Green Economy Action Plan,” March 2024, p. 49
23. New York City Economic Development Corporation, “Green Economy Action Plan,” March 2024, p. 50
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28. New York Just Transition Working Group, “2021 Jobs Study, March 2023: Vintage Update,” p.98
29. https://jobsfirstnyc.org/solutions/sector-network-green-economy
30. New York City Employment & Training Coalition: https://nycetc.org/2023/04/green-jobs-in-new-york-city/

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Appendix A
Manhattan Clean Energy Hub Survey Methodology and Key Findings

In fall 2023, as part of the RABA for the Manhattan Clean Energy Hub, Pratt Center for Community Development published and distributed a survey to Manhattan residents related to clean energy home upgrades and jobs. (See section 4 for more information about survey methodology and respondents.)

Survey promotion and outreach
The survey was promoted by Manhattan Hub organizations including WE ACT, Pratt Center, ANHD, KC3, USL, and Green City Force, using outreach materials developed by Pratt Center and approved by NYSERDA. Materials included email and social media graphics and template text, including links to the online survey, as well as physical fliers with links and QR codes for the online survey. Outreach channels included Hub organizations' email newsletters and social media channels (with combined audiences in the thousands), tabling at in-person events (job fairs, community events), flyering at community facilities (public libraries, community centers in public housing, community-based organizations' bulletin boards and information stations, public recreation centers, with an emphasis on DACs), and attending community meetings. At the community meetings, both paper surveys and links to the online survey were made available, with staff from Hub organizations available to assist in survey completion as needed. An important method for survey engagement was offering an incentive; survey respondents were entered in a raffle for a $100 gift card.

Survey Design
All survey respondents completed sections regarding demographics, housing tenure, and information channels they utilize. The survey contained separate sections for renters, homeowners, and jobseekers, which respondents completed depending on their housing tenure and jobseeker status. Questions were mostly multiple choice or ratings, with options to provide additional information in short-form responses. Each of these sections surveyed respondents about their level of awareness and interest in different clean energy technologies and programs, perspectives on various barriers to and benefits of participating in clean energy programs, and knowledge and financial resources, barriers, and needs related to home upgrades and job training.

Survey Findings
Key survey findings are highlighted below.

1. Information Sources and Community Engagement

1a. For information about housing, jobs, and their neighborhood, **Manhattan survey respondents across age groups primarily rely on:**

- **personal networks,**
- **local cultural and community events,**
- **information sessions held by local organizations or elected officials, and**
- **internet searches.**

Social media is widely used, but several respondents commented on the proliferation of unreliable information and accounts on social media, and the need to rely on trusted organizations and government sources.

Other widely-used sources include newspaper, civic association/local political organization and community board meetings, flyers posted locally. Mailers are not widely relied upon by respondents for information.

2. Clean Energy Home Upgrades: Perspectives and Information

2a. Awareness of Technologies: Most Manhattan survey respondents had some knowledge of some clean energy upgrades. The vast majority had heard of LED light bulbs (77.8%), Electric or induction stoves (71.1%), solar panels (68.9%) and other energy efficient appliances (64.4%). Roughly half were aware of high-efficiency windows (51.1%). A large minority of respondents were aware of improved insulation (44.4%) but only a quarter had heard of air-sealing. More than a third (37.8%) were aware of heat pumps/mini-splits. Less than a third had heard of heat pump water heaters or low-flow faucets or showers. **A small minority (6.7%) had not heard of any of these upgrades.**

2b. Implementation of Technologies: Uptake of or interest in these upgrades was much lower than awareness. LED light bulbs were the most-commonly adopted upgrade among respondents (20%), followed by energy efficient appliances (11%); less than 5% of respondents had implemented or planned to implement all other upgrades. Technologies people were interested in adopting

but unsure how to access or afford included high-efficiency windows (11%), heat pumps/mini-splits (9%), and solar panels (9%).

Fig. 1. What sources do you often hear about new programs through or turn to for information related to your housing, neighborhood, or job opportunities?

Personal networks (friends, family, neighbors, colleagues)	68.9%
Street fair, local concert, or other cultural or art event	60.0%
Information session or resource fair held by a local organization and/or elected official (job fair, affordable housing info, health fair, etc.)	57.8%
Community events (fairs, town halls and public meetings, etc.)	51.1%
Internet search	48.9%
Civic association or neighborhood political organization meeting	42.2%
Newspaper	40.0%
Social Media	40.0%
Community Board meeting, public hearing, or other meeting held by government agency	40.0%
Flyer posted on bulletin board, on the street	37.8%
Religious services at my church/mosque/synagogue/temple	35.6%
Block association, tenant association, homeowners association, or co-op board meeting	35.6%
Local nonprofit organization	31.1%
Local elected official (councilmember, Assemblymember, State Senator, etc.)	28.9%
TV, radio	26.7%
Community center or rec center	20.0%
Pamphlet sent through the mail	17.8%
Local Blog or newsletter	13.3%
Parent association meeting or events at my child's school	13.3%
My church/mosque/synagogue/temple	8.9%
Other	6.7%
I have not attended any of these community events	4.4%

2c. Motivation: The most motivating messaging about the benefits of clean energy upgrades for both owners and renters include:

- **fighting climate change,**
- **making the temperature of the home more comfortable, and**
- **lowering utility bills.**

Improving indoor air quality is highly motivating to a majority of surveyed renters, but with mixed importance to homeowners. Owners were also motivated by making needed repairs to their home, but less so than tenants. Across the board, renters were highly motivated by all benefits of home energy upgrades.

Fig. 2. Which of the following clean energy upgrades have you heard of?

LED light bulbs	77.8%
Electric or induction stoves	71.1%
Solar panels	68.9%
Energy efficient appliances (refrigerator, washer/dryer, etc)	64.4%
High-efficiency windows	51.1%
Improved insulations	44.4%
Heat pumps or mini-splits	37.8%
Heat pump water heaters	31.1%
Low-flow faucets or showers	31.1%
Smart thermostats	31.1%
Air sealing	24.4%
I haven't heard of any of these	6.7%

2d. Barriers: For renters and homeowners alike, the difficulty, complexity, and lack of information regarding process of receiving upgrades is a significant perceived barrier to making upgrades. Costs are a concern for both groups, but less so. For renters, the greatest perceived barriers to implementing upgrades that as renters they do not have the power to make upgrades they are interested in. More renters than homeowners identified not knowing what upgrades and technologies are available to them as major barriers. Among homeowners, other home upgrades being a bigger priority may present a barrier.

Fig. 3. On a scale of 1 to 5, with 1 being a benefit that is not at all appealing and 5 being a benefit that is very appealing to you, rate how appealing various benefits of home energy upgrades are to you?

Motivation (1=least, 5=most))	**1**	**2**	**3**	**4**	**5**
Lowering my utility bills	3.2%	0%	9.7%	35%	51.6%
Making needed home repairs like a roof replacement or mold/lead abatement as part of the upgrade	3.2%	9.7%	6.5%	22.6%	58.1%
Making my home's temperature more comfortable	0%	3.2%	9.7%	19.4%	67.7%
Preparing my home to with-stand natural disasters and avoid power outages	0%	6.5%	9.7%	16.1%	67.7%
Improving indoor air quality in my home	0%	0%	9.7%	12.9%	77.4%
Fighting climate change/ improving the environment	0%	3.2%	9.7%	16.1%	71%
Lowering my utility bills	0%	0%	20%	30%	50%
Making needed home repairs like a roof replacement or mold/lead abatement as part of the upgrade	0%	40%	0%	50%	20%
Making my home's temperature more comfortable	0%	0%	20%	30%	50%
Prepar-ing my home to withstand natural disasters and avoid power outages	0%	0%	20%	40%	40%
Improving indoor air quality in my home	10%	0%	30%	30%	30%
Getting my tenant to stop complaining about being cold/hot	60%	10%	20%	20%	0%
Fighting climate change/ improving the environment	0%	0%	0%	50%	50%

Fig. 4. Rate various obstacles to making clean energy upgrades in your home, with 1 being not an obstacle at all and 5 being a huge obstacle to making clean energy upgrades

Obstacle (1 lowest, 5 highest)	**1**	**2**	**3**	**4**	**5**
I cannot make the upgrades I'm interested in on my own as a renter	0%	0%	12.9%	22.6%	64.5%
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do as a renter	9.7%	3.2%	19.4%	25.8%	45.2%
The process of receiving upgrades (how to get permission from landlord, how to access incentive programs, etc.) is daunting/ complicated	3.2%	3.2%	16.1%	12.9%	67.7%
Other home repairs or up-grades are a bigger priority for me	0%	10%	40%	50%	10%
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do	0%	10%	40%	30%	20%
The process of receiving upgrades (how to find a contractor, how to access incentive programs, etc.) is daunting / complicated	0%	0%	20%	60%	20%
I can't afford the upfront cost of the upgrades I'm inter-ested in	2.4%	4.9%	24.4%	29.3%	39%
I don't want people coming into my home to install upgrades	51.2%	22%	14.6%	7.3%	4.9%

2e. Awareness of clean energy programs: 42% of renters had not heard of any of the home energy assistance programs available to renters that were included in the survey. The programs with the most renters reporting having heard of them included Home Energy Assistance Program (HEAP) (55% of respondents), National Grid Home Energy Affordability Team (HEAT) (29%), Community Solar (23%), NYSERA Loans (19%). and federal appliance rebates/grants and renewable energy/energy efficiency tax credits and incentives (19%). A small minority had heard of Empower+ (10%) and Weather Assistance Program (13%).

Surveyed homeowners generally had more awareness of programs available to them; 20% of homeowners reporting never having heard of any of the programs mentioned in the survey. Similar to renters, HEAP and Community Solar were among the best-known programs, with 40% and 50% of respondents reporting awareness of these programs respectively. There were several programs that no surveyed homeowners reported awareness of, including Comfort Home, NY-SUN, Affordable Solar Program, HomeFix, Sealed, and National Grid HEAT.

Fig. 5. Which of the following home energy assistance programs available to renters do you know about?

Home Energy Assistance Program (HEAP)	54.8%
I haven't heard of any of these programs	41.9%
National Grid Home Energy Affordability Team (HEAT)	29.0%
Community Solar	22.6%
Federal renewable energy/energy efficiency tax credits and incentives	19.4%
Federal appliance rebates or grants	19.4%
NYSERDA Loans (Smart Energy Loan, On-Bill Recovery Loan, Renewable Energy Tax Credit Bridge	19.4%
Weatherization Assistance Program (WAP)	12.9%
Empower+	9.7%

Fig. 6. Homeowners, which of the following home energy assistance programs do you know about?

Community Solar	50%
Home Energy Assistance Program (HEAP)	40%
Weatherization Assistance Program (WAP)	20%
Con Edison Clean Heat + Insulation Discounts	20%
NYSERDA Loans (Smart Energy Loan, On-Bill Recovery Loan, Renewable Energy Tax Credit Bridge	20%
I haven't heard of any of these programs	20%
Empower+	10%
Federal renewable energy/energy efficiency tax credits and incentives	10%
Federal appliance rebates or grants	10%
Comfort Home	0%
NY-SUN	0%
Affordable Solar Program	0%
HomeFix	0%
Sealed	0%
National Grid Home Energy Affordability Team (HEAT)	0%

3. Green Jobs and Workforce Development Programs:

3a. Perspectives on working in the clean energy economy and green jobs: Most surveyed Manhattan residents are interested in working in the green economy. 65% of Manhattan survey respondents said they currently work or are interested in working a green job, and 11% said they were unsure or would need more information.

Fig. 7. Are you interested in or open to working in the green economy?

No	24%	No - I already work in another field and do not plan on switching careers	18%
		No - the green economy is not of interest to me as a career	7%
Unsure	11%	I'm unsure or want more information	11%
		Yes - I already work in the green economy	9%
Yes	64%	Yes - I am open to working in the green economy in the future, but not actively planning to at the moment	42%
		Yes - I am planning on working in the green economy	13%

3b. Barriers and opportunities to working in the clean energy economy: Some Manhattan jobseekers may need workforce development training to build more basic skills. Among survey respondents, this includes job seeking skills (using job search sites, resume/cover letter writing, interview skills) (17% of respondents), office management and administrative skills (17%), basic computer skills (14%), obtaining a driver's license (14%), GED or remedial education programs (11%) and gaining English language proficiency (8%).

There is also interest in gaining more advanced or specialized skills. One-third of surveyed residents is interested in gaining data analysis skills. In addition, 28% are interested in gaining professional certifications (like those from the Building Perforamnce Institute), 19% are interested in building inspections/auditing/ evaluation, 17% are interested in construction management, and 14% are interested in renewable energy assembly/installation and mechanical/HVAC and other technical skills.

3c. Barriers and opportunities to participating in workforce development programs: The biggest barrier to participation in green job training programs reported by surveyed Manhattan residents is lack of information. 48% of respondents said not knowing how to find a green job training program was a strong barrier to participation, rating this a 4 or 5 out of 5, with 5 being the greatest barrier to participation.

Fig. 8. Which of the below skills, certifications, and experiences you are interested in gaining/ improving?

Data analysis skills	33.3%
Professional certiications like those from the Building Performance Institute (BPI)	27.8%
Building inspections, auditing, evaluation	19.4%
Job seeking skills (using job search sites, resume writing, cover letter writing, interview skills)	16.7%
Office management/administrative skills	16.7%
Construction management	16.7%
Basic computer skills (navigating the internet, storing files, emailing, word processing software)	13.9%
Driver's license	13.9%
Renewable energy (solar, wind) assembly/installation	13.9%
Mechanical, HVAC, building enelope, electrical, plumbing, other technical skills	13.9%
I'm not interested in gaining/improving any of these skills	13.9%
GED or remedial education programs	11.1%
English language proficiency	8.3%
Sales experience	5.6%
Construction (carprentry, masonry, welding, other construction labor) skills	5.6%

The biggest motivations for surveyed Manhattan residents to participate in a green job training program include learning new skills and the possibility of earning better wages and benefits. Notably, every respondent who expressed interest in job training programs reported these as highly motivating factors. The vast majority also would be highly motivated by receiving a stipend to participate. More than three-quarters said they would be motivated to participate in a green jobs training program by hearing about the program from a trusted source, and 70% would be motivated by hearing positive experiences from past participants. The vast majority also reported that they were motivated by the opportunity to do work that helps their community and the environment. A large subset (40%) reported free childcare during the program as an important motivating incentive to participate as well.

Fig. 9. Rate how certain benefits, incentives, or information would motivate you or enable you to participate in a green jobs training program (1 being not at all motivating and 5 being a huge motivator)

Motivation (1=least, 5=most)	**1**	**2**	**3**	**4**	**5**
Stipend (payment) for participation	0%	3.7%	7.4%	25.9%	63.0%
Free childcare during the program	37%	11.1%	11.1%	3.7%	37%
Possibility of earning better wages and benefits	0%	0%	0%	25.9%	74.1%
Learning new skills	0%	0%	0%	18.5%	81.5%
Doing work that helps my community and the environment	0%	3.7%	7.4%	14.8%	74.1%
Hearing positive experiences from people who completed the program	7.4%	3.7%	18.5%	18.5%	51.9%
Someone I trust recommending the program	3.7%	0%	18.5%	22.2%	55.6%

4. Survey Methods and Respondent Demographics

Pratt Center designed the resident surveys in consultation with Hub partners, based on RABA guidelines and goals of the Clean Energy Hubs program.

Survey distribution, outreach, and participation. Surveys were made available to complete online (via Typeform) and on paper. Surveys were promoted via partner and ally organization email lists and social media, flyers posted in community centers, libraries, and other public spaces and distributed at community events and meetings, with a focus on DACs. These outreach efforts reached thousands of online and in-person viewers. To incentivize participation, respondents were entered into a raffle for a $100 gift card.

Data quality assurance. Data validation methods for online responses included: ensuring a valid email address, borough and zip code validation, and other methods to screen automatically-generated responses.

Respondent demographics. The final survey results analyzed responses from 45 individuals, submitted online and on paper, in person. Demographics are reflective of Manhattan DACs.

Fig. 10. Respondent Demographics

Gender		
Male	14	31.1%
Female	30	66.7%
No answer	1	2.2%

Age		
18-24	2	4.4%
25-34	10	22.2%
35-44	12	26.7%
45-54	1	2.2%
55-64	6	13.3%
65+	14	31.1%

Household Size		
1	15	33.3%
2	16	35.6%
3	1	2.2%
4	8	17.8%
5	1	2.2%
6	1	2.2%
7+	1	2.2%
No answer	2	4.4%

Fig. 10. Respondent Demographics (continued)

Race and Ethnicity		
Not Hisp/Lat	33	73.3%
Black (alone)	10	22.2%
White (alone)	15	33.3%
Asian (alone)	4	8.9%
Indigenous/Native American (alone)	0	0.0%
"Other" (alone)	1	2.2%
Two or More (alone)	3	6.7%
Hisp/Lat	9	20.0%
Hispanic/Latino ALONE, no race specified	5	11.1%
Black (alone)	2	4.4%
White (alone)	1	2.2%
Asian (alone)	0	0.0%
Indigenous/Native American (alone)	1	2.2%
"Other" (alone)	0	0.0%
Two or More (alone)	0	0.0%
No answer	3	6.7%

Housing Tenure		Building Type (by housing tenure	
		Small Home	Apartment Building
Homeless/unhoused or living with family/friends	8.9%	N/A	N/A
Homeowner	22.2%	20.0%	80.0%
Renter	68.9%	16.1%	83.9%

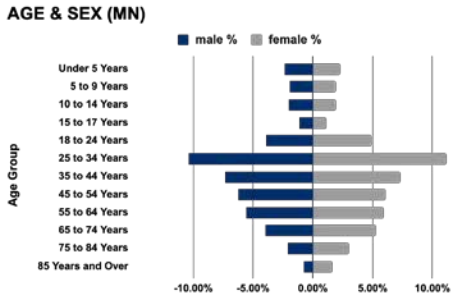
Income		
Less than $30,000	12	26.7%
$30,000-$59,999	9	20.0%
$60,000-$89,999	11	24.4%
$90,000-119,999	3	6.7%
$120,000-$149,999	2	4.4%
$150,000 or more	4	8.9%
No answer	4	8.9%

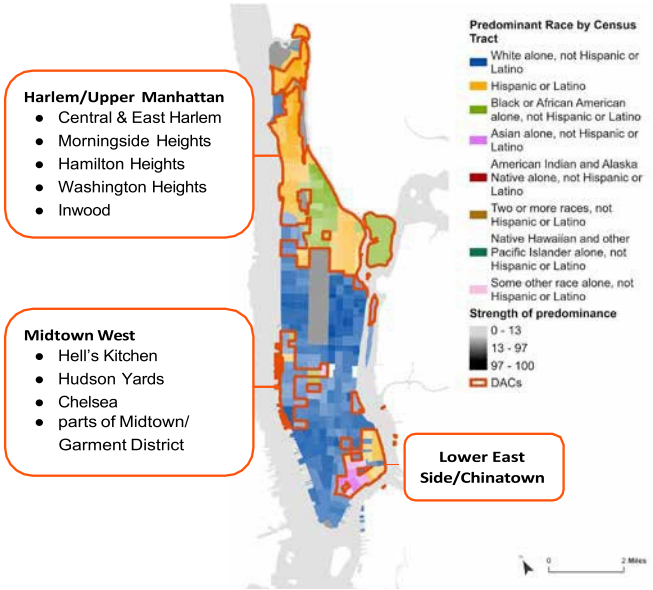
Education		
Some High School	1	2.2%
High School Diploma or G.E.D.	5	11.1%
Some College	4	8.9%
Trade school Degree	1	2.2%
Bachelor's Degree	13	28.9%
Some Graduate School	3	6.7%
Masters Degree or Higher	16	35.6%

Appendix B
RABA Manhattan Data Visualizations

TOTAL POPULATION [1]
1,669,127

TOTAL POPULATION DAC [1,2]
748,434





[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

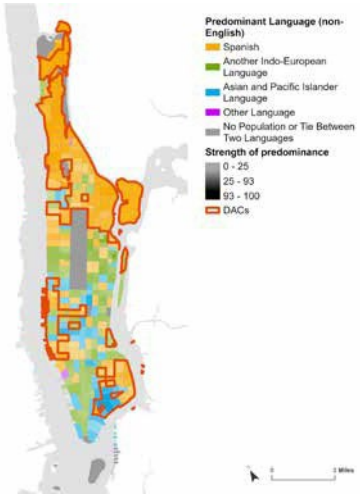
RACE & ETHNICITY

Race	DACs	Manhattan	NYC	NYS
White Alone	29.0%	53.6%	39.8%	60.7%
Black or African American Alone	26.0%	14.1%	23.4%	15.2%
American Indian and Alaska Native Alone	0.8%	0.4%	0.5%	0.4%
Asian Alone	11.0%	12.0%	14.3%	8.7%
Native Hawaiian and Other Pacific Islander Alone	0.0%	0.0%	0.1%	0.1%
Some Other Race Alone	23.1%	12.4%	14.9%	9.0%
Two or More Races	10.1%	7.6%	7.1%	6.0%

Ethnicity	DACs	Manhattan	NYC	NYS
Hispanic or Latino	**42.9%**	**25.7%**	**28.9%**	**19.3%**
White Alone	*8.6%*	*6.8%*	*7.8%*	*6.1%*
Black or African American Alone	*3.6%*	*1.9%*	*2.3%*	*1.3%*
American Indian and Alaska Native Alone	*0.6%*	*0.3%*	*0.4%*	*0.2%*
Asian Alone	*0.1%*	*0.1%*	*0.1%*	*0.1%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*22.3%*	*11.7%*	*13.9%*	*8.3%*
Two or More Races	*7.7%*	*4.7%*	*4.4%*	*3.3%*
Not Hispanic or Latino	**57.1%**	**74.4%**	**71.1%**	**80.8%**
White Alone	*20.4%*	*46.7%*	*31.9%*	*54.7%*
Black or African American Alone	*22.3%*	*12.1%*	*21.1%*	*13.9%*
American Indian and Alaska Native Alone	*0.2%*	*0.1%*	*0.2%*	*0.2%*
Asian Alone	*10.9%*	*11.8%*	*14.1%*	*8.6%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*0.8%*	*0.6%*	*1.0%*	*0.7%*
Two or More Races	*2.5%*	*2.9%*	*2.7%*	*2.7%*

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE



Top non-English languages in DACs:

1. Spanish
2. Chinese (incl. Mandarin, Cantonese)
3. French, Haitian, or Cajun

Language Spoken at Home (Population 5+)	DACs	Manhattan	NYC	NYS
Speak Only English	47.7%	61.7%	52.1%	69.5%
Spanish	36.2%	21.1%	23.5%	14.8%
French, Haitian, Or Cajun	2.6%	2.5%	2.3%	1.5%
German Or Other West Germanic Languages	0.4%	0.7%	1.5%	1.3%
Russian, Polish, Or Other Slavic Languages	0.9%	1.5%	3.6%	2.1%
Other Indo-European Languages	1.9%	3.3%	5.5%	3.9%
Korean	0.4%	0.7%	0.8%	0.5%
Chinese (Incl. Mandarin, Cantonese)	6.8%	5.3%	6.1%	3.2%
Vietnamese	0.1%	0.1%	0.1%	0.1%
Tagalog (Incl. Filipino)	0.2%	0.3%	0.6%	0.4%
Other Asian And Pacific Island Languages	0.7%	1.2%	1.1%	0.9%
Arabic	0.5%	0.4%	0.9%	0.6%
Other And Unspecified Languages	1.6%	1.4%	1.9%	1.2%

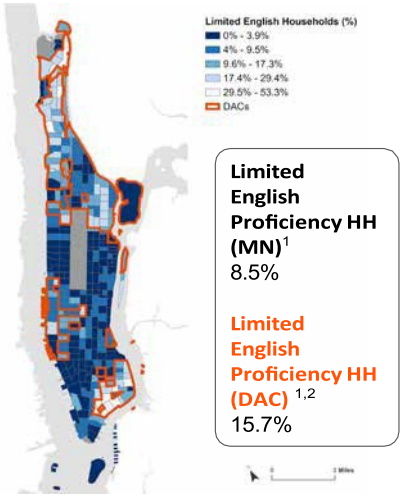
[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

Language Spoken at Home: Total Number of Speakers (Population 5+)	DACs	Manhattan	NYC	NYS
Speak Only English	339,584	981,406	4,271,921	13,177,639
Spanish	257,537	336,436	1,923,155	2,801,677
French, Haitian, Or Cajun	18,810	39,462	185,662	280,169
German Or Other West Germanic Languages	2,548	10,615	125,911	252,986
Russian, Polish, Or Other Slavic Languages	6,370	23,948	292,422	397,510
Other Indo-European Languages	13,157	51,977	449,051	744,335
Korean	2,766	11,456	62,803	91,014
Chinese (Incl. Mandarin, Cantonese)	48,510	83,656	500,659	600,113
Vietnamese	668	1,258	11,046	22,710
Tagalog (Incl. Filipino)	1,644	4,128	49,292	76,783
Other Asian And Pacific Island Languages	4,913	18,405	87,729	173,537
Arabic	3,682	6,789	75,392	115,658
Other And Unspecified Languages	11,495	22,190	157,567	226,238

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

Appendix B
RABA Manhattan Data Visualizations

LANGUAGE



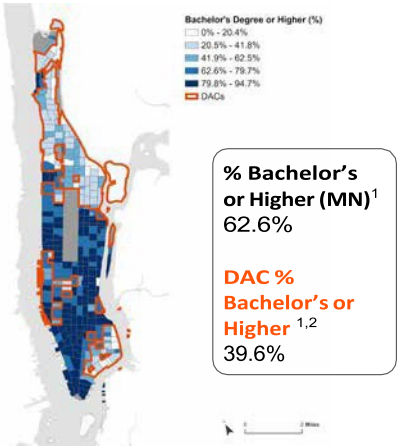
Limited English Proficiency HH (MN)[1]
8.5%

Limited English Proficiency HH (DAC) [1,2]
15.7%

Household Language and English Proficiency by Household (% of Total HH)					
Household Language	**English Proficiency**	**DACs**	**Manhattan**	**NYC**	**NYS**
English Only	N/A	48.6%	62.1%	50.6%	68.5%
Spanish	Limited English Speaking Household	**10.2%**	**4.7%**	**6.5%**	**3.6%**
	Not A Limited English Speaking Household	23.7%	13.8%	17.2%	11.2%
Other Indo-European Languages	Limited English Speaking Household	**0.9%**	**0.9%**	**3.6%**	**2.0%**
	Not A Limited English Speaking Household	5.9%	8.7%	10.5%	7.8%
Asian And Pacific Island Languages	Limited English Speaking Household	**4.3%**	**2.7%**	**3.4%**	**1.7%**
	Not A Limited English Speaking Household	4.7%	5.2%	5.4%	3.4%
Other Languages	Limited English Speaking Household	**0.3%**	**0.2%**	**0.4%**	**0.3%**
	Not A Limited English Speaking Household	1.7%	1.6%	2.4%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

EDUCATIONAL ATTAINMENT [1]



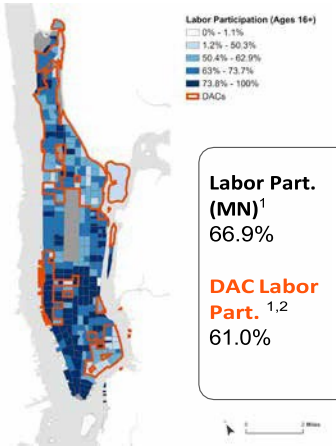
% Bachelor's or Higher (MN)[1]
62.6%

DAC % Bachelor's or Higher [1,2]
39.6%

Educational Attainment Level (Ages 25+)	DACs	Manhattan	NYC	NYS
Less than High School	21.9%	11.6%	16.8%	12.6%
High School Graduate or More (Includes Equivalency)	78.1%	88.4%	83.2%	87.4%
Some College or More	58.0%	76.2%	59.6%	62.2%
Bachelor's Degree or More	39.6%	62.6%	39.6%	38.1%
Master's Degree or More	16.6%	30.6%	16.7%	16.8%
Professional School Degree or More	5.0%	11.3%	4.9%	4.7%
Doctorate Degree	2.0%	3.7%	1.6%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



Labor Part. (MN)[1]
66.9%

DAC Labor Part. [1,2]
61.0%

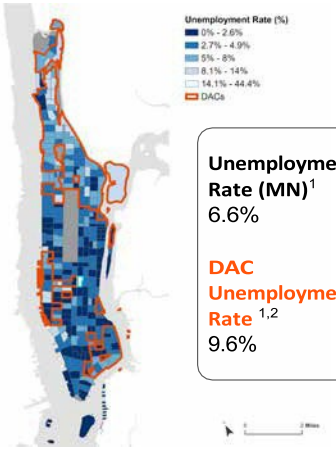
NYC
63.4%

NYS
63.1%

Labor Participation Rate *by Race or Ethnicity*				
Race or Ethnicity		**Manhattan**	**NYC**	**NYS**
Race	White alone	71.8%	65.0%	63.1%
	Black or African American alone	56.5%	60.6%	61.1%
	American Indian and Alaska Native alone	64.8%	62.9%	58.9%
	Asian alone	66.4%	64.2%	64.2%
	Native Hawaiian and Other Pacific Islander alone	70.5%	65.0%	63.8%
	Some other race alone	56.4%	61.7%	63.4%
	Two or more races	66.9%	65.4%	66.6%
Ethnicity	Hispanic or Latino origin (of any race)	59.8%	62.1%	64.2%
	White alone, not Hispanic or Latino	73.2%	65.8%	62.9%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



Unemployment Rate (MN)[1]
6.6%

DAC Unemployment Rate [1,2]
9.6%

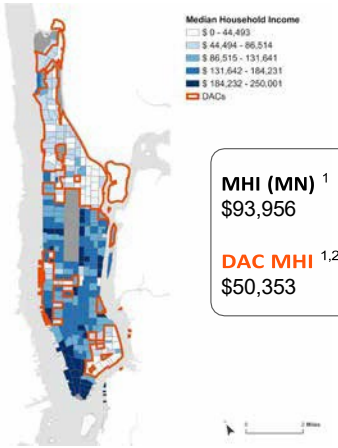
NYC
7.5%

NYS
6.2%

Unemployment Rate for the Pop. 16+ *by Race or Ethnicity*					
Race or Ethnicity		**DACs**	**Manhattan**	**NYC**	**NYS**
Race	White Alone	6.8%	4.6%	5.5%	5.0%
	Black or African American Alone	10.8%	10.8%	9.7%	9.2%
	American Indian or Alaska Native Alone	21.4%	21.2%	10.0%	9.2%
	Asian Alone	6.7%	5.5%	6.1%	5.7%
	Native Hawaiian or Pacific Islander Alone	0.0%	8.0%	15.5%	12.0%
	Some Other Race Alone	14.0%	12.9%	10.0%	9.0%
	Two or More Races Alone	10.5%	9.7%	10.0%	9.0%
Ethnicity	Hispanic or Latino	12.2%	10.7%	9.3%	8.3%
	White Alone, Not Hispanic or Latino	6.4%	4.4%	5.3%	4.9%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

MEDIAN HOUSEHOLD INCOME [1]



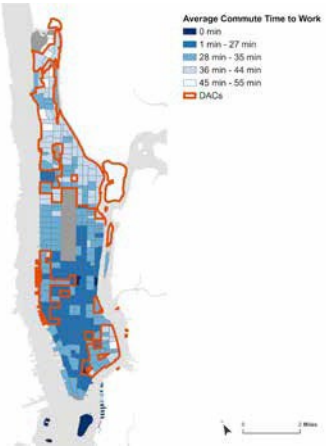
MHI (MN) [1]
$93,956

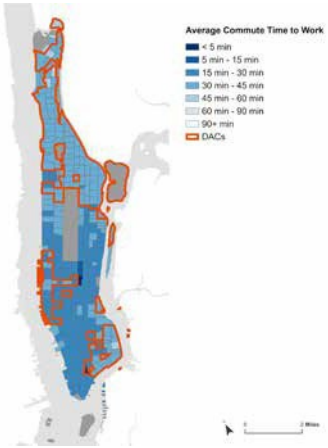
DAC MHI [1,2]
$50,353

Median Household Income *by Race or Ethnicity*					
Race or Ethnicity		**DACs**	**Manhattan**	**NYC**	**NYS**
Race	White Alone Householder	$84,057	$128,040	$93,105	$83,877
	Black or African American Alone Householder	$39,012	$42,341	$53,095	$53,697
	American Indian and Alaska Native Alone Householder	$47,953	$46,790	$52,801	$50,731
	Asian Alone Householder	$40,404	$94,758	$76,634	$83,399
	Native Hawaiian and Other Pacific Islander Alone Householder	$48,500	$79,432	$46,009	$49,528
	Some Other Race Alone Householder	$34,877	$38,117	$45,336	$49,838
	Two or More Races Householder	$46,773	$64,546	$65,288	$68,158
Ethnicity	Hispanic or Latino Householder	$37,115	$44,456	$49,189	$55,621
	White Alone Householder, Not Hispanic or Latino	$102,952	$136,386	$102,633	$85,520

[1] ACS 5-Year Estimates, 2021 *(MHI reported in 2021 inflation-adjusted dollars)*
[2] NYSERDA Final Disadvantaged Communities, 2023

AVERAGE COMMUTE TIME





Travel Time to Work (for workers 16+)	**DACs**	**Manhattan**	**NYC**	**NYS**
< 5 min.	1.1%	1.6%	1.1%	2.4%
5 - 14 min.	8.3%	10.6%	8.1%	17.5%
15 - 29 min.	21.6%	31.9%	20.6%	29.4%
30 - 44 min.	34.7%	32.7%	27.1%	22.1%
45 - 59 min.	17.6%	12.1%	16.3%	11.0%
60 - 89 min.	12.8%	8.3%	19.2%	12.1%
90+ min.	3.9%	2.9%	7.6%	5.7%
Average Commute Time	38 min.	32 min.	41 min.	33 min.

Avg. Commute Time (MN)[1]
32 min.

DAC Avg. Commute Time[1,2]
38 min

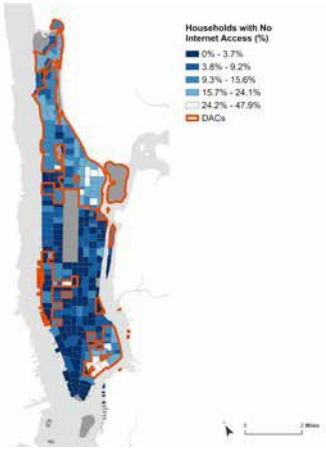
[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

MEANS OF TRANSPORTATION TO WORK

Means of Transport to Work (for workers 16+)	DACs	Manhattan	NYC	NYS
Public Transportation (Includes Taxicab)	60.8%	53.0%	50.8%	25.4%
Walked	14.1%	18.9%	9.5%	5.8%
Worked At Home	12.7%	17.0%	10.7%	9.5%
Car, Truck, or Van	9.2%	7.6%	26.8%	57.6%
Drove Alone	*6.9%*	*5.8%*	*22.4%*	*51.4%*
Carpooled	*2.2%*	*1.8%*	*4.4%*	*6.3%*
Bicycle	2.3%	2.3%	1.4%	0.7%
Other Means	0.9%	1.1%	0.9%	0.8%
Motorcycle	0.1%	0.1%	0.1%	0.1%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

INTERNET ACCESS [1]



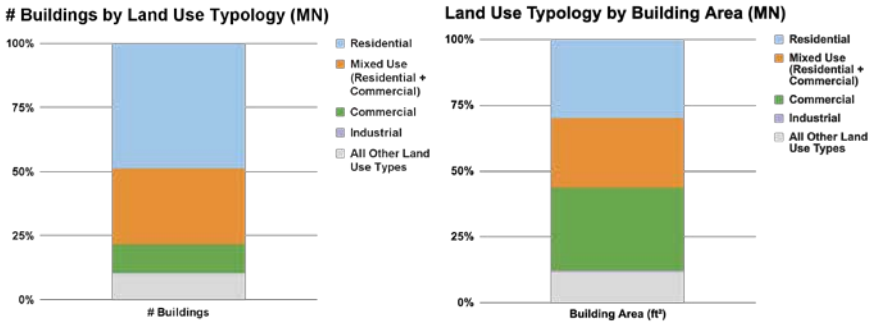
Internet Access by Household	DACs	Manhattan	NYC	NYS
With An Internet Subscription	82.0%	88.9%	86.3%	87.1%
Dial-Up Alone	*0.2%*	*0.1%*	*0.2%*	*0.2%*
Broadband (such As Cable, Fiber Optic, or DSL)	*68.7%*	*79.0%*	*72.9%*	*74.7%*
Satellite Internet Service	*2.4%*	*2.4%*	*3.7%*	*4.0%*
Other Service	*0.6%*	*0.4%*	*0.9%*	*0.8%*
Internet Access Without A Subscription	3.0%	2.3%	2.2%	2.4%
No Internet Access	15.0%	8.8%	11.5%	10.5%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LAND USE [1]

[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

LAND USE (MN): Overall Land Use Typologies [1]



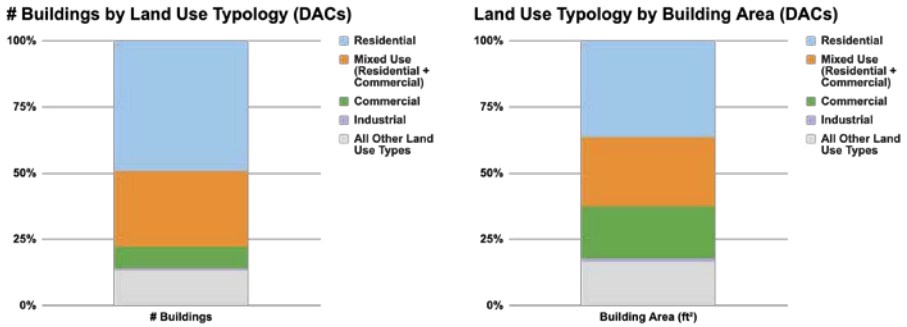
Land Use (MN)	# Buildings	% of Total Buildings
Residential*	22,301	48.8%
1-4 Unit	6,958	15.2%
5+ Units	15,325	33.5%
0 Units or Blank	*18*	*0.0%*
Commercial*	4,990	10.9%
Small (>25,000 ft²)	2,571	5.6%
Large (<25,000 ft²)	2,093	4.6%
0 Commercial sq. ft. or Blank	*326*	*0.7%*
Mixed Use (residential + commercial)*	13,590	29.7%
1-4 Unit (residential)	2,760	6.0%
5+ Units (residential)	10,105	22.1%
0 Units or Blank	*725*	*1.6%*
Industrial	233	0.5%
All Other Land Use Types	4,622	10.1%
Total	***45,736***	--

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023v2

Appendix B
RABA Manhattan Data Visualizations

LAND USE (DACs): Overall Land Use Typologies [1]

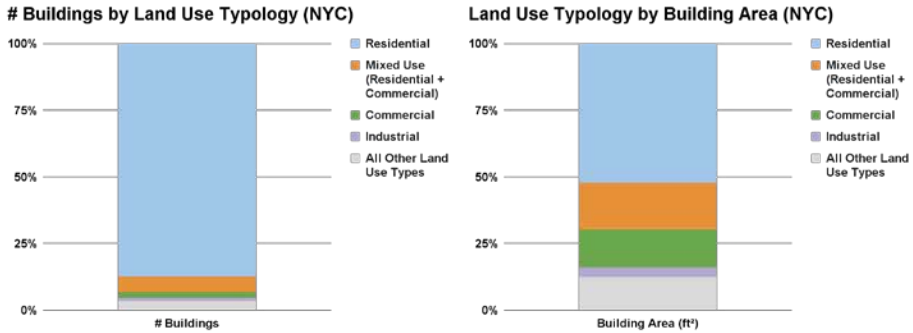


Land Use (MN)	# Buildings	% of Total Buildings
Residential*	9,266	51.9%
1-4 Unit	3,063	17.1%
5+ Units	6,197	34.7%
0 Units or Blank	*6*	*0.0%*
Commercial*	1,381	7.7%
Small (>25,000 ft²)	888	5.0%
Large (<25,000 ft²)	421	2.4%
0 Commercial sq. ft. or Blank	*72*	*0.4%*
Mixed Use (residential + commercial)*	4,825	27.0%
1-4 Unit (residential)	772	4.3%
5+ Units (residential)	3,789	21.2%
0 Units or Blank	*264*	*1.5%*
Industrial	170	1.0%
All Other Land Use Types	2,226	12.5%
Total	***17,868***	--

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

LAND USE (NYC): Overall Land Use Typologies [1]



Buildings by Land Use (NYC)	# Buildings	% of Total Buildings
Residential*	949,437	87.2%
1-4 Unit	860,466	79.0%
5+ Units	88,754	8.2%
0 Units or Blank	*217*	*0.0%*
Commercial*	23,909	2.2%
Small (>25,000 ft²)	19,328	1.8%
Large (<25,000 ft²)	3,759	0.3%
0 Commercial sq. ft. or Blank	*822*	*0.1%*
Mixed Use (residential + commercial)*	64,608	5.9%
1-4 Unit (residential)	39,544	3.6%
5+ Units (residential)	22,205	2.0%
0 Units or Blank	*2,859*	*0.3%*
Industrial	11,870	1.1%
All Other Land Use Types	39,077	3.6%
Total	***1,088,901***	--

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

Appendix B
RABA Manhattan Data Visualizations

RESIDENTIAL & COMMERCIAL AREA (MN) [1]

Buildings by Land Use (MN)	Building Area (ft²)	% of Total MN Building Area	Residential Area (ft²)	% of Total MN Building Area	Commercial Area (ft²)	% of Total MN Building Area	All Other Building Area (ft²)	% of Total MN Building Area
Residential*	542,203,368	29.9%	508,204,684	28.0%	*19,576,979*	1.1%	14,421,705	0.8%
1-4 Unit	28,469,537	1.6%	25,082,923	1.4%	*230,815*	0.0%	3,155,799	0.2%
5+ Units	511,700,397	28.2%	482,987,447	26.6%	*19,311,378*	1.1%	9,401,572	0.5%
0 Units or Blank	*2,033,434*	*0.1%*	*134,314*	*0.0%*	*34,786*	*0.0%*	*1,864,334*	*0.1%*
Commercial*	573,081,590	31.6%	*1,607,718*	0.1%	496,054,276	27.3%	75,419,596	4.2%
Small (<25,000 ft²)	70,651,245	3.9%	*700,151*	0.0%	20,542,675	1.1%	49,408,419	2.7%
Large (>25,000 ft²)	502,430,345	27.7%	*907,567*	0.1%	475,511,601	26.2%	26,011,177	1.4%
0 Commercial sq. ft. or Blank	*23,611,154*	*1.3%*	*60,866*	*0.0%*	–	–	*23,550,288*	*1.3%*
Mixed Use (residential + commercial)*	477,630,304	26.3%	383,934,967	21.2%	81,550,222	4.5%	12,145,115	0.7%
1-4 Unit (residential)	17,563,273	1.0%	10,903,311	0.6%	6,476,613	0.4%	183,349	0.0%
Small commercial (<25,000 ft²)	15,362,699	0.8%	9,254,237	0.5%	5,978,385	0.3%	130,077	0.0%
Large commercial (>25,000 ft²)	2,037,404	0.1%	1,539,176	0.1%	498,228	0.0%	0	0.0%
5+ Units (residential)	450,816,202	24.8%	372,919,699	20.6%	66,835,972	3.7%	11,060,531	0.6%
Small commercial (<25,000 ft²)	262,956,961	14.5%	229,651,290	12.7%	28,545,880	1.6%	4,759,791	0.3%
Large commercial (>25,000 ft²)	183,636,746	10.1%	140,980,688	7.8%	38,290,092	2.1%	4,365,966	0.2%
0 Units or Blank	9,250,829	0.5%	111,957	0.0%	8,237,637	0.5%	901,235	0.0%
Small commercial (<25,000 ft²)	5,380,847	0.3%	111,957	0.0%	4,528,239	0.2%	740,651	0.0%
Large commercial (>25,000 ft²)	3,750,544	0.2%	0	0.0%	3,709,398	0.2%	41,146	0.0%
All Other Land Use Types	221,392,646	12.2%	*1,471,760*	*0.1%*	*203,446,673*	*11.2%*	16,474,213	0.9%
Total	***1,814,307,908***	–	895,219,129	49.3%	800,628,150	44.1%	118,460,629	6.5%

[1] NYC DCP (MapPLUTO), 2023

RESIDENTIAL & COMMERCIAL AREA (DACs) [1]

Buildings by Land Use (MN)	Building Area	% of Total MN Building Area	Residential Area	% of Total MN Building Area	Commercial Area	% of Total MN Building Area	All Other Bldg. Area (ft²)	% of Total MN Bldg. Area
Residential*	191,304,780	10.5%	178,908,039	9.9%	*5,003,174*	0.3%	7,393,567	0.4%
1-4 Unit	10,422,073	0.6%	9,072,506	0.5%	*31,950*	0.0%	1,317,617	0.1%
5+ Units	180,520,337	9.9%	169,835,533	9.4%	*4,958,840*	0.3%	5,725,964	0.3%
0 Units or Blank	*362,370*	*0.0%*	*0*	*0.0%*	*12,384*	*0.0%*	*349,986*	*0.0%*
Commercial*	103,298,765	5.7%	*222,300*	0.0%	90,055,821	5.0%	13,020,644	0.7%
Small (<25,000 ft²)	11,148,940	0.6%	*97,636*	0.0%	6,844,438	0.4%	4,206,866	0.2%
Large (>25,000 ft²)	88,596,604	4.9%	*112,854*	0.0%	83,211,383	4.6%	5,272,367	0.3%
0 Commercial sq. ft. or Blank	*3,553,221*	*0.2%*	*11,810*	*0.0%*	*0*	*0.0%*	*3,541,411*	*0.2%*
Mixed Use (residential + commercial)*	138,016,111	7.6%	112,681,667	6.2%	21,033,545	1.2%	4,300,899	0.2%
1-4 Unit (residential)	4,737,237	0.3%	3,225,086	0.2%	1,485,215	0.1%	26,936	0.0%
Small commercial (<25,000 ft²)	3,693,221	0.2%	2,304,958	0.1%	1,362,842	0.1%	25,421	0.0%
Large commercial (>25,000 ft²)	1,021,199	0.1%	898,826	0.0%	122,373	0.0%	0	0.0%
5+ Units (residential)	130,244,564	7.2%	109,381,722	6.0%	16,821,336	0.9%	4,041,506	0.2%
Small commercial (<25,000 ft²)	90,095,745	5.0%	78,315,657	4.3%	9,472,710	0.5%	2,307,378	0.1%
Large commercial (>25,000 ft²)	37,023,104	2.0%	29,425,845	1.6%	7,348,626	0.4%	248,633	0.0%
0 Units or Blank	3,034,310	0.2%	74,859	0.0%	2,726,994	0.2%	232,457	0.0%
Small commercial (<25,000 ft²)	1,912,177	0.1%	74,859	0.0%	1,624,861	0.1%	212,457	0.0%
Large commercial (>25,000 ft²)	1,102,133	0.1%	0	0.0%	1,102,133	0.1%	0	0.0%
All Other Land Use Types	94,460,924	5.2%	290,125	0.0%	91,779,448	5.1%	2,391,351	0.1%
Total	527,080,580	29.1%	292,102,131	16.1%	207,871,988	11.5%	27,106,461	1.5%

[1] NYC DCP (MapPLUTO), 2023

LAND USE: Residential Land Use Typologies by # of Residential Units [1]

Manhattan

Residential Land Use Typology	# Total Residential Units	% Total Residential Units
1-4 Units	**22,441**	**2.4%**
"Residential" LU	14,885	1.6%
"Mixed Use" LU	7,044	0.7%
Other LU	*512*	*0.1%*
5+ Units	**921,406**	**97.6%**
"Residential" LU	507,219	53.7%
"Mixed Use" LU	399,816	42.4%
Other LU	*14,371*	*1.5%*
Total Residential Units	***943,847***	--

NYC

Residential Land Use Typology	# Total Residential Units	% Total Residential Units in NYC
1-4 Units	**1,184,033**	**32.5%**
"Residential" LU	1,107,911	30.4%
"Mixed Use" LU	73,125	2.0%
Other LU	*2,997*	*0.1%*
5+ Units	**2,457,491**	**67.5%**
"Residential" LU	1,669,158	45.8%
"Mixed Use" LU	755,871	20.8%
Other LU	*32,462*	*0.9%*
Total Residential Units	***3,641,524***	--

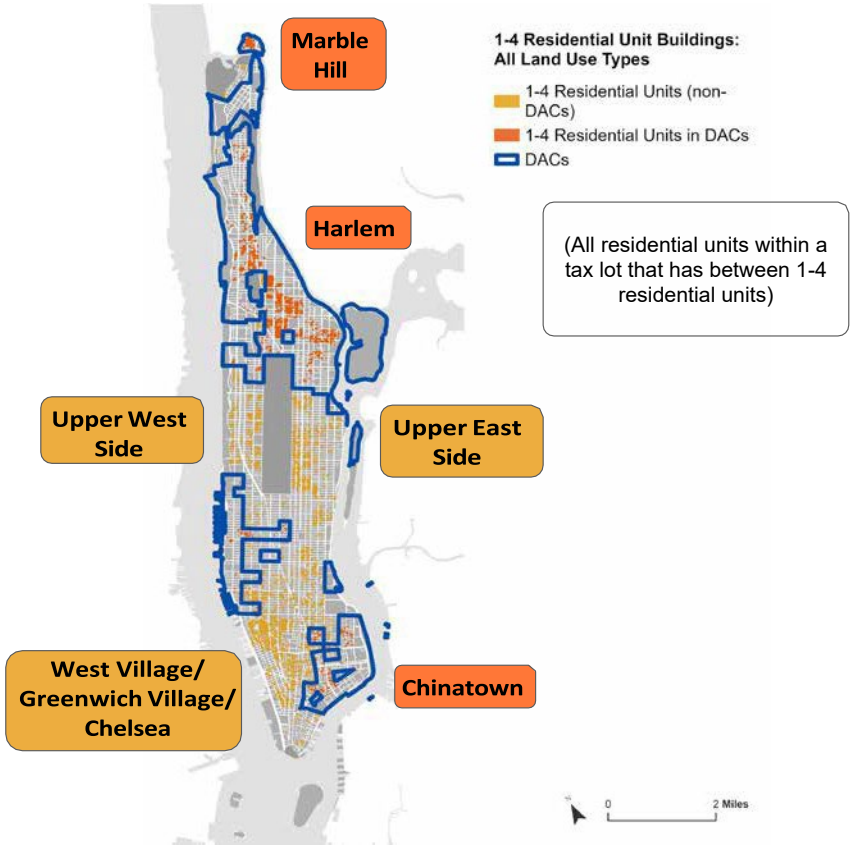
DACs

Residential Land Use Typology	# Total Residential Units	% Total Residential Units in DACs	% Total Residential Units in MN
1-4 Units	**9,847**	**2.9%**	**1.0%**
Residential LU	7,709	2.2%	0.8%
"Mixed Use" LU	2,032	0.6%	0.2%
Other LU	*106*	*0.0%*	*0.0%*
5+ Units	**334,370**	**97.1%**	**35.4%**
Residential LU	204,282	59.3%	21.6%
"Mixed Use" LU	126,305	36.7%	13.4%
Other LU	*3,783*	*1.1%*	*0.4%*
Total Residential Units	***344,217***	--	**36.5%**

***36.5%** of residential units are in DACs, **9,847** of which are in a 1-4 unit 'tax lot'*

[1] NYC DCP (MapPLUTO), 2023

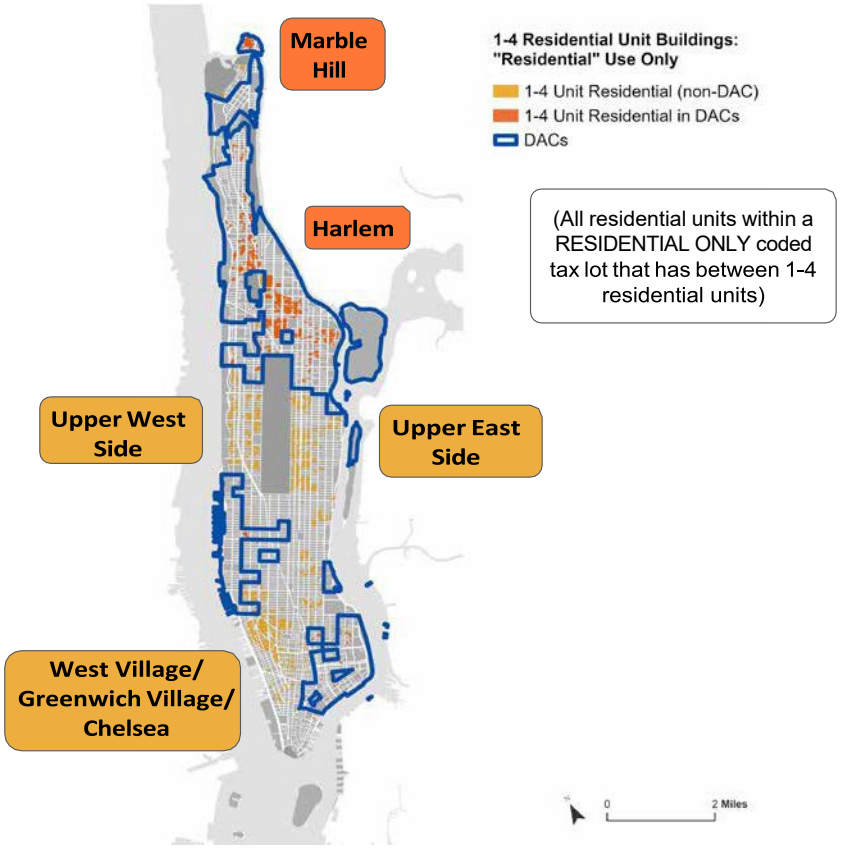
1-4 UNIT RESIDENTIAL BUILDINGS [1]



(All residential units within a tax lot that has between 1-4 residential units)

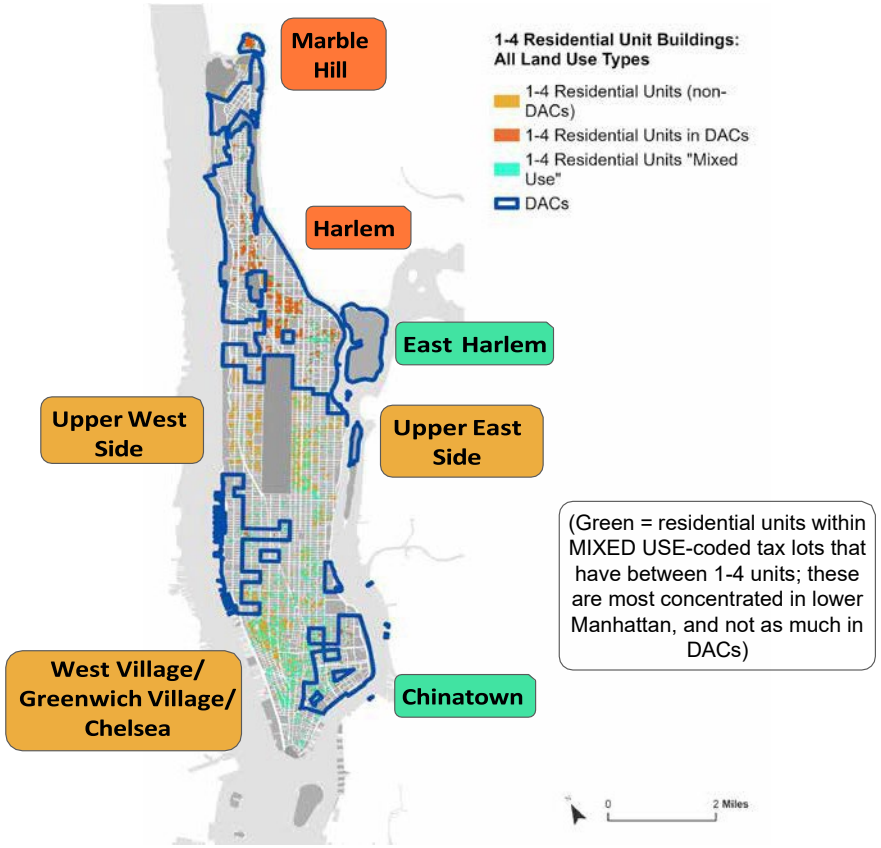
[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

1-4 UNIT RESIDENTIAL BUILDINGS [1]



[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

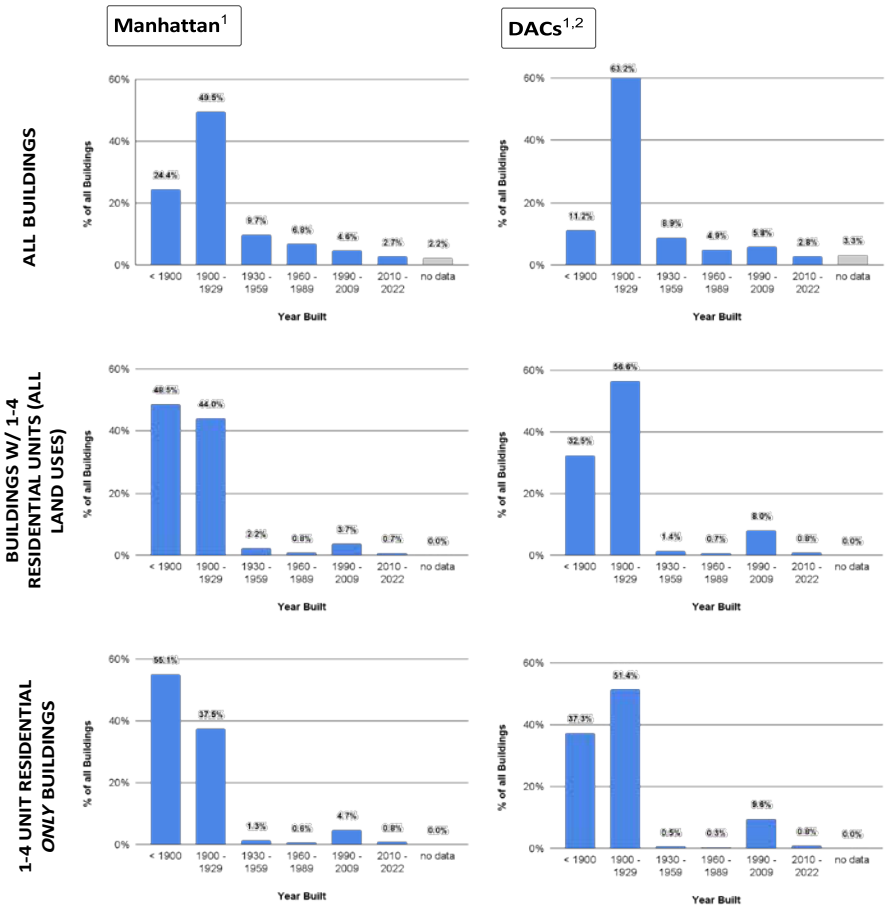
1-4 UNIT RESIDENTIAL BUILDINGS [1]



[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

Appendix B
RABA Manhattan Data Visualizations

YEAR BUILT [1]



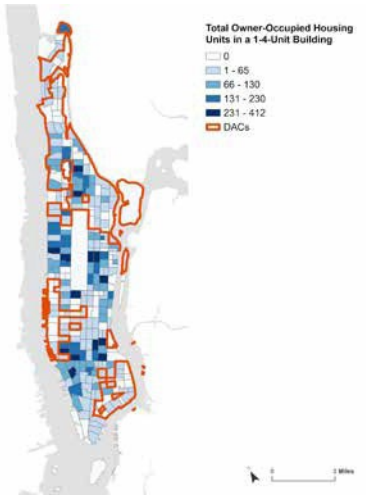
[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

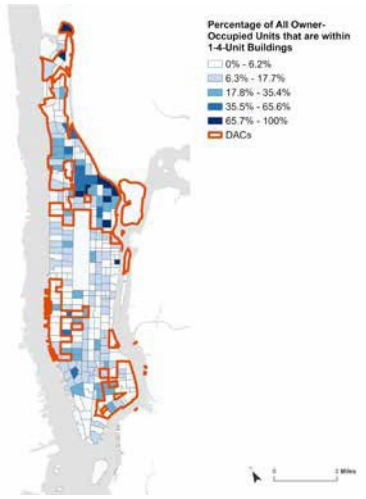
Historic Preservation Districts [2]

[1] NYC DCP (MapPLUTO), 2023
[2] NYC Landmarks Preservation Commission, 2023

RESIDENTIAL LAND USE: Occupancy, Vacancy, Tenure [1]

Housing Tenure, Occupancy/Vacancy Rates				
	DACs	MN	NYC	NYS
Occupancy Rate	90.5%	84.6%	90.5%	89.1%
Owner-Occupied	10.1%	20.9%	30.0%	48.5%
Units in a 1-4-Unit Building	**1.42%**	**1.9%**	**19.8%**	**41.8%**
Units in a 5+-Unit Building	8.7%	19.0%	10.2%	5.4%
Units in a Mobile Home/Boat/RV/etc.	*0.0%*	*0.0%*	*0.1%*	*1.3%*
Renter-Occupied	80.4%	63.7%	60.5%	40.6%
Units in a 1-4-Unit Building	3.25%	2.3%	15.0%	15.0%
Units in a 5+-Unit Building	77.2%	61.4%	45.4%	25.2%
Units in a Mobile Home/Boat/RV/etc.	*0.1%*	*0.1%*	*0.1%*	*0.5%*
Vacancy Rate	9.5%	15.4%	9.5%	10.9%
For Rent	3.7%	3.7%	2.3%	1.7%
For Sale	0.3%	0.8%	0.6%	0.6%
Other Vacant	5.5%	10.9%	6.6%	8.5%





[1] ACS 5-Year Estimates, 2021

RESIDENTIAL LAND USE: Tenure by Race [1]

Ratio of Owner:Renter *by Race or Ethnicity*		DACs		Manhattan		NYC		NYS	
		Owner	Renter	Owner	Renter	Owner	Renter	Owner	Rent
	All Householders	**11.2%**	**88.8%**	**24.7%**	**75.4%**	**33.2%**	**66.8%**	**54.4%**	**45.6**
Race	White Alone Householder	17.1%	82.9%	31.0%	69.0%	39.4%	60.6%	64.5%	35.5
	Black Or African American Alone Householder	9.0%	91.1%	11.0%	89.0%	27.2%	72.8%	32.2%	67.8
	American Indian And Alaska Native Alone Householder	3.8%	96.2%	7.1%	92.9%	22.5%	77.5%	36.1%	64.0
	Asian Alone Householder	14.1%	85.9%	26.5%	73.5%	44.8%	55.2%	50.7%	49.3
	Native Hawaiian And Other Pacific Islander Alone Householder	29.4%	70.6%	31.1%	68.9%	32.0%	68.0%	38.7%	61.3
	Some Other Race Alone Householder	3.5%	96.5%	5.1%	94.9%	14.3%	85.7%	21.4%	78.6
	Two Or More Races Householder	7.9%	92.1%	15.2%	84.8%	24.8%	75.2%	37.9%	62.1
Ethnicity	White Alone, Not Hispanic Or Latino Householder	20.5%	79.6%	33.1%	66.9%	42.7%	57.3%	66.9%	33.1
	Hispanic Or Latino Householder	4.3%	95.7%	8.3%	91.7%	16.9%	83.1%	27.1%	72.9

"VACANCY RATES"	DACs	Manhattan	NYC	NYS
"Available Housing Vacancy Rate":	**4.2%**	**4.9%**	**3.0%**	**2.6%**
For Sale + For Rent:	**4.0%**	**4.5%**	**2.8%**	**2.4%**

[1] ACS 5-Year Estimates, 2021

RESIDENTIAL LAND USE: House Heating Fuel by Tenure [1]

Owner-Occupied

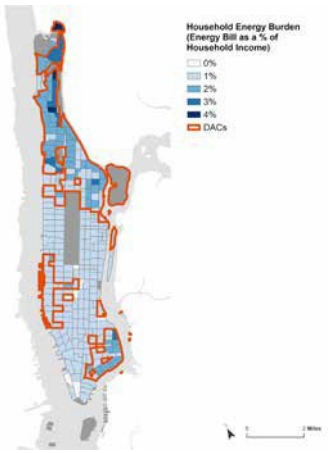
House Heating Fuel for Owner-Occupied Households *(as a %age of Total Owner-Occupied Households)*	DACs	Manhattan	NYC	NYS
Utility Gas	49.8%	48.1%	73.9%	60.8%
Bottled, Tank, Or Lp Gas	3.6%	2.5%	2.7%	5.6%
Electricity	20.7%	20.1%	8.1%	7.1%
Fuel Oil, Kerosene, Etc.	20.5%	22.8%	12.8%	22.2%
Coal Or Coke	0.0%	0.0%	0.0%	0.3%
Wood	0.1%	0.2%	0.1%	2.5%
Solar Energy	0.1%	0.0%	0.1%	0.1%
Other Fuel	3.1%	3.7%	1.1%	0.9%
No Fuel Used	2.2%	2.5%	1.1%	0.5%

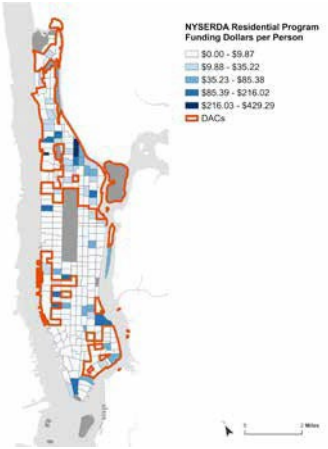
Renter-Occupied

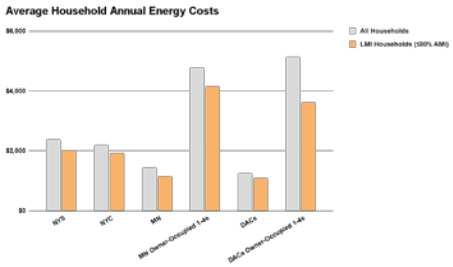
House Heating Fuel for Renter-Occupied Households *(as a %age of Total Renter-Occupied Households)*	DACs	Manhattan	NYC	NYS
Utility Gas	48.1%	47.6%	61.0%	58.3%
Bottled, Tank, Or Lp Gas	2.0%	1.9%	2.3%	3.1%
Electricity	25.6%	27.8%	16.1%	19.8%
Fuel Oil, Kerosene, etc.	19.2%	16.2%	15.5%	14.4%
Coal Or Coke	0.1%	0.1%	0.1%	0.1%
Wood	0.0%	0.0%	0.0%	0.3%
Solar Energy	0.2%	0.1%	0.1%	0.1%
Other Fuel	1.8%	2.6%	1.8%	1.5%
No Fuel Used	3.2%	3.7%	3.2%	2.4%

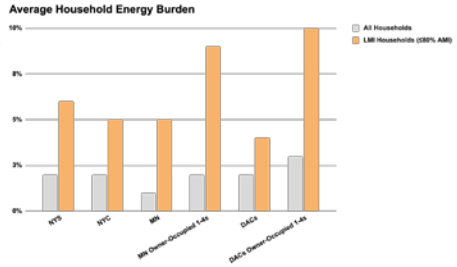
[1] ACS 5-Year Estimates, 2021

ENERGY COST & BURDEN





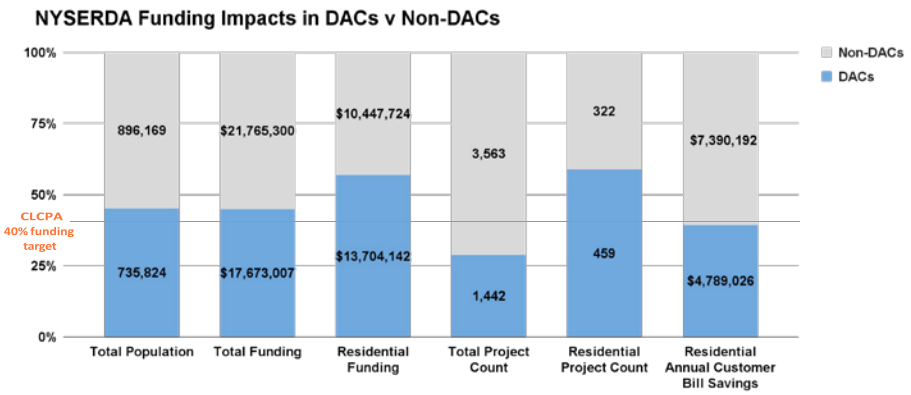


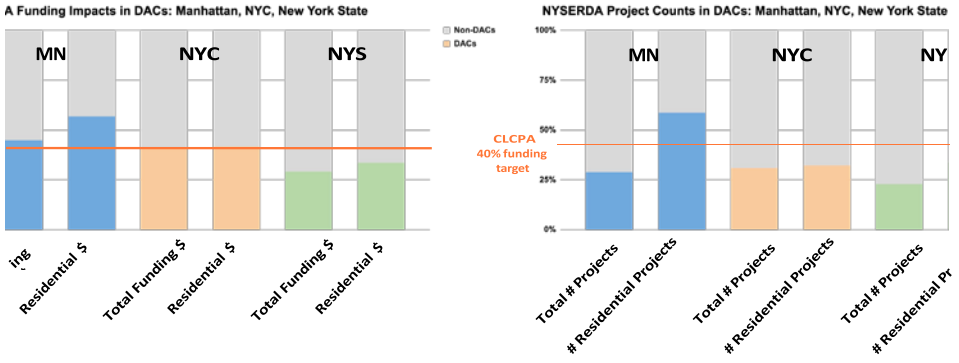


[1] DOE LEAD Tool, 2018

Appendix B
RABA Manhattan Data Visualizations

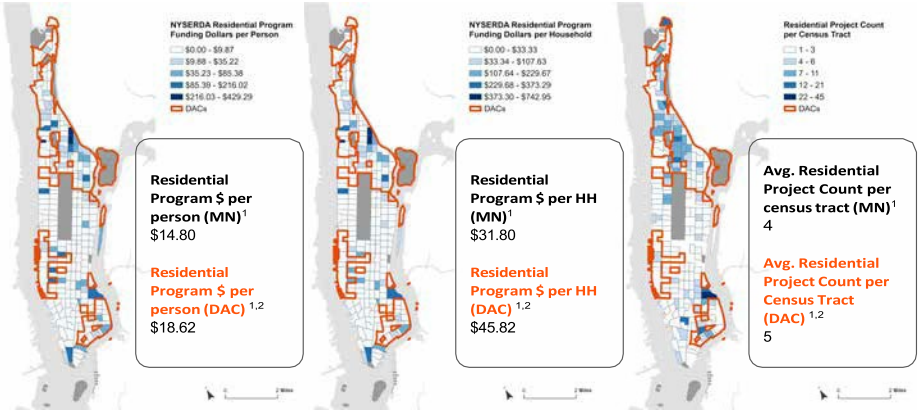
NYSERDA FUNDING DOLLARS

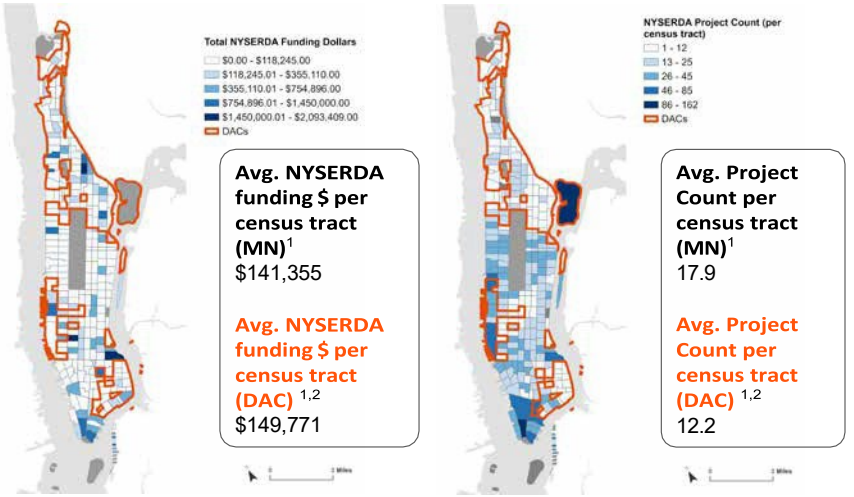




[1] NYSERDA RABA Data Viz Tool (2019 data)

NYSERDA FUNDING DOLLARS





[1] NYSERDA Final Disadvantaged Communities, 2023

Appendix B
RABA Manhattan Data Visualizations

NYSERDA Initiative	Sub-Initiative	Project Count - Manhattan	Funding Dollars - Manhattan
Community Energy Engagement	Community Energy Engagement	1	$ 962,352.00
Heat Pumps Phase 1 (2017)	Air Source Heat Pumps	200	$ 230,500.00
LMI Multifamily	Direct Injection Program	3	$ 2,586,500.00
LMI Multifamily	Multifam Performance Pgm	44	$ 10,593,298.00
LMI Multifamily	Real Time Enrgy Management	73	$ 3,240,413.00
Low Rise New Construction Transition - Market Rate	Low Rise New Construction	3	$ 14,432.00
Multifamily Low Carbon Pathways	Low Carbon Tech Demos	2	$ 858,050.00
Multifamily New Construction Transition - LMI	Multifam New Construction	14	$ 943,467.00
Multifamily New Construction Transition - Market Rate	Multifam New Construction	3	$ 151,340.00
NY-Sun: Con Ed - Residential	NYSUN: Sm MW Blk Incentives	71	$ 91,301.00
NY-Sun: Con Ed - Residential	RPS:CST- PV	3	$ 7,400.00
NY-Sun: Residential	RPS:CST- PV	18	$ 146,259.00
NY-Sun: Residential	RPS:CST- PV I&J	4	$ 31,221.00
NY-Sun: Residential	SBC:End Use Renewable Engy Mkt	12	$ 618,936.00
NYS Healthy Homes Value Based Payment Pilot	Healthy Homes VB Payment Pilot	1	$ 248.00
New Construction - LMI	New Construction Housing	17	$ 1,973,953.00
New Construction - Market Rate	New Construction Housing	11	$ 1,423,924.00
REVitalize	REVitalize	1	$ 65,000.00
Residential	GJGNY Market Rate Audits	2	$ 300.00
Residential	NYCH: Comfort Home	1	$ 2,850.00
Residential	NYCH: Technical Assistance	1	$ -
Single Family - Low Income	Home Perf w Energy Star	305	$ 208,035.00
Single Family Market Rate Transition	Home Perf w Energy Star	1	$ 2,100.00

Appendix C
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Regional Assessment & Barriers Analysis

Queens & Staten Island Regional Clean Energy Hub

October 2024

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I. Executive Summary

The Queens and Staten Island Regional Assessment and Barriers Analysis (RABA) reveals entrenched barriers to home energy upgrades and green employment across the region. These barriers manifest in inequitable program impacts, with disadvantaged communities (DACs) receiving far fewer benefits from the New York State Energy Research and Development Authority's (NYSERDA) programs.

Despite these barriers, the Hub and NYSERDA have opportunities to improve program uptake and equity, especially in DACs, by better listening to what communities need and tailoring approaches in response. RABA findings draw from extensive public engagement, data analysis, and secondary research, and the combined expertise of the Hub team.

Key Takeaways

- **Baseline Regional Characterization and Baseline Assessment of Clean Energy Program Participation**

Sociodemographics
Queens and Staten Island DACs are among the most ethnically diverse communities in the state, and are home to over a third of the region's residents. More than 60% of DAC residents in Queens and more than 40% in Staten Island speak a language other than English at home. The median income in DACs is not a living wage.

Building and Sector Assessment
There is a high proportion of 1-4 unit buildings in both boroughs, though Queens' building stock is more varied. Many homes are older and have maintenance problems, and also subject to escalating environmental hazards. Residents face very high housing and energy costs, and low- and moderate-income (LMI) residents are particularly struggling. Renters make up a majority of DAC residents in Queens, and almost half in Staten Island.

Clean Energy Workforce
The region's green economy is small but growing, driven by strong climate policies and investment. Nearly half of jobs in the green economy are in building decarbonization, but other sectors, like offshore wind, are projected to grow. White workers are overrepresented in green sectors and disproportionately work in higher-paying jobs. The green economy offers lower barriers to entry and better salaries than other high-demand fields. Expanding training programs will be key to helping workers get jobs while enabling the industry to diversify.

Baseline Assessment of Clean Energy Program Participaton
NYSERDA residential programs have had highly inequitable impacts, and are not meeting the equity goals of the Climate Leadership and Community Protection Act (CLCPA). Disadvantaged communiteis with lower incomes, lower English proficiency, more apartments and more renters are the most under-resourced populations within each borough.

Barriers

Information Overload and Misinformation
Residents face an overwhelming amount of information from various sources, including misinformation and scams, particularly in immigrant and elderly communities.

Knowledge Gaps
Awareness of clean energy technologies and programs is unevenly distributed, with marginalized communities being less informed. The process of going through incentive programs is very complex and confusing, requiring research and time commitment that DAC communities struggle to prioritize.

Language and Cultural Barriers
The linguistic and ethnic diversity of Queens and Staten Island poses challenges for outreach, and NYSERDA has not made enough effort to address these barriers.

Complex Building Stock
Queens' and Staten Island's building stock is older and more complex than in most communities statewide. Homes often need health and safety repairs that are not covered by existing programs.

Inadequate Incentive Programs
Current LMI incentive programs have overly restrictive qualifying criteria and do not meet low-income families' needs. Upgrades can still be too expensive after incentives are applied.

Poor Options for Renters
Renters have few options to substantially retrofit their homes. Renters receive fewer benefits than building owners when homes are upgraded.

Opportunities

Community Networks and Partnerships
Existing trusted community-based organizations (CBOs) and electeds have reach into the region's diverse communities and are interested in getting more involved in the green economy. Word of mouth is a powerful outreach method that can be leveraged.

Wide Interest and Low Program Adoption
There is wide interest in both home energy upgrades and green workforce opportunities, but existing programs have low participation. There is wide untapped demand.

Improved Technology and Opportunities
Funding from the Inflation Reduction Act (IRA) and other sources, policies like Local Law 97, and improved technologies are expanding access to home energy upgrades and the green economy.

Recommendations

Launch Marketing Campaigns
The Hub and NYSERDA should launch multilingual campaigns to promote Hubs and available incentives, demystify technologies and programs, and dispel misinformation, targeting DACs.

Build Partnerships
The Hub should partner with CBOs, contractors, and green employers to strengthen its network.

Simplify and Expand Programs
NYSERDA should identify ways to simplify programs, develop strategies and programs to help renters and people with home repair needs, and use new funding streams to expand access.

Learn from the Hub
NYSERDA should learn from the Hub about the unique qualities and diversity of the region and tailor programs and outreach in response.

Support and Expand the Hub
NYSERDA should ensure that the Hub is equipped to help clients navigate the green economy through investment in training and marketing, and provide the Hub with more funding commensurate with the task of helping the region's vast and diverse DAC communities access the green economy.

II. Baseline Regional Characterization

Baseline Regional Sociodemographics

See Appendix A for a more detailed discussion of the topics covered here.

Over a third (36%) of Queens residents, and 29% of Staten Island residents, live in DACs.[4] DACs are found throughout Queens, but are concentrated in Western and Central Queens (in neighborhoods like Corona and Long Island City), Southwestern Queens (in neighborhoods like Richmond Hill), and the Rockaways (Map 1). DACs are concentrated in Staten Island's North Shore, in neighborhoods like Stapleton, St. George, and Port Richmond (Map 2).

Table 1. Population, Age, and Sex[1,2]

		Queens	Queens DACs	Staten Island	Staten Island DACs
Total Population		2,393,104	850,109	493,194	141,077
Age	Under 18	21.9%	21.6%	22%	22.6%
	18-64	60.8%	64.8%	61.7%	63.5%
	65+	13.6%	13.6%	16.3%	13.9%
Sex	Male	48.8%	49.5%	48.8%	48.8%
	Female	51.4%	50.5%	51.2%	51.2%

Only 25% of Queens residents are white alone, and only 16% of DAC residents are white, compared to 55% of NYS residents.

• Race & Ethnicity

Queens is the most diverse county in the state. Only 25% of Queens residents are white alone, and only 16% of DAC residents are white, compared to 55% of New York state (NYS) residents. The proportion of Hispanic, Asian, Black, and white populations is fairly evenly-split (Chart 1). DACs have a significantly larger Hispanic population (39%) and a significantly smaller white population than Queens as a whole. Queens is segregated, with many ethnic enclaves, as shown in Map 1. Queens' population is 47% foreign-born, of whom 59% are U.S. citizens.[5]

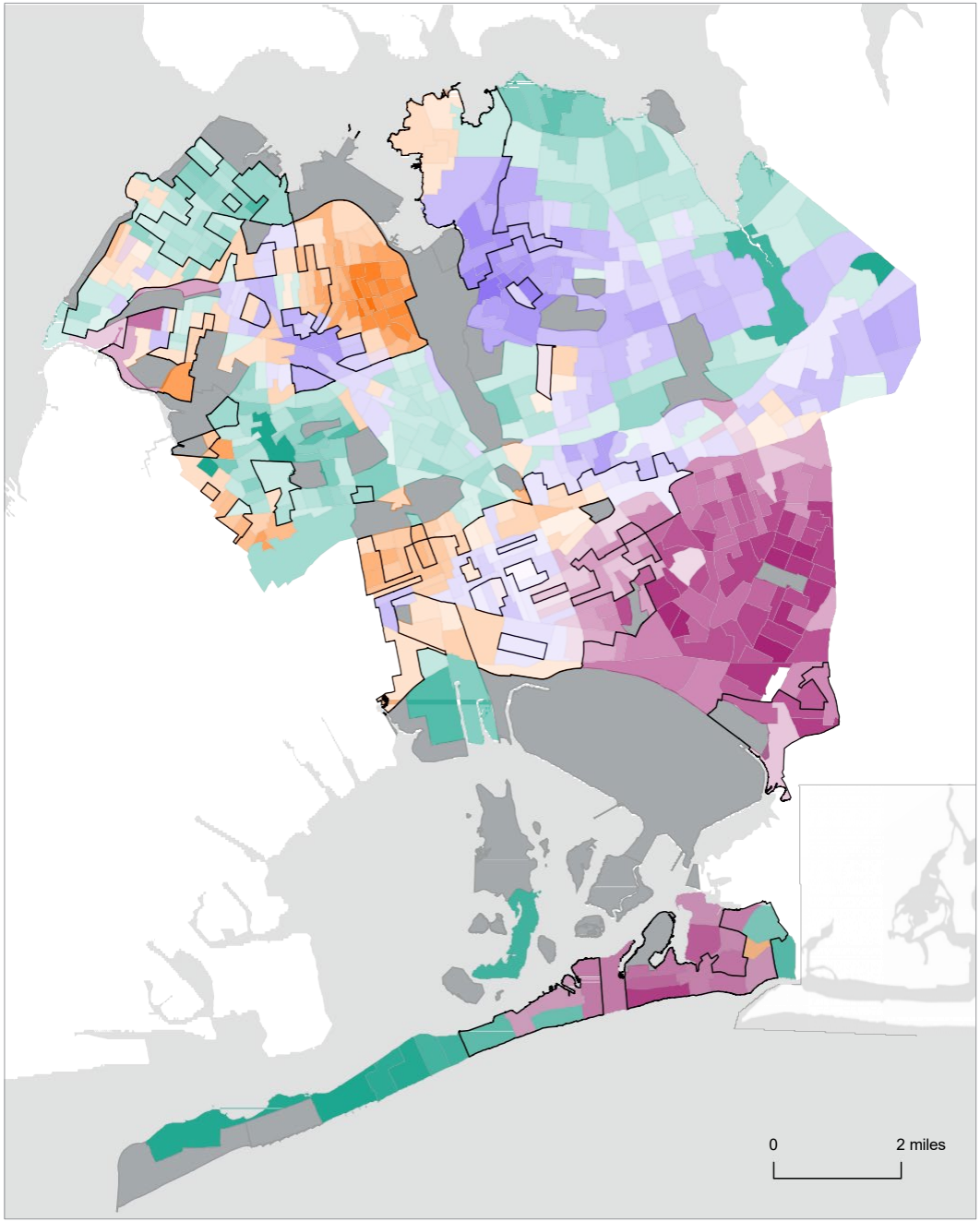
Staten Island has a higher share of non-Hispanic white residents (60%) than statewide (55%) (Chart 2)**, but in DACs this share falls to 30%.** The DAC population is 32% Hispanic, 25% Black, and 11% Asian. Staten Island's communities of color are predominantly located on the North Shore (Map 2). Black and Hispanic residents are the predominant race/ethnicity in most neighborhoods of color in Staten Island, but other, smaller ethnic populations, like Sri Lankans, also make up an important part of the North Shore community.[6] Staten Island's population is 24% foreign-born, of whom 68% are U.S. citizens.[7]

• Language

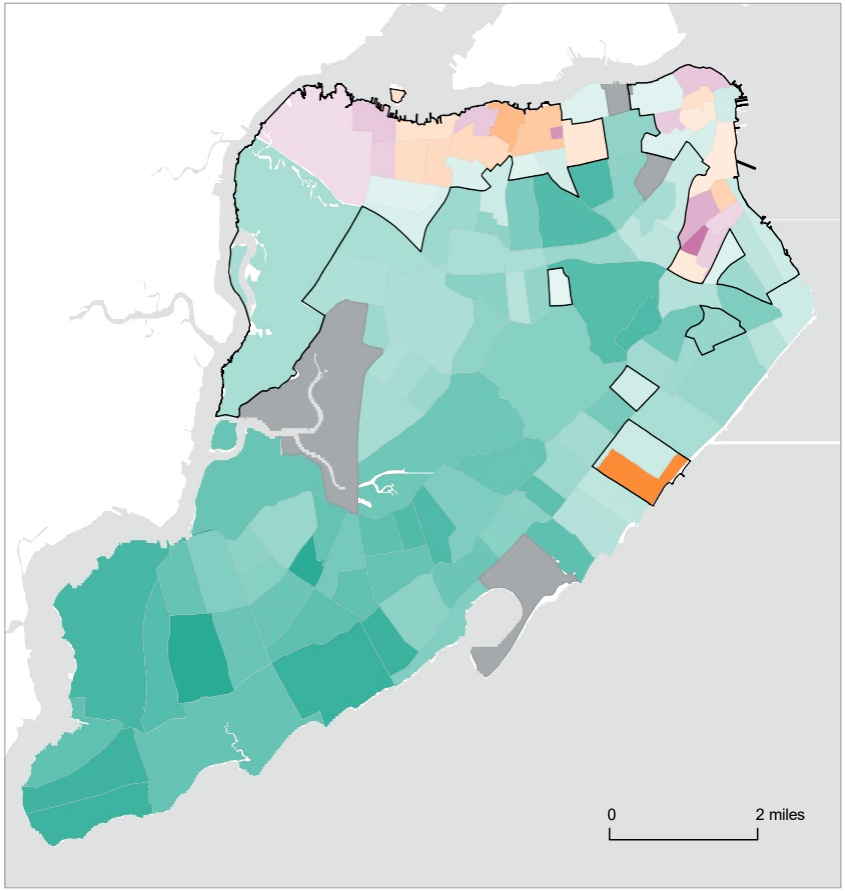
More than half of Queens residents speak a language other than English at home, including more than 60% of DAC residents. This is compared to 30% of all NYS residents. In DACs, about a third of the population speaks Spanish at home (Table 2). A third of this group are limited-English speaking. Half of DAC Asian American and Pacific Islander (AAPI) language-speaking households are limited-English speaking, and nearly a third of other Indo-European language-speaking households (this group likely includes predominantly South Asian language speakers [9,10]) are limited-English.

A third (34%) of Staten Islanders, and 41% of DAC residents, speak a language other than English at home. Of Spanish-speaking households, 16% have limited English proficiency, constituting 4% of DACs' population. Meanwhile, 26% of Other Indo-European language speaking households and 44% of AAPI language speaking households have limited English proficiency, together comprising 6% of DAC population.

Map 1. Predominant Race by Census Tract, Queens[2]



Map 2. Predominant Race by Census Tract, Staten Island[3]



White alone, not Hispanic or Latino

Hispanic or Latino

Black or African American alone, not Hispanic or Latino

Asian alone, not Hispanic or Latino

American Indian or Alaskan Native alone, not Hispanic or Latino

Two or more races, not Hispanic or Latino

Native Hawaiian and other Pacific Islander alone, not Hispanic or Latino

Some other race, not Hispanic or Latino

Strength of predominance

0-13

13-97

97-100

DACs

Charts 1 & 2. Race & Ethnicity, Queens (left) and Staten Island (right)[8]

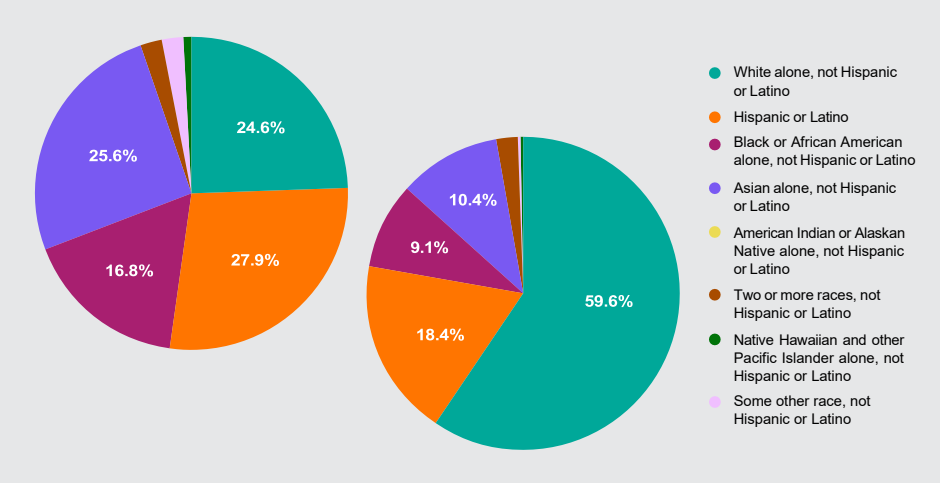


Table 2. Household Language and Limited English Proficiency by Household[11]

Household Language	Queens DACs	Queens	Staten Island DACs	Staten Island	NYS
Spanish	11.1%	6.7%	3.5%	1.5%	3.6%
Other Indo-European Languages	4.3%	4.1%	3.0%	2.8%	2.0%
Asian and Pacific Island Languages	6.3%	6.7%	2.6%	2.2%	1.7%
Other Languages	0.4%	0.3%	0.2%	0.1%	0.3%

Income

Queens' median household income (MHI) is not a living wage. In 2021, the borough's MHI was $75,866, which is only 82% of the Self Sufficiency Standard (SSS) for a family of two adults and two children. This means that a typical family of that size was $16,000 short of meeting its basic needs. Median household income is lower for people of color than white people (see Appendix A page 49). For DAC residents, MHI was 70% of SSS, more than $27,000 short.[14]

While MHI is slightly higher than SSS in Staten Island as a whole, in the borough's DACs, median MHI was only 74% of SSS, $23,000 short.[15] Table 3 shows Queens & Staten Island residents' income by its ratio to the poverty line.

Table 3. Ratio of Income in 2020 to Poverty Level[16]

Household Language	Queens	Staten Island DACs
Doing Poorly (Under 1.00)	11.4%	10.3%
Struggling (1.00 to 1.99)	17.5%	12.1%
Poor or Struggling (Under 2.00)	28.9%	22.4%
Doing Ok (2.00 and Over)	71.1%	77.6%

Education & Employment

The majority of people in Queens and Staten Island DACs have a high school education or lower. Educational attainment is lower in Queens and Staten Island than in the rest of the state (Table 4). Queens' labor force participation rate is 64%, comparable to city and state rates. The Queens unemployment rate is 7%, higher than the state's 6% rate. Staten Island's labor force participation rate is 60%, lower than the city and state rates of 63%. Staten Island's unemployment rate is about 3.5%, significantly lower than city- and state-wide.[17]

Table 4. Share of population with a high school or less than high school education[18]

Queens	Queens DACs	Staten Island	Staten Island DACs	NYC
44%	53%	41%	50%	38%

Transportation

Just 29% of workers residing in Queens, and 28% in Staten Island, have jobs in the borough.[19] Manhattan, Brooklyn, and Nassau County are the three most common counties where residents of the region work outside of their own. Average commute time is 44 minutes in Queens and 45 minutes in Staten Island, compared to 33 minutes in NYS. 46% of Queens residents take public transit to work, compared to 25% of NYS residents. Over a third (37%) of Queens households, and 46% of the borough's DAC households, lack access to a car. The majority of Staten Island residents drive to work, but 37% of DAC residents and 27% of all Staten Island residents take public transit, compared to 25% of NYS residents. Almost a third (29%) of households in Staten Island DACs lack access to a car, despite the borough's limited public transit network.[20]

Building and Sector Assessment

See Appendix B for a more detailed discussion of the topics covered here.

Table 5 shows buildings by land use, including small and large residential, small and large commercial, mixed use, and industrial uses. The Hub is focusing on small (1-4 unit) residential buildings, which are the focus of this section.

Table 5. Land Use Overview[21]

Buildings by Land Use	# of Buildings, Queens	% of Total Buildings, Queens	# of Buildings, Staten Island	% of Total Buildings, Staten Island
Residential	424,607	91.7%	132,626	93.2%
1-4 Unit	**396,132**	**85.6%**	**125,655**	**88.3%**
5+ Units	28,404	6.1%	6,936	4.9%
0 Units or Blank	71	0.0%	35	0.0%
Commercial*	6,986	1.5%	2,391	1.7%
Small (>25,000 ft²)	6,194	1.3%	2,124	1.5%
Large (<25,000 ft²)	569	0.1%	233	0.2%
0 Commercial sq. ft. or Blank	223	0.0%	34	0.0%
Mixed use (residential + commercial)*	15,573	3.4%	2,258	1.6%
1-4 Unit (residential)	**12,333**	**2.7%**	**2,069**	**1.5%**
5+ Units (residential)	2,647	0.6%	136	0.1%
0 Units or Blank	593	0.1%	53	0.0%
Industrial	4,248	0.9%	877	0.6%
All Other Land Use Types	11,392	2.5%	4,162	2.9%
Total	*462,806*	--	*142,314*	--

• Small Residential

Over half (52%) of residential units in Queens, and 47% in DACs, are in 1-4 unit buildings, compared to 16% of units in New York City (NYC). In DACs, about two-thirds of these buildings are 2-, 3-, and 4-unit buildings (Chart 3). Single-family (1-unit) buildings are concentrated in Eastern Queens, while 3- and 4-unit buildings are found more often in Western and Central Queens. Two-unit buildings are common throughout the borough. Of 1-4 unit buildings in Queens, 93% were built before 1990 (Chart 5).

One- to four-unit buildings make up 82% of total residential units in Staten Island, and 66% in DACs. The majority of 1-4 unit buildings in Staten Island are single-family homes (Chart 4). Two-unit buildings are also common, making up 30% of total 1-4 unit buildings in DACs. Buildings with 3 and 4 units, while less common, are concentrated in DACs. Of 1-4 unit unit buildings in Staten Island, 73% were built before 1990 (Chart 6).

Owners of one- to-four unit homes are particularly burdened by high energy costs, with an average annual energy cost of $4,224 in Queens, almost double the state average, and $3,803 in Staten Island.

• Household Energy

The average LMI resident of Queens and Staten Island is energy cost-burdened, spending 6% and 7% of their income on energy costs in each borough, respectively. The average LMI owner of a 1-4 unit home spends even more, 9% and 8%. Average annual energy cost is $2,699 in Queens and $3,369 in Staten Island, more than $1,000 higher than that of NYS (Table 5). Owners of 1-4 unit homes are particularly burdened by high energy costs, with an average annual

energy cost of $4,224 in Queens, almost double the state average, and $3,803 in Staten Island. Of owner-occupied housing units in Queens, 79% use utility gas for heating, 12% use fuel oil, and 5% use electricity. Of owner-occupied housing units in Staten Island, 89% use utility gas for heating, 4% use fuel oil, and 4% use electricity.[25]

Chart 3. Breakdown of 1-4 Unit Buildings, Queens[22]

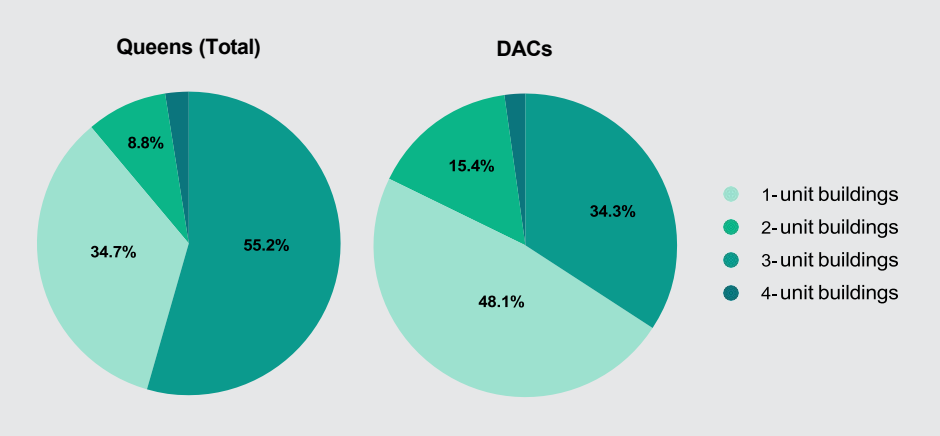


Chart 4. Breakdown of 1-4 Unit Buildings, Staten Island[23]

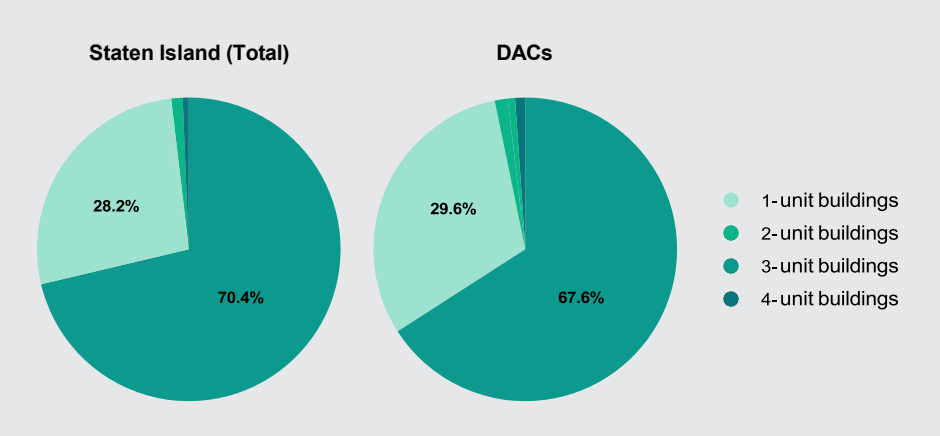


Chart 5. Age of 1-4 Unit Buildings, Queens[24]

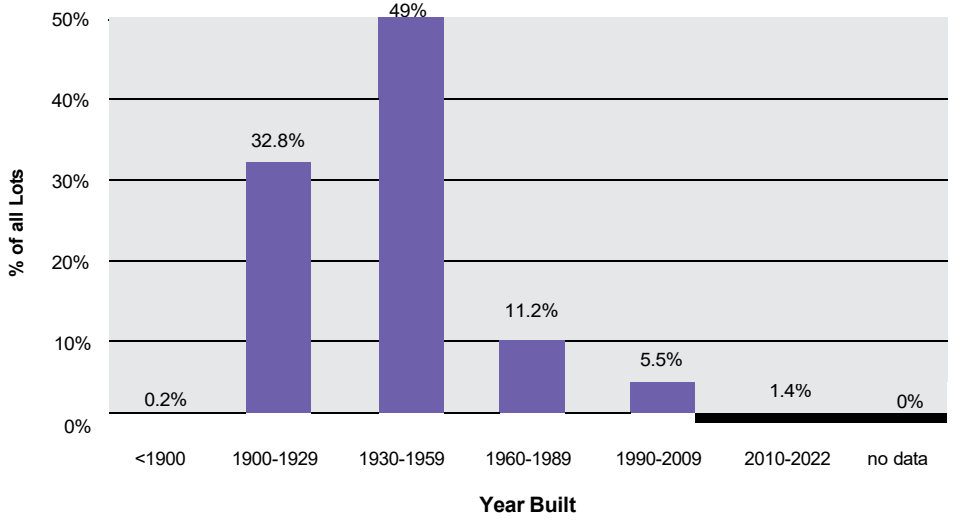


Chart 6. Age of 1-4 Unit Buildings, Staten Island[24]

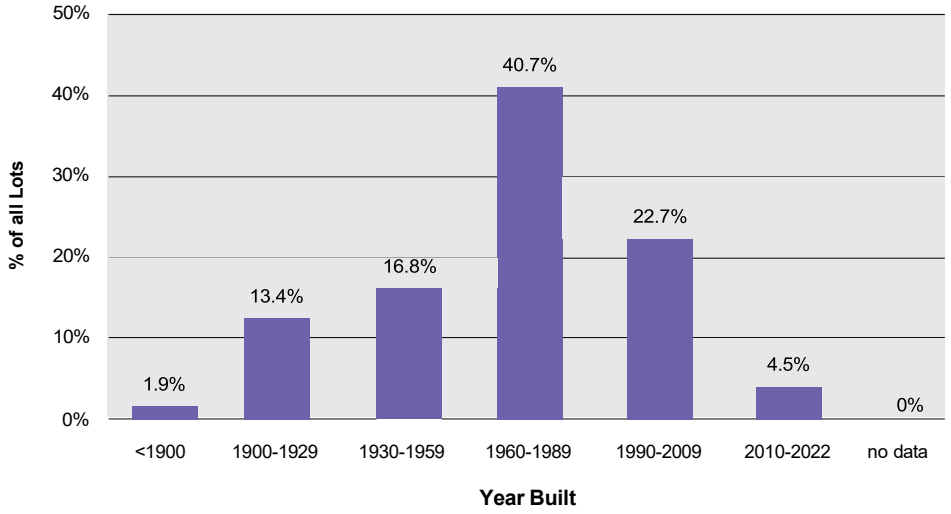


Table 6. Energy Costs, NYS vs. Queens & Staten Island[26]

	Annual Energy Cost		Energy Burden	
	All	LMI	All	LMI
NYS	$2,391	$2,014	2%	6%
Queens	$2,699	$2,384	3%	6%
QN Owner-Occupied 1-4s	$4,224	$4,069	4%	9%
Staten Island	$3,369	$2,973	3%	7%
SI Owner-Occupied 1-4s	$3,803	$3,554	3%	8%

• Household Maintenance

An estimated 41% of occupied housing units in Queens and 29% in Staten Island have at least one maintenance problem. A smaller proportion of units—10% in Queens and 4% in Staten Island—have 3 or more.[27] An estimated 15% of units in Queens and 13% in Staten Island have used supplemental heating. Mold, heating breakdowns, and holes in the wall are other common maintenance issues. Maintenance problems are generally more prevalent in affordable housing, rental units, and older buildings.[28] These numbers only cover maintenance issues tracked by the NYC Housing & Vacancy Survey, and not other common ones like deficient roofs.

• Housing Vacancy

NYC is in the midst of a housing crisis: the majority of households citywide are rent-burdened.[29] Low vacancy rates are a primary indicator of this crisis. According to 2021 American Community Survey (ACS) estimates, the vacancy rate was 2.2% in Queens (lower than city- and state-wide) and 3.5% in Staten Island.[30] More recent data suggests that housing is even more scarce today: the 2023 Housing and Vacancy Survey shows that the citywide vacancy rate for rental units has decreased dramatically since 2021 from 4.5% to 1.4%. Among lower-cost units, vacancy rates are even lower.[31]

• Housing Tenure

Queens is majority renter, while Staten Island is majority homeowner. In Queens DACs, 68% of occupied units (and 52% of 1-4 units) are home to renters, compared to 46% in NYS as a whole. Meanwhile, 69% of Staten Island units and 51% of DAC units (and 66% of 1-4 units in DACs) are owner-occupied.[32] Queens and Staten Island homeowners are racially diverse. Black, Asian, and Hispanic homeownership rates are higher than at the city and state levels. There are still wide disparities in homeownership by race. In Queens DACs, only 20% of Hispanic residents own their home, compared to 37% of non-Hispanic white residents and 42% of Asian residents. In Staten Island DACs, only 35% of Hispanic and Black residents own their home, compared to 65% of non-Hispanic white residents and 77% of Asian residents.[33]

• Climate & Environmental Hazards

Queens and Staten Island face substantial and growing climate and environmental hazards relating to heat, flooding, air pollution, and more. Southeast Queens neighborhoods like Jamaica, St. Albans, Hollis, and Rockaway Beach are among the highest risk neighborhoods for heat vulnerability in the city.[34] Coastal flooding is already a regular occurrence throughout the Rockaway peninsula and in neighborhoods along the eastern shore of Staten Island.[35] Stormwater flooding is an increasing risk throughout both boroughs, reaching neighborhoods that have previously not experienced flooding.[36] It is compounded by substandard housing conditions, as evidenced by the tragic deaths of multiple residents of illegal basement apartments in Central Queens during Hurricane Ida in 2021.[37] Finally, both indoor and outdoor air pollution contribute to health issues like asthma. Almost a quarter of adults in the Rockaways have asthma, the second highest rate in the city. Southeast Queens and the North Shore of Staten Island also have higher than average rates of asthma.[38]

Regional Clean Energy Workforce

Queens' and Staten Island's green economies are small but growing. **NYSERDA estimates that in 2022 Queens had 13,309 clean energy jobs and Staten Island had 2,551.**[39] The City of New York estimates that the city as a whole had 133,000 "green economy" jobs across 21 sectors in 2021, representing 3% of all jobs citywide and $16 billion in earnings.[40] Nearly half of these jobs are in building decarbonization, among which roughly half are in heating, ventilation, and air conditioning (HVAC), a third are in ENERGY STAR, efficient lighting and water conservation, 11% are in green building management and operations, and 6% are in advanced materials and insulation. Approximately 9% of green economy jobs are in energy, of which 37% are in solar, 20% are in hydropower, 16% are in on-shore wind, and the remainder are in other sub-sectors.[41] The citywide clean energy workforce landscape aligns with statewide trends; building decarbonization and energy efficiency represented nearly three-quarters of all clean energy jobs in the state in 2022.[42]

Green jobs have grown approximately 5% per year between 2016 and 2021, driven primarily by 1) local climate policy, including new buildings and energy regulations, 2) government investment in infrastructure projects and green technologies, 3) consumer demand for sustainable products, and 4) increased private investment in clean energy. The City projects ongoing rapid growth in the green economy to 400,000 jobs (or 7% of all jobs) by 2040, many in the subfields of buildings and finance and consulting. The majority of these jobs will be in existing professions adopting sustainable practices and an estimated 30% will be in new jobs. (Other estimates for job growth include the State Just Transition Working Group's projection that the city will see an increase of 43,000 green jobs by 2030, and Green Economy Network's projection of 90,000 new green jobs between 2021 and 2030). Statewide, each job directly created by the clean energy industry is estimated to generate an additional job through indirect and induced employment.[43]

Offshore wind will be an important green industry for NYC, particularly in Staten Island, in the coming years. Arthur Kill Terminal on Staten Island is being developed into an offshore wind assembly and staging port, which is projected to create 500 to 600 jobs during construction and over 100 permanent jobs, while spurring significant indirect job creation.[44] Citywide, the industry is projected to create up to 13,000 jobs.[45]

White workers are overrepresented in green sectors as compared to the overall workforce, and disproportionately work in higher-paying jobs. In 2020, 72% of green economy workers statewide identified as white, 15% as Hispanic, and 8% as Black.[46] Black, Hispanic, and Asian workers are overrepresented in lower-paying jobs, including building trades jobs. Women are also underrepresented in the green economy, particularly in building trades, where they hold less than 2% of jobs, as well as in design and engineering jobs. Overall, 75% of clean energy jobs in New York State are held by men.[47]

The green economy offers lower barriers to entry and better salaries than many other high-demand fields. **The majority of annual projected job openings in clean energy occupations are typically open to those with a high school diploma or equivalent.**[48] These green jobs generally pay better and are more secure than other jobs open to people with similar levels of education. For example, many building trades jobs that do not require a college degree have average salaries above $73,000.[49] Some fast-growing buildings trades jobs, such as roofers, solar installers, maintenance/repair workers, and construction workers, have slightly lower median annual salaries ($52,000-$54,000). The City's Green Economy Action Plan prioritizes education, training, and outreach for those occupations in the green economy that pay living wages of $63,000 per year or more. Many of these jobs do not require significant new skills training. Approximately a third of projected job openings in clean energy require a bachelor's degree or higher, like engineers, managers, and sales representatives.[50]

Some green jobs do require technical training. Expanding training programs while lowering barriers to participation will be key to helping green businesses find workers and workers get jobs, while enabling the industry to diversify. There are a variety of existing workforce programs in Queens and Staten Island offering training in numerous sectors of the green economy. Of particular note are programs at the City University of New York's (CUNY) LaGuardia Community College (in Queens) and the College of Staten Island. Both campuses are investing in offshore wind and other green economy training programs.[51] [52] In Queens, the Ravenswood Training Center will retrain former fossil fuel workers for offshore wind jobs.[53] Nonprofits like Green City Force and Solar One and businesses like Soulful Synergy and the Willdan Clean Energy Academy also offer green jobs training.

Important policy changes are underway at all levels of government that will significantly expand the green economy. Notably, the federal (IRA) will add an estimated $34 billion to NYS's green economy through 2030 and expand the market for building retrofits.[54] Compliance with Local Law 97 is projected to create more than 40,000 green jobs and expand the city's annual building retrofit market to $20 billion, more than 13 times larger than its size in 2021.[55] Finally, the State's upcoming Cap and Invest Program is projected to fund between $4 to 8 billion in statewide decarbonization investments annually and create over 28,000 green jobs by 2030.[56]

Regional Partners

Only a small selection of key partners is listed here. Find a full list of potential partners in Appendix C. Neither the following list nor Appendix C are intended to be exhaustive.

Civic Institutions and Community Centers: Secular gathering places like schools, hospitals, community centers, and libraries that people are already connected to and frequent in their day to day lives.

Hub collaboration:
Outreach partners. Potential hosts of energy education and workforce programs. Certain community institutions, particularly CUNY, offer workforce and other sustainability programming that the Hub can plug into.

Key partners:
Queens Public Library • New York Public Library • CUNY (esp. LaGuardia & College of Staten Island) • Public schools • Jewish Community Center of Staten Island • Senior centers (including Elmcor in Queens) • Eastern Queens Alliance • New York City Housing Authority (NYCHA) Community Centers

Religious Congregations: Mosques, churches, temples, synagogues, etc. Regular meeting places for particular cultural communities that may be hard to reach in other ways. Congregants trust their congregations to give them accurate information. Some congregations are connected to social services programs.

Hub collaboration:
Outreach partners. Potential of energy education and workforce programs. Congregations may also be interested in assistance with retrofitting their physical spaces.

Key partners:
Muslim American Society • Green Faith • Catholic Charity Network • Staten Island Ministerial Alliance

Cultural or Immigrant Organizations: Secular groups that provide services or programming to benefit a particular ethnic/cultural group or work primarily with immigrants.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education and workforce programs. These organizations are often skilled at working with non-English speakers and people from different cultural backgrounds, and can help the Hub reach and tailor its messaging to communities they serve.

Key partners:
Pride Center of Staten Island • Chhaya • Make the Road • Bait-ul Jamaat • New Immigrant Community Empowerment • YMCA New Americans Initiative

Housing Organizations: Organizations providing or helping people find or stay in affordable housing, or organizations working to repair or retrofit housing.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education programs. Certain housing organizations administer important home repair or retrofit programs, like HomeFix and Weatherization Assistance Program (WAP). The Hub can work with individual residents to navigate the landscape of existing housing programs and organizations. The Hub can also help organizations build their own capabilities interfacing with home retrofit programs.

Key partners:
Neighborhood Housing Services of Jamaica • Neighborhood Restore • Northfield Community LDC • Center for NYC Neighborhoods • Adapt Community Network • Margert Community Corporation • Association for Energy Affordability • HANAC

Social Services Organizations: Organizations providing a range of services to disadvantaged communities including food, legal and administrative assistance, afterschool programs, etc. These groups often offer wide ranging services that can also encompass housing and workforce related programs.

Hub collaboration:
Outreach partners, client referrals. Potential hosts of energy education and workforce programs. The Hub can turn to these organizations when clients need wraparound services that are outside of its scope.

Key partners:
Food pantries • Queens Legal Services • Commonpoint Queens • Central Family Life Center • Nonprofit Staten Island

Environmental Organizations: Organizations working on environmental or sustainability issues. Includes resiliency or disaster preparedness organizations.

Hub collaboration:
Outreach partners. Pre-existing community solar, home retrofit, and green workforce programs that the Hub can plug into. Technical expertise on home retrofits. Potential to partner or collaborate on future energy education programs and community campaigns.

Key partners:
Solar One • Urban Green Council

• RETI Center • Resilience/disaster relief groups (see Appendix C)

Workforce Development Organizations: A mix of nonprofit and for-profit organizations offering green workforce training, general remedial education, and English language learning programs. Some organizations focus on particular communities, such as youth, NYCHA residents, justice involved people, or immigrants.

Hub collaboration:
Client referrals. Preexisting green workforce programs that the Hub can plug into. Potential to partner or collaborate on future workforce programs. English learning and remedial education programs are essential wraparound services that many clients may need before being able to work in the green economy.

Key partners:
NYC Employment and Training Coalition • Green Economy Network • HOPE Program • Green City Force • Soulful Synergy • Solar One • Willdan • TMI Waterfront • La Colmena • Nontraditional Employment for Women • Interstate Renewable Energy Council • Energy Economic Development Corporation

Economic Development Organizations: Organizations that promote business interests and economic growth. Some organizations are very involved in promoting the growth of the green economy, especially offshore wind in Staten Island, and green job training programs.

Hub collaboration:
Outreach partner for work involving small businesses and green employers.

Key partners:
NYC Economic Development Corporation (EDC) • Staten Island EDC • Queens Chamber of Commerce • Business Improvement Districts

Contractors: Companies that install green home upgrades like solar panels, heat pumps, weatherization, etc. Other types of contractors, like electricians and plumbers, are also important in home repairs and retrofits.

Hub collaboration:
Client referrals. Having a strong network of trusted contractors will streamline the home retrofit process for clients. Contractors are also a potential green employer. Potential to educate contractors on low-income programs and new technologies.

Key partners:
Minority- and/or Women-Owned Business Enterprises (MWBE) and other companies owned by people of color and women, especially those from DACs in NYC • See Appendix C for key contractor partners

Major Green Employers: Companies that work in renewable energy, building decarbonization, sustainable manufacturing, recycling/composting, etc.

Hub collaboration:
Potential employers for clients seeking to work in the green economy.

Key partners:
Offshore wind companies at Arthur Kill Terminal (potentially Attentive Energy One) • See Appendix C for other potential green employer partners

Other businesses: Various other private businesses not directly involved in the green economy.

Hub collaboration:
Various, see description of key partners.

Key partners:
Small landlords (potential clients for retrofitting affordable rental housing) • Local/ethnic media (outreach partners in hard-to-reach communities) • Neighborhood gathering places (businesses like barbers, cafes)

City Government: Mayor's offices, executive agencies, and other branches of city government.

Hub collaboration:
Various, see description of key partners.

Key partners:
NYC Accelerator (offers assistance to large buildings in decarbonizing) • NYCHA (outreach partner for workforce programs) • Community boards (outreach partners) • NYC Department of Housing Preservation and Development (HPD) (administers the HomeFix home repairs program) • NYC Department of Small Business Services (SBS) (outreach partner for small businesses)

Local Elected Officials

Hub collaboration:
Outreach partners.

Key partners:
State Assembly members • State Senators • City Councilors • US Representatives • Borough Presidents

Utilities: Electricity and gas utilities.

Hub collaboration:
Outreach partners. Line of communication to streamline incentive application and retrofit processes. Potential green employers.

Key partners:
ConEd • National Grid

Regional Assets

Hub team organizations have a long history in Queens and Staten Island DACs, and these communities know that the Hub organizations are helpful, trustworthy partners. Hub organizations have extensive experience working with and engaging diverse communities in different languages. People already know to turn to them for help for many housing, workforce, and other needs.[57]

The seven Hub team organizations are collectively very experienced in all aspects of the Hub's work. The Hub is an extension of the housing counseling, retrofits, workforce development, and business development work that Hub organizations have been doing for many years.

- Programs like Electrify NYC (run by KC3, NHSQ, N4SF) and EnergyFit (run by Pratt Center) have given the Hub organizations experience counseling residents through the home upgrade process, helping with financing and repairs, and connecting with contractors.
- Youth WINS and New Women New Yorkers run successful programs to help DAC residents upgrade their workforce skills and connect with jobs.
- BOC Network has extensive experience helping small businesses with capacity building/financing/education.[58]

Hub team organizations have existing relationships with other organizations throughout Queens and Staten Island that can expand the reach of outreach and wraparound services. Hub organizations also take part in coalitions such as Operation Urban Sustainability in Queens, which further expand their reach.[59]

Queens and Staten Island have established civic engagement and information infrastructure.

- Local elected officials often offer strong constituent services and programming.
- Community Boards also play an important role in relaying information about programs to the community.
- Established community-based organizations play leadership roles in sharing information about public policy and programs in their communities.
- Queens and Staten Island are also host to a range of public and shared spaces that are essential for community gatherings and outreach, including parks, libraries, Older Adult Centers, and schools.[60]

Many organizations throughout Queens and Staten Island have complementary missions and expertise to the Hub's own, focusing on housing counseling, repair, and retrofits, green economic development, job training, and more. (See Regional Partners section).

- These organizations run a number of useful events that the Hub can plug into, such as Staten Island EDC's Forum for a Sustainable Future, Chhaya's annual housing fairs, and the Queens Borough President's Queens Climate Expo.
- Queens and Staten Island residents have access to green job training programs in their boroughs and citywide.
- Partnerships will be especially useful in connecting clients to wraparound services such as social and legal services, remedial education, language learning, and accessing financing.[61]

City and State government, including institutions like EDC, CUNY, and the Mayor's Office, are aligned in developing the local green economy, especially in key industries like offshore wind.[62]

III. Baseline Assessment of Clean Energy Program Participation

Baseline Assessment of Regional Clean Energy Programs

For a list of home retrofit and green programs, see Appendix D. See Appendix E for the full results of this analysis.

Overall, Queens received about $55 million and Staten Island about $39 million in NYSERDA residential and multifamily funding from January 2018 to August 2023.[63] As shown in Table 6, this works out to $24 per person in Queens and $83 per person in Staten Island. This inequity can be explained by the greater prevalence of single-family homes and homeowners in Staten Island, the borough's smaller immigrant population, and its higher median income (discussed below). Queens, which has more multifamily buildings, renters, immigrants and non-English speakers, and lower incomes, is especially poorly served by NYSERDA programs. However, neither borough is being adequately served by NYSERDA, especially in DACs.

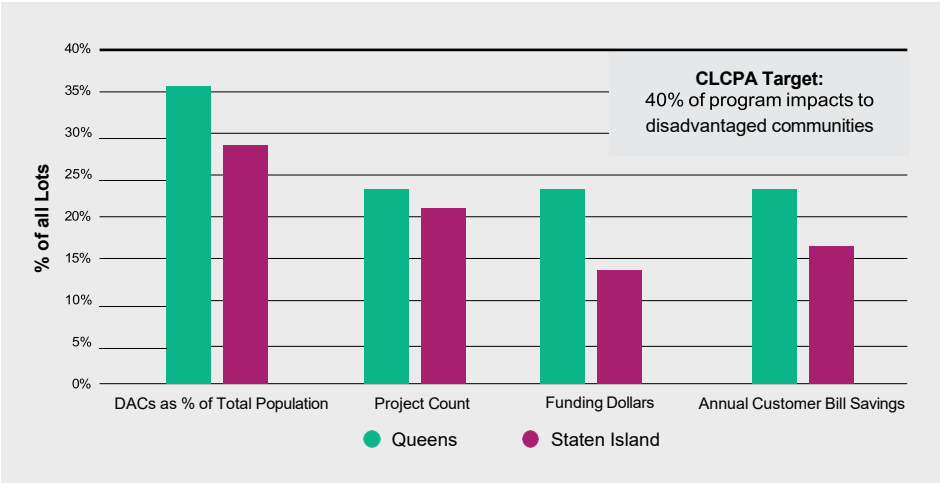
The CLCPA mandates that at least 35% of program impacts, with a target of 40%, flow to DACs and LMI households.[65] As shown in Chart 7, NYSERDA is far from meeting this target by almost every metric. In Queens, 36% of people live in DACs, but less than a quarter of NYSERDA projects, funding, and customer bill savings flow to DACs. In Staten Island, 29% of people live in DACs, but only 21% of projects and 13% of funding dollars flow to DACs. In total, 14% of projects in Queens and 3% of projects in Staten Island have been through LMI programs. In Queens, 36% of NYSERDA funding has been spent on LMI programs, and in Staten Island only 5% has. Only 9% of bill savings have flowed to LMI customers in Queens, and only 2% in Staten Island. So even though Staten Island is better served by NYSERDA programs overall, its DAC and LMI communities are especially poorly served by NYSERDA.

Map 3 shows Queens census tracts by the amount of NYSERDA Residential and Multifamily funding they have received per person. The bottom five neighborhood tabulation areas (NTAs) in Queens by NYSERDA funding per person, including Edgemere, Corona, Far Rockaway[67], and Woodside, are all poor neighborhoods

Table 6. NYSERDA Funding Dollars Per Person by Borough[64]

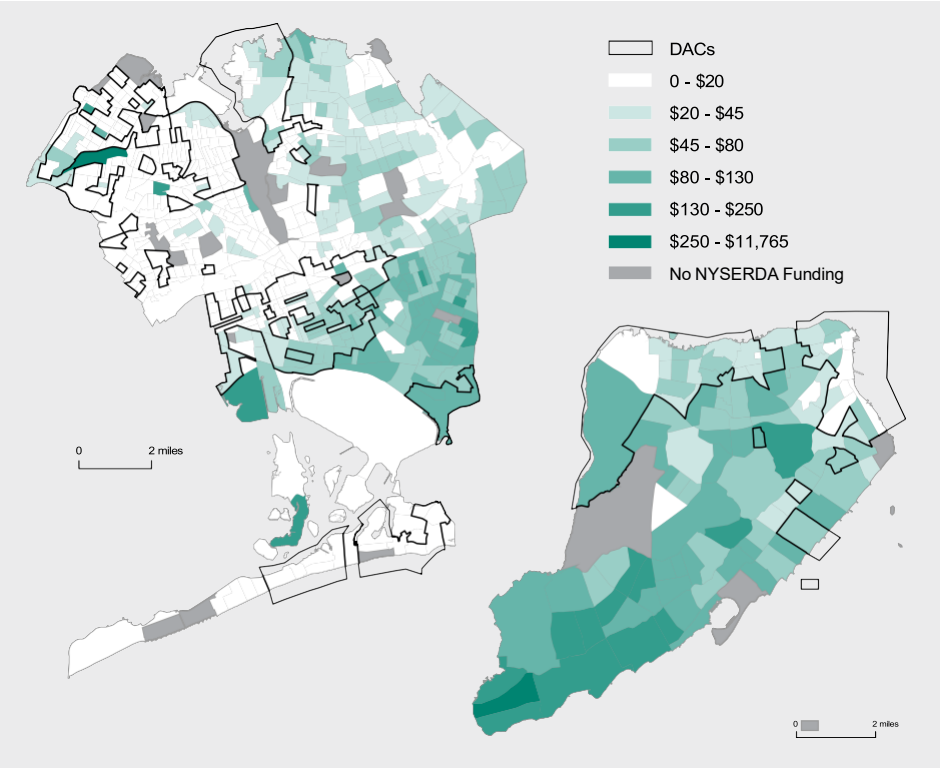
Queens	$24
Staten Island	$83

Chart 7. NYSERDA DAC Program Impacts as a Percentage of Total, Queens & Staten Island[66]



of color, and have received less than $4 per person in NYSERDA funding. Census tracts in most of Western and Central Queens, home to most of the borough's DACs, have received less than $20 per person. Meanwhile, the top five NTAs in Queens, including Laurelton, Rosedale, and St. Albans, are also neighborhoods of color, but are made up predominantly of middle-class homeowners.[68] They have received upwards of $80 per person. In the top five neighborhoods, people save between $130 and $174 per year on utility bills due to NYSERDA programs, versus only $4 to $11 in the bottom five.

Maps 3 & 4. Census Tracts by NYSERDA Dollars per Person, Queens (top) and Staten Island (bottom)[64]



As shown in Map 4, the story is similar in Staten Island. Census tracts in much of the wealthier, whiter South Shore have received over $100 per person, whereas tracts on the North Shore, where DACs are concentrated, have mostly received less than $50 per person. The bottom five NTAs in Staten Island are all on the North Shore and include Stapleton, Clifton, New Brighton, and St. George. People in these neighborhoods save between $42 and $93 on yearly energy bills due to NYSERDA programs. The top five NTAs are all on the South Shore and include Tottenville, Huguenot, Eltingville, and Oakwood Beach. In these neighborhoods, people save an average of $137 to $223 per year on energy bills. The top five NTAs are all high income, predominantly White and English speaking, and predominantly homeowners. The bottom five NTAs show the opposite trends.[69]

Chart 8 plots every Queens and Staten Island NTA by median household income and NYSERDA Residential/Multifamily Funding. In general, NYSERDA spends more money and delivers more benefits to people in high income neighborhoods.

Our analysis found similarly inequitable results when NTAs were plotted by other metrics:

- The more limited English proficiency households there are in a neighborhood, the less NYSERDA funding it gets.
- The more single-family detached homes there are in a neighborhood, the more NYSERDA funding it gets.
- The more renters there are in a neighborhood, the less NYSERDA funding it gets.

Overall, this analysis reveals program impacts to be distributed very inequitably in Queens and Staten Island. NYSERDA's programs distribute money away from DACs, low-income people, people of color, non-English speakers, renters, and apartment dwellers. Money and benefits accrue to high income and white people, English speakers, homeowners, and single-family home residents.

Chart 8. Queens & Staten Island NTAs by Median Income and NYSERDA Residential Program Funding[70]

Existing NYSERDA Community Campaigns

NYSERDA has not implemented any community campaigns in Queens or Staten Island.

IV. Stakeholder and Community Engagement

Close to 300 people were engaged during RABA development through interviews, focus groups, and a resident survey. Feedback from public engagement formed the backbone of the Barriers and Opportunities Chapter, as well as the Regional Partners and Regional Assets sections of the Baseline Regional Characterization.

Interviews & Focus Groups

See Appendix F for a list of External Organization Interviews and Focus Groups.

Pratt Center interviewed other Hub partner organizations to get their feedback on potential partners, assets, barriers, opportunities, and recommendations. These partner organizations also helped to identify external organizations focused on environmental, housing, and workforce issues in DACs to interview. Interviews allowed us to hear from experts about partners, barriers, and opportunities. Of the ten external organizations that were interviewed, eight are nonprofits, one is a for profit business, and one is a government office. Pratt Center also held four focus groups that corresponded with Hub partner organizations' existing programs and communities. Participants in the ENYC, Immigrant Women, and Youth Focus Groups were given a $50 incentive.

Key Takeaways: Interviews & Focus Groups[71,72,73]

Outreach and communication

- Outreach and resources available to non-English speaking and immigrant communities for NYSERDA programs has been severely inadequate.
- Many organizations throughout Queens and Staten Island are already involved in the green economy, housing, workforce development, and/or offer other useful wraparound services.
- Even for organizations focusing on these issues, it is difficult to keep track of the rapidly changing environment and help their communities access these opportunities.

Home energy upgrades

- Residents are not aware of what options exist to upgrade their homes, how upgrades can benefit them, and what programs can help them get these upgrades.
- Many residents are interested in upgrades, but available programs do not meet their needs financially.
- The process of getting home energy upgrades is time consuming, confusing, and riddled with barriers that deter many interested residents, even those who are willing and able to pay upfront costs.
- NYC's built environment presents unique challenges to retrofits that NYSERDA programs seem to ignore.

Workforce

- There is wide interest in clean energy jobs that are higher paying, hands on, and offer the opportunity to learn and help one's community.
- Most community members know little about what the green economy actually entails and how to enter it.
- Some are deterred from green jobs due to common perceptions (some inaccurate) about the industry, such as that it is not diverse, it requires technical skills, or that it is dominated by manual labor jobs.

Survey

The Hub designed and fielded an online survey for Queens and Staten Island residents. The survey was offered in English and Spanish (due to funding limitations, the Hub could not translate it into more languages to match the region's diverse population). It was open for about two months. Hub organizations promoted the survey through email blasts, social media posts, phone calls, tabling, and flyering. The survey focused on outreach methods, home energy upgrades, and green workforce topics. A summary of survey results can be found in Appendix G.

The survey received 262 total responses, with 196 coming from Queens and 66 from Staten Island. Spanish survey takers made up 11% of respondents. Of respondents, 56% were renters and 35% were homeowners (the rest had other housing situations). Almost two-thirds of renter and homeowner respondents lived in a 1-4 unit home. Of respondents who gave their income, 58% had a household income of less than $60,000 per year. Two-thirds of survey respondents were

women. In Queens, the survey overrepresented Hispanic residents (about half of survey takers who shared their race/ethnicity were Hispanic, compared to 39% of Queens DAC residents) and undercounted Asian residents (9% vs. 24%). In Staten Island, the survey overrepresented Black residents (36% vs. 25%) and undercounted Hispanic (21% vs. 32%) and white (15% vs. 30%) residents.[74]

Key Takeaways: Survey[75]

Outreach

- Word of mouth and personal networks are the most important sources that respondents rely on for important information. Internet searches and social media are other important sources.

Home Energy Upgrades

- The majority of respondents are open to a wide array of upgrades, but most people don't know about the full range of upgrades available to them and the programs that can help them pay for these upgrades.
- Knowledge is inequitably distributed: people of color, low-income people, and renters are less likely to know about technologies and programs.
- Some of the most important technologies, like heat pumps, and programs such as Empower+, are the least well known.

Workforce

- There is wide interest in working in the green economy, especially but not exclusively in less technical or manual labor heavy sectors. People of color, low income, and renter communities are particularly interested.
- Most people are passively interested or open to working in the green economy, rather than actively planning to work in it.
- There is also strong interest in job training programs, especially for general job skills applicable within the green economy, but people don't know where to find relevant job training programs.

V. Barriers and Opportunities

Barriers

1. Barriers to Residential Program Implementation

Public organizations like NYSERDA, and the programs it offers, have limited name recognition and are not well promoted. (1.1)

- Marketing has been very limited. Most people find out about clean energy opportunities through web searches, meaning they are only reaching people who are already interested and motivated.[76]

People don't know about what technologies and programs exist to upgrade their homes. (1.2)

- As shown in Chart 9, less than a quarter of respondents to the RABA survey had heard of heat pumps/mini splits, heat pump water heaters, and air sealing. There were 8 other technologies that less than half of people had heard of, and only 3 that more than half of people had heard of.[77]
- As shown in Chart 10, there was no clean energy incentive program that more than half of RABA survey respondents had heard of, and only 2 programs that more than 20% of people had heard of. More than a third of respondents had not heard of any of the programs. Only 12% of people had heard of the EmPower+ program. None of the three most known programs were NYSERDA programs.[78]
- There are knowledge disparities of clean energy technologies and programs across racial, income, educational, housing tenure, and other lines (see Barrier 3.2).

Non-environmental benefits of home energy upgrades, like lower energy bills and healthier, more comfortable homes, are not well known or publicized. People can be skeptical of the benefits of clean energy technologies. (1.3)

- Respondents to the RABA survey ranked lowering utility bills and improving indoor air quality as the most effective motivators to getting a clean energy upgrade.[81]
- Messaging has focused too much on helping the environment, not enough on personal benefits.[82]
- Technologies have improved greatly in recent years, and people may have out of date ideas about their utility.

Chart 9. Knowledge of Clean Energy Technologies[79]

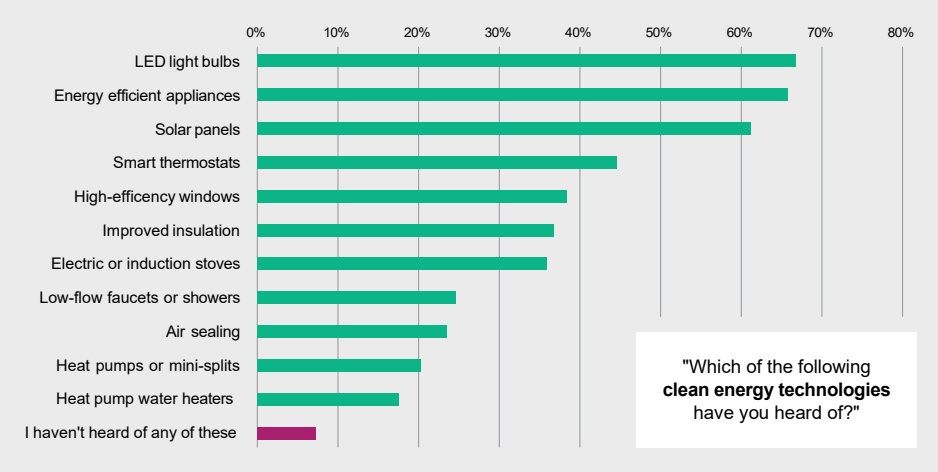
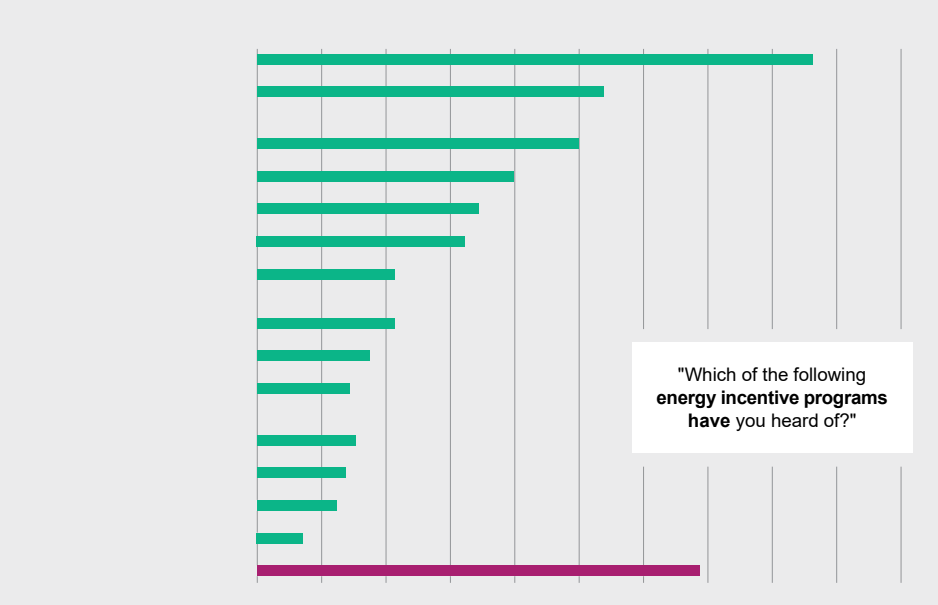


Chart 10. Knowledge of Home Energy Incentive Programs[80]



- Misinformation about clean energy technologies and programs is spreading, eroding trust in claims from reputable sources (see Barrier 3.1).

NYC has an older residential building stock than most of the state, and its building typologies are very unique not only statewide but nationwide, making retrofits more complicated and costly.[83] (1.4)

- Of buildings in Queens, 79% were built before 1960.[84]
- Older homes often need weatherization and electrical upgrades before being able to handle other upgrades.
- Design features of some older or more urban building typologies, such as low ceiling heights, masonry walls, small rooms, pipes wrapped in asbestos, and lead paint, present further challenges to green upgrades.[85]

Homes often have structural or health and safety problems that must be addressed before installation of clean energy upgrades, and these fixes are not covered by home retrofit incentive programs like EmPower+.[86] Programs that do cover repairs, like HomeFix, are vastly underfunded to meet the need for repairs. (1.5)

- Solar installations often require a roof replacement, and weatherization often requires lead/mold/asbestos abatement. Many interviewees cited funding for roof repairs/replacements as a particularly urgent need.[87]
- Of occupied housing units, 41% in Queens and 29% in Staten Island have at least one maintenance issue.[88] This only includes maintenance issues tracked by one survey, and not other common ones like deficient roofs.
- Affordable housing, rentals, and older buildings are more likely to have problems, and residents of these housing types are lower income and have less resources to deal with the problems.
- RABA survey respondents with household incomes less than $30,000 were much more likely to rank home maintenance issues as an important barrier to making a home energy upgrade.[89]
- Repair funding through the HomeFix, RESTORE, and Affordable Housing Corporation (AHC) programs is sporadically available and difficult to access. These programs come nowhere close to meeting demand for repairs from people who qualify for them.[90]

Many homes in Queens and Staten Island are overcrowded, have illegal basement units, or are not up to code in other ways. These circumstances discourage occupants from engaging with government or contractors. (1.6)

- An interviewee mentioned a contractor participating in the Electrify NYC program who intimidated families for having too many people per room, refused to take jobs and told NYSERDA that this was the reason.[91]
- Immigrant families are especially likely to have these types of housing situations.

Homeowners have competing priorities vying for their time and money. (1.7)

- Median incomes in NYC, especially in DACs, do not match the cost of living and housing prices. People are stretched thin paying for day-to-day expenses.[92]
- MHI in Queens DACs is only 70% of the borough's Self Sufficiency Standard, and MHI in Staten Island DACs is 74% of the borough's SSS (see page 21).[93]
- LMI 1-4 unit homeowners spend 8-9% of their income on energy costs in Queens and Staten Island, much higher than the 2% average for all NYS residents.[94]
- Flooding and other climate hazards are adding to the maintenance needs that homeowners must prioritize.[95]

It is difficult to find accurate information on how much upgrades will cost, how much incentive residents will get, and how much long-term savings will be in advance, making financial planning difficult. (1.8)

- Many resources citing estimated costs are based on non-NYC costs, which are much lower.[96]
- Quotes often vary widely between contractors.
- High inflation means that many estimates that are only a few years old are likely out of date.
- Project scopes and budgets often balloon if complications, such as finding undiscovered leaks, lead paint, and required energy service upgrades, arise. This is especially common in older buildings with maintenance issues.[97]
- Incentive programs often come with poorly explained caveats that result in residents receiving less than they expect to. For example, strict qualifying criteria for the HEAR Rebates being offered through EmPower+ mean that few people qualify, but residents would not know this from looking at the webpage advertising them.

Middle income people do not qualify for more generous incentives, but many can't afford market options. (1.9)

Many homeowners can't afford home upgrades even after incentives are applied. (1.10)

- This is especially true for upgrades like heat pumps or solar that usually run into the tens of thousands of dollars.
- As shown in Table 7, "I can't afford the upfront cost of the upgrades I'm interested in" was the biggest barrier to installing an upgrade for respondents

to the RABA survey.

Spotlight: Inadequate LMI Incentive Programs

Incentive programs do not provide enough help to surmount cost barriers for low-income households and are not structured in a way that meets their needs. (1.11)

- **Eligibility for the EmPower+ Low Income Incentive, WAP, and Home Energy Affordability Program (HEAP) programs is set at 60% of State Median Income (SMI). Using SMI rather than Area Median Income (AMI) to determine eligibility excludes hundreds of thousands of LMI NYC residents who are over the income limit but face very high costs of living.[98] (1.11.1)**
    - The IRA defines low income as under 80% of AMI, which is currently the income limit for the EmPower+ Moderate Income Incentive.[99]
- **Many tax credits, including those from the IRA and the NYS Solar Tax Credit, are nonrefundable, meaning that low-income people with low or no tax liability cannot fully benefit from them.[100] (1.11.2)**
- **Tax credits and some rebates require residents to pay upfront and be refunded later. Most low-income people do not have the on-hand capital to bridge this gap in time. (1.11.3)**
- **NYSERDA's loan programs aren't attractive to many low-income families who are often turned off by the conditions or hesitant to take out a loan at all.[101] (1.11.4)**

The process of getting a home retrofit is very complex and confusing. Customers must develop extensive knowledge on a variety of technologies, programs, and procedures to navigate the process.[102] (1.12)

- Of RABA survey respondents, 80% said there was at least one home energy technology that they wanted but didn't know how to access or afford.[104]
- Incentive programs are confusing. Multiple programs do similar things (for example, WAP, EmPower+, and Comfort Home), and it is unclear which can be stacked, what each program covers, and what caveats apply.[105]
- Incentives, qualifying criteria, and regulations have been changing quickly (for example EmPower+ Home Energy Affordability Rebates (HEAR) Rebates, rules around stacking it with Clean Heat). It is easy to find out of date information.
- There is no centralized, consistently updated source of information where people can get accurate, authoritative information about every step of the retrofit process and the options available to them.[106]
- Project scopes from contractors are hard to interpret and often don't explain what each item is, making it difficult for customers to understand what is happening in their homes.[107]
- Subcontractor agreements contain complex legal language that people cannot easily understand on their own.[108]

The time and effort required to successfully upgrade your home - with self-education, program applications, communication with agencies and contractors, and installation - can add up to "a full-time job" for months.[109] (1.13) As shown in Table 7, RABA survey respondents ranked "The process of receiving upgrades is daunting/complicated" as the third biggest obstacle to getting a home upgrade.[110]

- Residents often have to apply to multiple funding sources across levels of government to pay for an upgrade, and applications for these programs are often very long and duplicative.
- Accessing and submitting documents, like utility records, is challenging for customers and organizations to navigate, especially for people who are not tech-savvy.[111]
- It can be very difficult and time consuming to find a quality contractor.

Table 7. Home Upgrade Barriers[103]

How big of an obstacle would these be to making a home energy upgrade? (Scale of 1-5)

I can't afford the upfront cost of the upgrades I'm interested in	4.2
I cannot make the upgrades I'm interested in on my own as a renter (only asked to renters)	4.1
The process of receiving upgrades is daunting/complicated	4.0
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do	3.8
Other home repairs or upgrades are a bigger priority for me (only asked to homeowners)	3.6
I don't want people coming into my home to install upgrades	2.3

- NYSERDA published lists of contractors claiming to cover certain areas/offer certain services are very inaccurate and outdated.[112]
- Customers in Staten Island often encounter problems getting contractors who claim to work throughout NYC to accept jobs.[113]
- Contractors often specialize in particular types of work (for example, solar contractors working only on pitched roofs) that limit available choices.[114]
- Customers can be distrustful of contractors, and feel that they often do subpar work or otherwise take advantage of customers.[115]
- Contributors to this perception: genuine bad actors (few and far between), customers' unrealistic expectations about pricing, customers doing work out of order (for example, installing heat pumps before weatherizing, leading to an oversized/malfunctioning system), contractors being very busy, program design stopping contractors from addressing structural/health and safety needs.[116]
- Customers are asked to make many technical decisions, such as choosing between versions of the same technology, that are beyond their comfort zone. Contractors can be too busy to guide them through this process.[117]

When residents encounter problems, it is difficult to get assistance. Customer service and response speed are issues for many agencies and contractors. (1.14)

- Focus group participants cited not being able to get in touch with anyone as a reason they abandoned projects.[118]
- There is a perception that employees helping people navigate programs are not knowledgeable or well-trained.
- This is exacerbated by poorly explained and constantly changing program details, which it is difficult for even energy advisors to keep up with (Barrier 1.12).[119]

Spotlight: Poor Options for Renters

For renters, both the options for upgrades and the potential benefits of them are greatly reduced. (1.15)

- Of occupied housing units in DACs, 68% in Queens, and 49% in Staten Island are occupied by renters.[120]
- As shown in Table 7, RABA survey respondents who were renters ranked "I can't make the upgrades I'm interested in on my own as a renter" as the second biggest barrier to making a home upgrade.[121]
- Renters have little agency to make large changes to their homes. There are few options available to renters, and few renters know about the options that are available.[122]
- Renters have little leverage to get their landlords to make upgrades, and may fear eviction or rent increases if they complain about utility bill issues or ask for an upgrade.
- Retrofits are more complicated in buildings with renters. Getting access to the unit from the tenant and figuring out financing, including verifying income eligibility, is more complicated in rentals.
- Split incentive: the benefits of home energy upgrades in rental housing are split between occupants and owners, giving each side less of an incentive to make the upgrade.[123]
- Renters may not live in their unit long-term, swaying the calculation of construction hassle vs. long term benefits.
- Buildings over 25,000 square feet are required to sharply cut their carbon emissions by NYC's Local Law 97, giving landlords a strong incentive to make upgrades. But smaller rental buildings have no such mandate. Most rental buildings in Queens and Staten Island are under 25,000 square feet.[124]

Community solar, one of the primary options available to renters, is too small to meet demand for the program, is poorly promoted, and has faced extensive implementation problems. (1.16)

- Only 7% of RABA survey renters had heard of community solar.[125]
- The NYSERDA Community Solar webpage is confusing and clunky to use, and many of the projects it lists have no spots left for new subscribers.
- The 10-20% discount that community solar offers to customers is much lower than the savings available to homeowners that install solar on their own roofs.
- Thousands of community solar customers have had difficulties getting ConEd to apply their solar credits to their accounts, and these problems persist despite efforts by the State to fix them.[126]

Because it is common for renters to pay for electricity but not gas, electrifying energy systems often raises renters' energy bills. (1.17)

- Electrifying more rental units has the potential to worsen already high levels of energy cost burden unless paired with rate reforms or affordability programs.[127]

Home energy upgrades are less accessible for some groups. In the RABA survey, Black, Hispanic, and very low-income respondents gave higher scores to most of the barriers listed in Table 7.[128] (1.18)

Small home retrofits, especially through LMI programs, can be complicated and time consuming for contractors to navigate, discouraging them from participating. (1.19)

- The amount of paperwork associated with LMI programs, including EmPower+, is a powerful disincentive to participating. As a result, some choose not to work with people using these programs.[129]
- Some rebate programs pay contractors after work is done, complicating cash flow considerations.
- Homeowners can have unrealistic expectations about costs, project scopes, and incentive amounts.
- Retrofits are more complicated and more expensive in NYC, discouraging contractors from working here.[130]

2. Barriers to Participating in Workforce

People don't know much about the green economy, its branches, or workforce programs, and there is a lack of clarity about what it encompasses. (2.1)

- It is difficult to find comprehensive, reliable information about the field, paths into it, types of jobs, and necessary skills/qualifications for these jobs.[131]
- Many people associate the green economy with solar and other renewables, but do not know about other parts of the field, such as building decarbonization.
- People do not know about specific companies that are hiring within the field, or job training programs that can help them get skills and find a job.
- As shown in Table 8, few people know about existing green job training programs.
- Many people do not realize how green jobs help individuals and communities, not just the environment.[132]
- In the RABA survey, Hispanic, Black and Asian respondents, women, and people with lower levels of education were more likely to indicate that they wanted more information about the green economy.[133]

Untrue perceptions about the green economy deter people from being interested. (2.2)

- One common perception is that the green economy is dominated by jobs requiring manual labor. Another is that the green economy is very scientific/ technical, and that it requires extensive training to work in it. Respondents to the RABA survey were generally less interested in these types of jobs.[134]
- As shown in Table 8, many RABA survey respondents were worried that they did not have the right skills to work in the green economy or participate in a training program.

Table 8. Job Training Obstacles[135]

How big of an obstacle would these be to participating in a green job training program? (1-5 scale)	
I don't know how to find a green job training program	4.2
I'm worried I don't have the right skills	4.1
Travel time	4.0
Work schedule / inability to take time off work	3.8
Childcare or other caretaking responsibilities and/or cost	3.6

The green economy is dominated by white men, particularly in higher paying roles, which discourages women and people of color from learning about or participating in the industry and contributes to disparities in employment and income. (2.3)

- Green economy workers are predominantly (75%) male.[136] Construction is particularly dominated by men. In the RABA survey, women were significantly less likely to be interested in working in manual labor and technical trades.
- Almost three-quarters (72%) of green economy workers identify as white.[138]
- No one in a focus group of youth of color knew anyone working in the clean energy industry. Participants also had little knowledge of what the green economy comprises.[139]

Green job training programs can be difficult to participate in, especially for low-income people and non-English speakers. (2.4)

- Programs are time consuming and often cost money, presenting challenges especially to those with a full-time job or a family. Free programs have an opportunity cost when there are no stipends provided.[140]
- Programs are often offered only in English.
- Many workers need general job skills in addition to more specialized skills. This includes educational remediation (for example core literacy, writing, and math skills).[141]
- When asked about skills they are interested in gaining/improving, respondents to the RABA survey ranked general skills, like getting a driver's license and basic computer skills, highest.[142]

- Because many green jobs haven't yet arrived, it is difficult to know what to train for - both for potential participants and for organizations designing programs.[143]

Existing training programs are not always meeting the needs of the industry. (2.5)

- There is a lack of coordination between workforce training programs and the actual needs of the green energy industry, and green job openings often require specific skills that are not covered in general training programs.[144]

Immigrants, people of color, low-income people, unhoused people, justice involved people, people without a car, and other marginalized groups experience general systemic barriers to employment.[145,146] (2.6)

- Some of these barriers include the high cost of childcare, lack of access to transportation, the digital divide, discrimination, and bias.[147]
- In Staten Island, 29% of DAC households lack access to a vehicle despite the borough's poor public transit network.[148]

3. Barriers to Community Campaign Implementation

There is an overwhelming amount of information about clean energy initiatives available from many different sources, not all trustworthy. People don't know where to turn for accurate information.[149] (3.1)

- Self-interested private sector companies are often the loudest promoters of clean energy upgrades.
- Misinformation and scams about clean energy home upgrades are spreading. These scams can be financially devastating and also erode trust in legitimate programs.
- Solar scams among elderly and immigrant neighborhoods in Queens are a particular issue.[150]

Knowledge of clean energy opportunities is inequitably distributed, and outreach to some groups is harder than others. There has not been sufficient effort to close these information and outreach gaps. (3.2)

- The RABA survey found that people of color, low-income people, renters, and people with lower levels of education know less about clean energy technologies and programs, and that young people and seniors are less likely to attend community events.[151]
- Of DAC residents, 53% in Queens and 50% in Staten Island have a high school diploma or less.[152]
- Of DAC households, 12% in Queens and 18% in Staten Island do not have internet access, and older people are also less likely to have or know how to use the internet to find out about opportunities.[153]

NYC communities are far more diverse ethnically and linguistically than typical communities in other parts of the state, and NYSERDA has not invested enough in multilingual, culturally competent outreach. (3.3)

- Of DAC households, 22% in Queens and 9% in Staten Island have limited English proficiency, compared to 8% of NYS households.[154]
- NYC agencies routinely translate materials into up to 11 languages, but NYSERDA materials are often only available in English and sometimes Spanish.[155]
- Enabling non-English speakers to participate in clean energy programs requires deep investment in multilingual events, applications, one on one assistance, and more, not just translating flyers.[156]
- Cultural differences may require different approaches to outreach and messaging in different communities.
- Historically-marginalized communities often lack trust in government institutions and require increased investment of time to gain their trust.[157]

Queens and Staten Island span both a much more diverse and a much larger population than most of the other Hubs, but the Hub has not been given commensurate funding to conduct adequate outreach across all of these communities. (3.4)

4. Barriers to Engaging Partners

Community organizations doing complementary/overlapping work are often splintered, without much of a chance to coordinate or help each other. (4.1)

- CBOs can be territorial, stymying efforts to streamline resources and share information and best practices.
- The large number of organizations offering similar clean energy programs or expertise can be confusing for people trying to access home upgrades or green careers.[158]

Just as residents do, organizations and businesses also struggle to gain and retain expertise on the clean energy economy. (4.2)

- It is difficult to find information about how to get involved, funding opportunities, and how to position themselves to offer useful services within the green economy. [159]

- Constantly changing regulations, incentive programs, technologies, funding streams, and staff hinder efforts to build institutional capacity.
- The green economy is still nascent. Many projects that will create jobs have yet to arrive, and there are many unknowns about what these projects will end up looking like and the impacts they will have.
- Pivoting to the green economy requires significant capacity building, and it is difficult to find programs to help with this process.[160]

Public sector green economy programs are often complicated and cumbersome to participate in. (4.3)

- Contractors feel that many programs require them to fill out unmanageable, duplicative paperwork.[161]
- Public sector agencies can move on a very slow timeline, which adds costs, makes project planning and scheduling difficult, and further discourages participation. [162]
- These problems are especially difficult for smaller/MWBE contractors and small community organizations with less back-office capacity to navigate.[163]

MWBEs, other small businesses, and community organizations in DACs often struggle to find opportunities, lack trust in institutions, and have smaller networks. (4.4)

- MWBE (both certified and other minority and women owned businesses) struggle to be respected. Racist, negative stereotypes mean they have to jump through more hoops to get projects and earn trust.[164]

Opportunities

1. Opportunities for Residential Program Adoption

There is wide interest in sustainable home upgrades. (2.1)

- As shown in Table 9, survey respondents ranked almost every energy upgrade motivator as very effective.
- There was no technology that more than a quarter of survey respondents indicated definitely not wanting.
- When asked about what technologies people did want, survey respondents ranked LED lightbulbs, energy efficient appliances, high efficiency windows, improved insulation, and solar panels highly.[165]

Few people in Queens and Staten Island have participated in existing energy signals that with the right program design and support, there are huge opportunities to enroll more people. (2.2)

- Of RABA survey respondents, 75% have not participated in any listed program. Only 5% of respondents have participated in EmPower+. Only 36% of those with a household income less than $30,000 have applied to HEAP.[167]

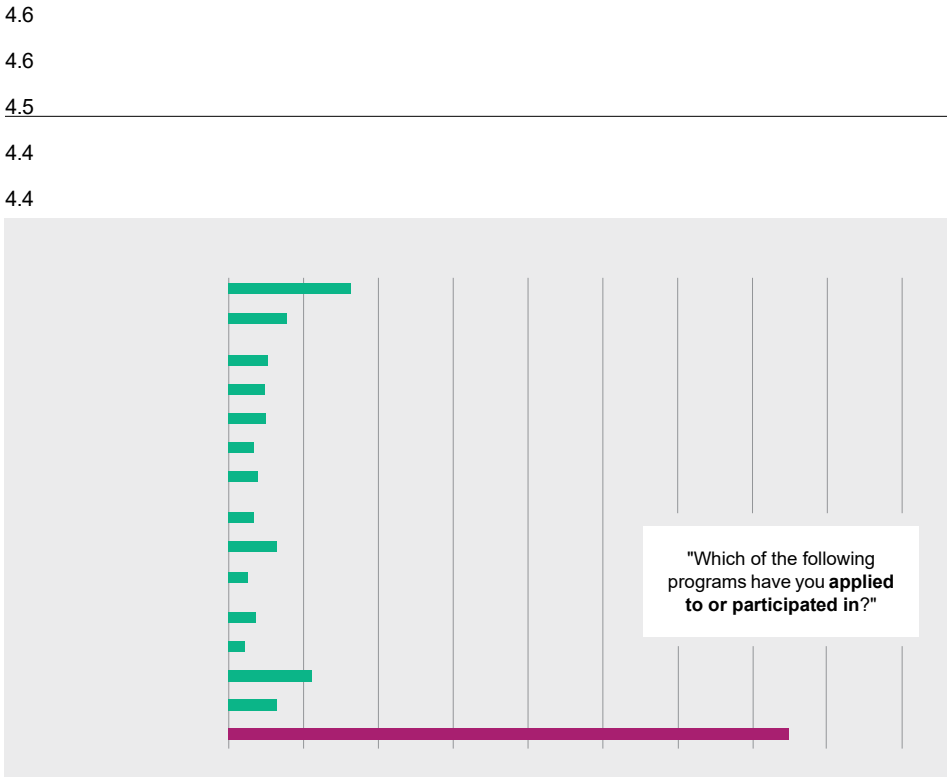
Table 9. Clean Energy Motivators[166]

How much do these benefits of making a home energy upgrade appeal to you? (1-5 scale)
Lowering my utility bills
Improving indoor air quality
Preparing my home to withstand natural disasters and avoid power outages
Making my home's temperature more comfortable
Fighting climate change/improving the environment
Making needed home repairs like a roof replacement or mold/lead abatement as part of the

upgrade

Getting my tenant to stop complaining about being cold/hot (only asked to homeowners)

Chart 11. Participation in Home Energy Incentive Programs[168]



Significant funding is becoming available to expand home energy upgrades for LMI and DAC residents. (2.3)

- NYS was awarded $250 million to expand solar in LMI communities through the Solar for All program.[169]
- The federal government recently awarded $20 billion to a network of "green banks" that will focus on expanding green energy investment in DACs nationwide.[170]

Clean energy technologies are becoming better adapted to the urban environment through increased market interest and strategic government investment. (2.4)

- The new Gradient and Midea America window heat pump, developed with NYCHA, has the potential to make installing heat pumps in older NYC apartment buildings dramatically cheaper and simpler.[171]

3. Opportunities for Participating in Workforce

Green jobs offer higher pay than many other jobs open to people with lower levels of formal education. (3.1)

- On average, energy efficiency jobs pay about $2 per hour more than the national average hourly wage, and clean energy production jobs pay about $5 more.[172]
- More than 50% of the annual projected job openings in clean energy occupations typically require no more than a high school diploma or equivalent.[173]
- The industry's growth prospects and competition for workers means there is room for career growth.[174]

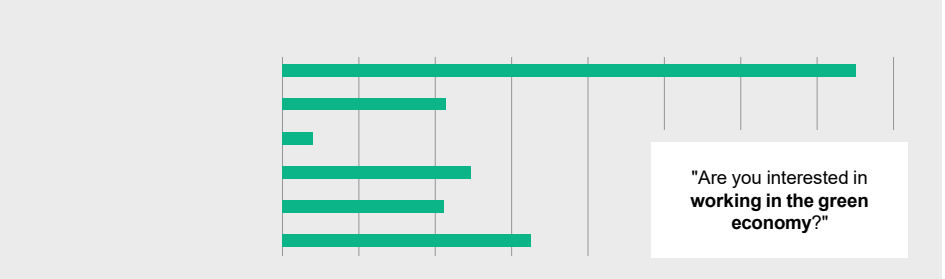
Most people, including those who are currently underrepresented in green careers, are interested in working in the green economy. (3.2)

- As shown in Table 10, people are interested in higher paying jobs that offer the potential to learn, help their communities and the environment.
- As shown in Chart 11, over three quarters of RABA survey respondents said they were interested, open to, or already working in the green economy.
- Of RABA survey respondents, 13% already worked in or were actively planning to work in the green economy, 42% were interested and open to it, and 22% said they wanted more information.
- RABA survey respondents from low-income communities of color and renters, groups that have received less benefits from NYSERDA, are more likely to want to work in the green economy.

Table 10. Green Jobs Motivators[178]

How much would the following encourage/enable you to participate in a green jobs training program? (1-5 scale)	
Possibility of earning better wages and benefits	4.7
Learning new skills	4.6
Doing work that helps my community and the environment	4.5
Stipend (payment) for participation	4.5
Hearing positive experiences from people who completed the program	4.4
Online option (no in-person requirement)	4.3
Someone I trust recommending the program	4.3
Free childcare during the program	3.4

Chart 12. Interest in the Green Economy[179]



- Black, Hispanic, and Asian respondents were open to working in a wider array of green economy sectors, including the more technical and manual labor-intensive sectors.[175]
- Focus group participants felt more excited about clean energy jobs than other jobs that they mentioned being available to them (retail, restaurants, home health care, etc.).[176]
- This enthusiasm extends to job training programs: 72% of RABA survey respondents were interested in formal green economy job training. Younger people and renters were particularly interested in green jobs training.[177]

The clean energy sector has the potential to diversify significantly by including more women, people of color, and other underrepresented groups. (3.3)

Green industries are expanding rapidly in the region. (3.4)

- The green economy is growing faster than the overall economy in NYS.[180]
- Major government policies and legislation such as the IRA and Local Law 97 are accelerating growth.[181]
- Offshore wind, which is being planned for the Arthur Kill Terminals, promises to bring thousands of jobs to Staten Island.[182] Solar and building decarbonization are also growing quickly throughout the city.[183]

There are opportunities to expand existing training programs and create new ones that are more inclusive and accessible. (3.5)

- Leveraging community-based organizations for outreach and training can enhance participation from marginalized communities.
- Programs that integrate wraparound services (e.g., childcare, transportation, stipends) can help overcome participation barriers.

3. Opportunities for Community Campaign Adoption

Communications channels outside of existing NYSERDA and private sector marketing offer opportunities to increase the reach and effectiveness of outreach. (1.1)

- Existing trusted CBOs in Queens and Staten Island that have their own audiences and can be outreach partners, and many are interested in getting more involved in environmental issues.[184]
- Some local elected officials have been champions of the green economy and have strong local networks.[185]
- Word of mouth, especially from within one's own community, is a powerful motivator. In the RABA survey, 56% of respondents said they often turn to personal networks for important information.[186]

Queens & Staten Island homeowners are very diverse. Black, Asian, Hispanic, and NHPI homeownership rates are higher in Queens and Staten Island than at the City and State level. Home retrofits have the potential to advance racial and housing justice outcomes. (2.2)

4. Opportunities for Engaging Partners

There are synergies between existing housing and financial counseling programs and clean energy advising. (4.1)

- Housing and financial counseling can help people understand what they can afford and create a plan for how to pay for upgrades.[187]

Educational institutions are creating pathways into the green economy that the Hub can connect to. (4.2)

- CUNY's LaGuardia Community College (in Queens) and the College of Staten Island are investing in offshore wind and other green economy training programs.[188]

VI. Recommendations

This chapter presents recommendations for the Queens/Staten Island Hub, NYSERDA, and other agencies to pursue in response to RABA findings. The recommendations are organized on a timeline:

A. Short term: recommendations for the coming year, through mid-2025

B. Medium term: recommendations for the remainder of this Hub contract, through mid-2026

C. Long term: recommendations stretching beyond the end of this Hub contract

A. Short Term

• Residential Program Adoption

Create a consumer-facing NY State Clean Energy Hubs website that offers centralized information about the types of programs and technologies available in the state and directs to individual Hubs' websites. When necessary, work with Hubs to create their own standalone websites. (Implementers: NYSERDA, Hub)

- The current NYSERDA website lacks resources to help people learn about technology options, and information on incentive programs is buried in a drop down. Also, many people do not know about NYSERDA, and thus do not know to look at its website.
- NY State Energy Advisor only lists some programs and its quiz format, while helpful in some contexts, presents a barrier to finding information in others.

Ensure that energy advisors are provided the tools to offer helpful and timely assistance and stay on top of programs by investing in robust, continuous training. (Implementers: NYSERDA, Hub)

Create communications materials that explain how programs work in easy to understand, graphical ways, like timelines, checklists, etc. Use a mix of outreach methods to reach different audiences. (Implementers: NYSERDA, Hub)

- The RABA survey found that social media reaches more young people and renters. Community events reach more low-income people and people of color. People with lower levels of formal education are more likely to attend religious services.[189]

Launch a campaign to combat misinformation and scams surrounding clean energy upgrades, including solar scams. Work with the Hubs to identify and punish scammers and companies with bad business practices. (Implementers: NYSERDA, Hub)

Support Hubs in building relationships with local contractors. Vet and update lists of contractors working in certain programs/geographies more thoroughly and frequently to ensure that they are accurate. (Implementers: NYSERDA, utilities, Hub)

Support and train contractors on how to navigate rebate/incentive program processes, and about the opportunities of working in DACs. Focus on expanding the number of contractors working in Queens and Staten Island DACs. (Implementerss: NYSERDA, Hub)

Utilize new revenue sources like the IRA and Cap & Invest to make incentives for home upgrades more generous, especially for LMI residents: provide larger incentives, more grants, less loans, and less stringent eligibility criteria. (Implementer: NYSERDA)

- Make it easier to qualify for measures like HEAR heat pump funds, which currently has restrictive criteria making it difficult for many interested LMI homeowners to qualify.

Work with Hubs to develop a strategy for assisting renters and helping them access programs available to them. (Implementers: NYSERDA, Hub, NYS Homes and Community Renewal (HCR), NYC Department of Housing Preservation and Development (HPD))

- Possibilities: engage small landlords, helping them make upgrades while ensuring tenants also benefit. Create a toolkit and support for tenants organizing to get their landlord to make changes.

Make program applications more user friendly and accessible to people with limited tech access or knowledge. Design forms in plain language and reduce paperwork burden where possible. Ensure that people can fill out on their

phones. Be able to assist people with a computer, scanner, and tech support at Hub organization offices. Field test with Hub partners. (Implementers: NYSERDA, Hub)

• Participating in Workforce

Build relationships with major green workforce organizations and employers citywide to offer wider workforce options beyond Queens and Staten Island. (Implementers: NYSERDA, Hub)

Identify, build awareness, and make referrals to existing training programs that meet employers' needs, with a focus on those that provide wraparound services like a stipend, necessary tools, transportation, childcare, and food. (Implementers: NYSERDA, Hub)

Support the Hub in hosting green career fairs and career exploration workshops that incorporate certifications/training programs. (Implementers: NYSERDA, Hub)

Continue to support and expand initiatives to increase the participation of women, people of color, and other underrepresented groups in the clean energy workforce. Create mentorship and support networks to retain and advance underrepresented workers in the green economy. (Implementers: NYSERDA, Hub)

• Community Campaign Implementation

Launch targeted awareness campaigns to promote the Hubs, residential incentive programs available to LMI households, and career opportunities in the clean energy sector. Target marketing in DACs. (Implementer: NYSERDA)

- There is currently very limited knowledge of these programs. Only 12% of RABA survey respondents had heard of EmPower+.[190]
- Partner with trusted community organizations to disseminate information and build interest.

Significantly increase monetary investment and staffing for multilingual outreach and translation services that are available for Hub organizations to utilize, not just for marketing but also for providing all Hub services. Utilize a trans-language approach, in which programs are provided entirely in other languages rather than being translated from English.[191] (Implementers: NYSERDA, Hub)

- In Queens and Staten Island, Spanish, South Asian languages, and Chinese are the most spoken languages.[192]
- NYC government translates materials into 11 languages.[193]

Co-brand the Hub with the existing, trusted CBOs that are a part of it and emphasize their role in its activities and programs. (Implementers: Hub)

Harness word of mouth and cultivate trusted messengers: document and highlight DAC community members' positive experiences with home upgrades and green jobs through events, building tours, etc. Compensate these community members for their help. (Implementers: NYSERDA, Hub)

Meet people at the events and locations they already visit (e.g. street fairs, religious services, schools, community centers, hair salons, parks, bodegas). (Implementer: Hub)

Support the Hub in offering incentives to those who attend Hub events, like free food, money, giveaways, games, and child care. (Implementers: NYSERDA, Hub)

Conduct in person program intakes at Hub events. (Implementers: Hub)

• Engaging Partners

Continue to build a network of partners to amplify the Hub's reach: make connections between climate, housing, and workforce organizations. Cultivate a referral network in which clients are directed to other organizations to access wraparound services, and those organizations refer to the Hub for the services it provides. (Implementes: Hub)

Partner with culturally embedded CBOs when designing and conducting outreach campaigns to ensure that a diverse variety of audiences are engaged. (Implementers: NYSERDA, Hub)

B. Medium Term

• Residential Program Adoption

Overhaul community solar: expand it, improve its cost saving benefits, work out kinks with utilities applying credits, and automatically enroll and notify batches of LMI renters. (Implementers: NYSERDA, utilities)

Use 80% AMI to define low-income for all NYSERDA programs, including to define eligibility for the EmPower+ low-income incentive, to reflect differences in cost of living across the state and match the federal IRA definition.[194] **Increase funding for EmPower+, Affordable Solar programs to reflect expanded eligible population.** (Implementer: NYSERDA)

Identify ways to dramatically expand access to funding for structural/health and safety repairs in 1-4 unit buildings that are necessary to go along with LMI home energy upgrades. (Implementers: NYSERDA, HCR, HPD, NYS Department of Health (DOH), NYC Department of Health and Mental Hygiene (DOHMH))
Possibilities:

- Expand EmPower+ to directly cover these repairs.
- Dramatically expand HPD's HomeFix so that it is a year-round, adequately funded program.
- Launch a new statewide program to cover these repairs open to anyone eligible for EmPower+.

AHC's RESTORE program could serve as a model. It offers up to $20,000 in grants for home repairs to elderly homeowners making less than 100% AMI.[195] **An expanded version could serve homeowners of all ages.**

- An estimated 42% of owner-occupied housing units in NYC have at least one maintenance problem.[196] Many of these units could be expected to benefit from such a program.

Work with Hubs to codesign more programs allowing renters to benefit from the clean energy economy. Examples could include helping renters get induction stoves and energy efficient appliances, better engaging landlords and helping residents do the same. (Implementers: NYSERDA, HCR, HPD, DOH, DOHMH)

Address the problem of electrification increasing renters' utility costs by reforming utility rate structures or creating a new energy affordability program for renters living in electrified units. (Implementers: NYSERDA, utilities, Department of Public Service (DPS), Public Service Commission (PSC))

Explore ways to prequalify more residents to LMI programs. (Implementers: NYSERDA, Office of Temporary Disability Assistance (OTDA), NYS Human Resources Administration (HRA))

- Bring back and expand geo-eligibility programs to cover residents of DACs.
- Coordinate with agencies administering low-income benefits programs to prequalify and notify recipients to EmPower+.

Increase transparency around how much customers can expect energy upgrades to cost, how much incentive they will qualify for, and how much they can expect to pay out of pocket. (Implementers: NYSERDA, Hub)

- Work with Hubs to gather and publicize information about typical pricing for popular upgrades in different areas of the state.
- Make qualifying criteria and caveats for incentives like HEAR rebates, nonrefundable federal tax credits clearer.

• Participating in Workforce

Work with Hubs to launch a public awareness campaign to educate communities about what the green economy is, combat misconceptions, showcase the breadth of opportunities, highlight success stories, explain the importance of green jobs for the environment and economy, and demystify paths to entering these careers. (Implementers: NYSERDA, Hub)

Work with clean energy employers and workforce development programs to establish robust follow-up systems to track the hiring, retention, and advancement of priority populations, as well as the career progression of participants in certification and training initiatives. (Implementer: NYSERDA)

Collaborate with local educational institutions to create seamless pathways from education to employment in the green economy. Engage employers in the development of training curricula to ensure alignment with industry needs. (Implementers: NYSERDA, Hub)

Develop and fund new training programs that are accessible to low-income and marginalized communities. Ensure that training programs offer certifications and skills that match the needs of green energy employers. (Implementers: NYSERDA, Hub, EDC)

Expand support services for trainees. Provide wraparound services, such as childcare, transportation, and stipends, to reduce barriers to participation in training programs. (Implementers: NYSERDA, Hub, EDC)

• Community Campaign Implementation

Explore using community campaign funding to address specific localized problems. (Implementer: Hub) Ideas:

- Offer free necessary structural/health and safety repairs in cases where these are necessary before efficiency upgrades.
- Take advantage of uniform building characteristics in particular areas to access economies of scale through bulk purchasing, standardization. Test this model in NYC's densely populated neighborhoods.
- Connect resilience and sustainability: provide special outreach, assistance, and funding to customers after natural disasters.

• Engaging Partners

Explore ways to streamline the processes by which green economy businesses and contractors interact with NYSERDA. Offer extra assistance with administrative burden to smaller/MWBE businesses without as much experience navigating government programs. (Implementers: NYSERDA, Hub)

Educate non-green economy businesses from underrepresented communities about how to get involved in the green economy, available certifications, and benefits of doing so. (Implementers: NYSERDA, Hub)

C. Long Term

• Residential Program Adoption

Create more programs that center and integrate resilience in response to escalating climate threats. Examples include programs that integrate batteries and solar, moving equipment out of basements, give economic incentive to those who have gone through a natural disaster. (Implementers: NYSERDA, HCR, HPD)

• Participating in Workforce

Devote more resources to workforce development in the next iteration of the Hubs, and shift the focus of workforce development work more towards supporting workers, especially from underrepresented communities, as opposed to employers. (Implementer: NYSERDA)

Foster ongoing collaboration between training providers, employers, and policymakers to address evolving workforce needs. Promote industry standards and certifications that ensure high-quality training and job readiness. (Implementers: NYSERDA, HCR, ECD)

Conduct deeper research on the current and future green economy in NYC, such as sector specific analyses, to become an authority on green workforce issues. (Implementers: NYSERDA, Hub)

Focus on resilience and adaptability. Prepare the workforce for the evolving demands of the green economy, including emerging technologies and changing regulations. Also, support continuous learning and professional development opportunities for green energy workers. (Implementers: NYSERDA, HCR, ECD)

• Community Campaign Implementation

Learn from the Hubs about the unique qualities of their communities, including ethnically and linguistically diverse communities, and tailor programs and outreach in response. (Implementers: NYSERDA, Hub)

In the next round of Hub contracts, provide Hubs, especially those covering very populous regions, with significantly more funding to expand the number of energy advisors and community campaigns. (Implementers: NYSERDA, Hub)

- Tie Hub funding to achieve a target number of energy advisors based on each region's LMI population. Consult with Hubs to determine appropriate targets.

• Engaging Partners

Build relationships with and support unions/organizing in the green economy to ensure that green jobs continue to be good livable jobs. (Implementers: NYSERDA, Hub)

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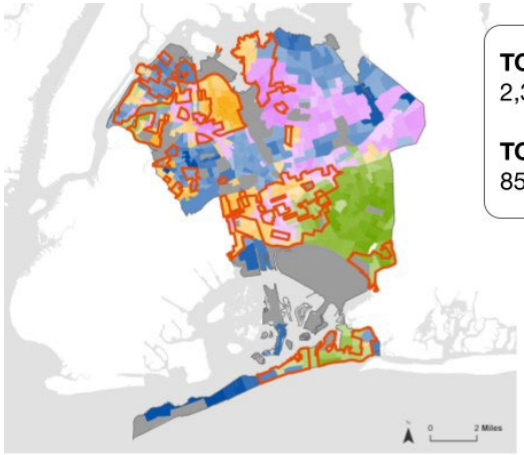
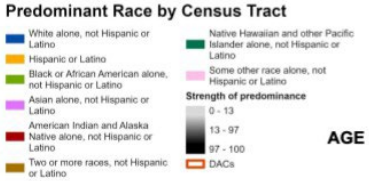
Appendix A
Complete Sociodemographic Data

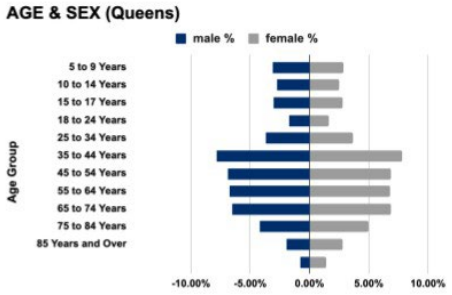
QUEENS: OVERVIEW



TOTAL POPULATION [1]
2,393,104

TOTAL POPULATION DAC [1,2]
850,109





[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

RACE & ETHNICITY [1]

Race*	DACs	Queens	NYC	NYS
White	26.8%	33.6%	39.8%	60.7%
Black or African American	17.5%	17.8%	23.4%	15.2%
American Indian and Alaska Native	0.7%	0.6%	0.5%	0.4%
Asian	23.9%	25.8%	14.3%	8.7%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%	0.1%	0.1%
Some Other Race	22.5%	14.6%	14.9%	9.0%
Two or More Races	8.5%	7.6%	7.1%	6.0%

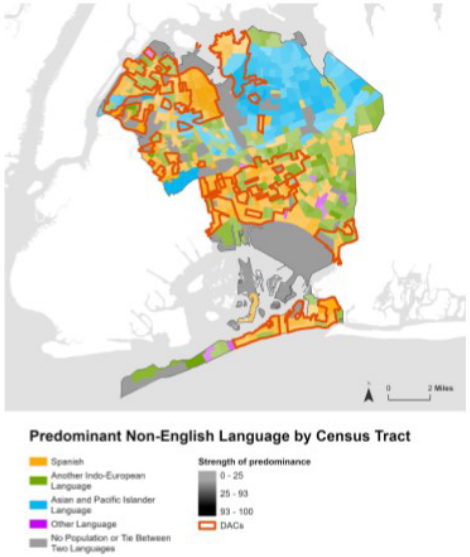
*Categories are mutually exclusive

Ethnicity**	DACs	Queens	NYC	NYS
Hispanic or Latino	39.2%	27.9%	28.9%	19.3%
White Alone	*11.4%*	*9.0%*	*7.8%*	*6.1%*
Black or African American Alone	*1.3%*	*1.0%*	*2.3%*	*1.3%*
American Indian and Alaska Native Alone	*0.4%*	*0.3%*	*0.4%*	*0.2%*
Asian Alone	*0.3%*	*0.2%*	*0.1%*	*0.1%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*20.0%*	*12.7%*	*13.9%*	*8.3%*
Two or More Races	*5.9%*	*4.8%*	*4.4%*	*3.3%*
Not Hispanic or Latino	60.8%	72.1%	71.1%	80.8%
White Alone	*15.5%*	*24.6%*	*31.9%*	*54.7%*
Black or African American Alone	*16.2%*	*16.8%*	*21.1%*	*13.9%*
American Indian and Alaska Native Alone	*0.3%*	*0.3%*	*0.2%*	*0.2%*
Asian Alone	*23.6%*	*25.6%*	*14.1%*	*8.6%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*2.6%*	*2.0%*	*1.0%*	*0.7%*
Two or More Races	*2.6%*	*2.8%*	*2.7%*	*2.7%*

**Categories are mutually exclusive

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE SPOKEN AT HOME; FOREIGN-BORN POPULATION [1]



Immigration stats link

% Foreign-born (QN)[1]
47.0%

% Foreign-born (DAC) [1,2]
50.4%

% Foreign-born w/ citizenship status (QN)[1]
58.5% (as percent of foreign-born pop.)

% Foreign-born w/ Citizenship status (DAC) [1,2]
51.6% (as percent of foreign-born pop.)

Language Spoken at Home (Population 5+)	DACs	Queens	NYC	NYS
Speak Only English	39.3%	44.8%	52.1%	69.5%
Spanish	34.2%	23.4%	23.5%	14.8%
French, Haitian, Or Cajun	1.2%	1.7%	2.3%	1.5%
German Or Other West Germanic Languages	0.3%	0.3%	1.5%	1.3%
Russian, Polish, Or Other Slavic Languages	1.8%	3.3%	3.6%	2.1%
Other Indo-European Languages	10.7%	10.0%	5.5%	3.9%
Korean	0.9%	1.8%	0.8%	0.5%
Chinese (Incl. Mandarin, Cantonese)	7.1%	9.4%	6.1%	3.2%
Vietnamese	0.1%	0.2%	0.1%	0.1%
Tagalog (Incl. Filipino)	1.3%	1.5%	0.6%	0.4%
Other Asian And Pacific Island Languages	1.3%	1.7%	1.1%	0.9%
Arabic	0.9%	0.8%	0.9%	0.6%
Other And Unspecified Languages	0.8%	1.1%	1.9%	1.2%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE SPOKEN AT HOME [1]

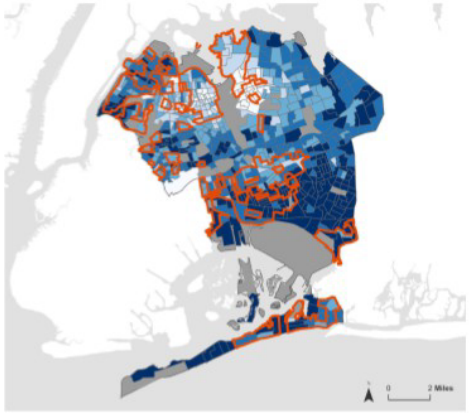
Language Spoken at Home: Total Number of Speakers (Population 5+)	DACs	Queens	NYC	NYS
Speak Only English	312,306	1,008,620	4,271,921.00	13,177,639.00
Spanish	272,079	525,964	1,923,155.00	2,801,677.00
French, Haitian, Or Cajun	9,836	37,591	185,662.00	280,169.00
German Or Other West Germanic Languages	2,377	7,074	125,911.00	252,986.00
Russian, Polish, Or Other Slavic Languages	14,061	74,781	292,422.00	397,510.00
Other Indo-European Languages	85,062	225,941	449,051.00	744,335.00
Korean	7,360	41,446	62,803.00	91,014.00
Chinese (Incl. Mandarin, Cantonese)	56,763	210,645	500,659.00	600,113.00
Vietnamese	842	3,538	11,046.00	22,710.00
Tagalog (Incl. Filipino)	10,181	33,648	49,292.00	76,783.00
Other Asian And Pacific Island Languages	10,655	38,270	87,729.00	173,537.00
Arabic	7,435	18,194	75,392.00	115,658.00
Other And Unspecified Languages	6,373	23,741	157,567.00	226,238.00

Top non-English languages in DACs *(~10,000 speakers above age 5)*:

1. **Spanish**: *272,079 speakers*
2. **Other Indo-European Languages (incl. South Asian languages, some European languages)**: *85,062 speakers*
3. **Chinese (incl. Mandarin, Cantonese)**: *56,763 speakers*
4. **Russian, Polish, or Other Slavic Languages**: *14,061 speakers*
5. **Tagalog (Incl. Filipino)**: *10,181 speakers*
6. **Other AAPI Languages (incl. Many East/Southeast Asian languages other than Chinese, Vietnamese, Korean, Tagalog)**: *10,655*

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

HOUSEHOLD ENGLISH PROFICIENCY [1]



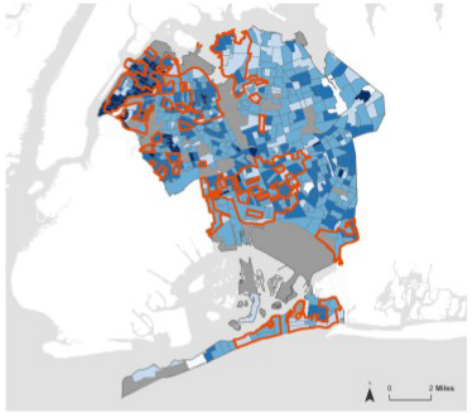
Limited English Proficiency HH (QN)[1]
17.8%

Limited English Proficiency HH (DAC) [1,2]
22.1%

Household Language and English Proficiency by Household					
Household Language	**English Proficiency**	**DACs**	**Queens**	**NYC**	**NYS**
English Only	N/A	37.5%	42.3%	50.6%	68.5%
Spanish	Limited English Speaking Household	**11.1%**	**6.7%**	**6.5%**	**3.6%**
	Not A Limited English Speaking Household	21.7%	16.2%	17.2%	11.2%
Other Indo-European Languages	Limited English Speaking Household	**4.3%**	**4.1%**	**3.6%**	**2.0%**
	Not A Limited English Speaking Household	10.8%	12.8%	10.5%	7.8%
Asian And Pacific Island Languages	Limited English Speaking Household	**6.3%**	**6.7%**	**3.4%**	**1.7%**
	Not A Limited English Speaking Household	6.3%	9.1%	5.4%	3.4%
Other Languages	Limited English Speaking Household	**0.4%**	**0.3%**	**0.4%**	**0.3%**
	Not A Limited English Speaking Household	1.7%	1.8%	2.4%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



Labor Participation (QN)[1]
63.9%

Labor Participation (DAC) [1,2]
63.9%

NYC
63.4%

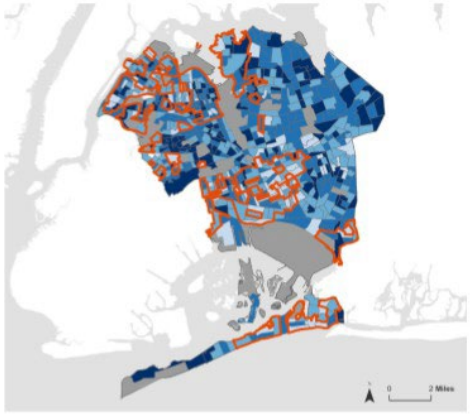
NYS
63.1%

Labor Participation Rate *by Race or Ethnicity*				
Race or Ethnicity		**Queens**	**NYC**	**NYS**
Race	White alone	**61.7%**	**65.0%**	**63.1%**
	Black or African American alone	**64.4%**	**60.6%**	**61.1%**
	American Indian and Alaska Native alone	**68.6%**	**62.9%**	**58.9%**
	Asian alone	**63.7%**	**64.2%**	**64.2%**
	Native Hawaiian and Other Pacific Islander alone	**66.8%**	**65.0%**	**63.8%**
	Some other race alone	**67.8%**	**61.7%**	**63.4%**
	Two or more races	**65.5%**	**65.4%**	**66.6%**
Ethnicity	Hispanic or Latino origin (of any race)	**67.2%**	**62.1%**	**64.2%**
	White alone, not Hispanic or Latino	**60.2%**	**65.8%**	**62.9%**

* **Labor participation** refers to people in the workforce who are either working or actively looking for work; **unemployment** refers to people who are actively seeking work and are unemployed ("labor participation" is the denominator)

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



Unemployment Rate (QN)[1]
7.0%

Unemployment Rate (DAC) [1,2]
8.0%

NYC
7.5%

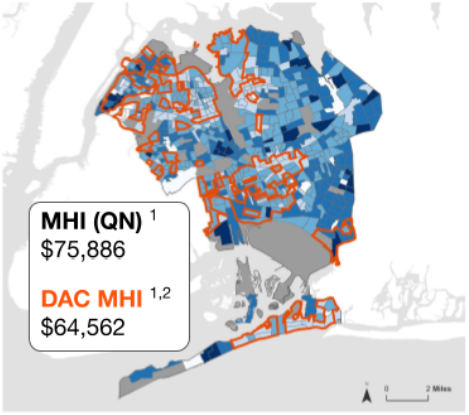
NYS
6.2%

Unemployment Rate for the Pop. 16+ *by Race or Ethnicity*					
Race or Ethnicity		**DACs**	**Queens**	**NYC**	**NYS**
Race	White Alone	6.5%	5.9%	5.5%	5.0%
	Black or African American Alone	11.5%	8.8%	9.7%	9.2%
	American Indian or Alaska Native Alone	4.2%	5.9%	10.0%	9.2%
	Asian Alone	6.7%	6.0%	6.1%	5.7%
	Native Hawaiian or Pacific Islander Alone	0.0%*	10.2%	15.5%	12.0%
	Some Other Race Alone	7.9%	7.6%	10.0%	9.0%
	Two or More Races Alone	9.8%	9.4%	10.0%	9.0%
Ethnicity	Hispanic or Latino	7.3%	7.3%	9.3%	8.3%
	White Alone, Not Hispanic or Latino	7.6%	6.1%	5.3%	4.9%

* Very small population of NHPI in DACs

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

MEDIAN HOUSEHOLD INCOME [3]



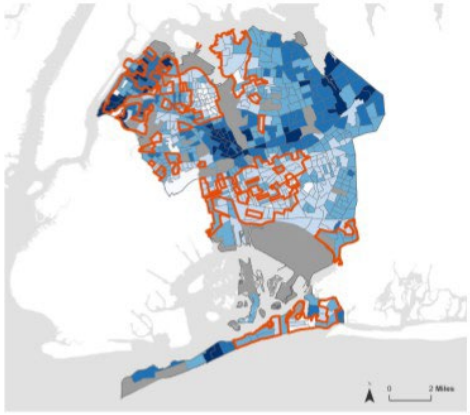
MHI (QN) [1]
$75,886

DAC MHI [1,2]
$64,562

Median Household Income *by Race or Ethnicity*					
Race or Ethnicity		**DACs**	**Queens**	**NYC**	**NYS**
Race	White Alone Householder	$70,434	$82,668	$93,105	$83,877
	Black or African American Alone Householder	$55,997	$74,726	$53,095	$53,697
	American Indian and Alaska Native Alone Householder	$62,521	$68,543	$52,801	$50,731
	Asian Alone Householder	$64,828	$73,580	$76,634	$83,399
	Native Hawaiian and Other Pacific Islander Alone Householder	$48,499	$116,985	$46,009	$49,528
	Some Other Race Alone Householder	$62,935	$66,132	$45,336	$49,838
	Two or More Races Householder	$66,683	$75,963	$65,288	$68,158
Ethnicity	Hispanic or Latino Householder	$61,051	$66,470	$49,189	$55,621
	White Alone Householder, Not Hispanic or Latino	$78,608	$86,784	$102,633	$85,520

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023
[3] NYSERDA RABA Data Visualization Tool, 2023

EDUCATIONAL ATTAINMENT



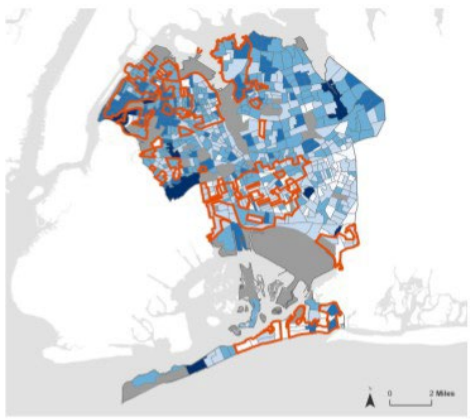
% Bachelor's or Higher (QN)[1]
33.9%

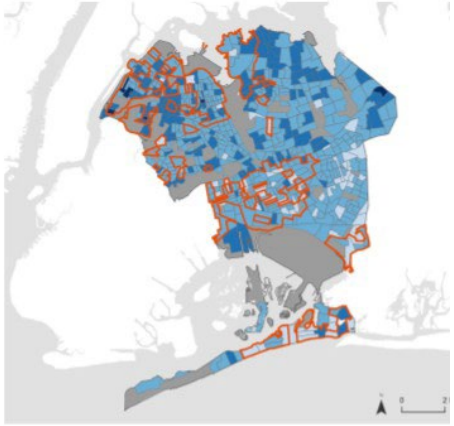
% Bachelor's or Higher (DAC) [1,2]
26.2%

Educational Attainment Level (Ages 25+)	DACs	Queens	NYC	NYS
Less than High School	22.9%	17.3%	16.8%	12.6%
High School Graduate or More (Includes Equivalency)	77.1%	82.7%	83.2%	87.4%
Some College or More	47.0%	56.0%	59.6%	62.2%
Bachelor's Degree or More	26.2%	33.9%	39.6%	38.1%
Master's Degree or More	9.0%	12.9%	16.7%	16.8%
Professional School Degree or More	2.0%	3.2%	4.9%	4.7%
Doctorate Degree	0.7%	1.1%	1.6%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

TRAVEL TIME TO WORK





Travel Time to Work (for workers 16+)	DACs	Queens	NYC	NYS
< 5 min.	1.0%	0.8%	1.1%	2.4%
5 - 14 min.	7.3%	7.3%	8.1%	17.5%
15 - 29 min.	16.2%	18.0%	20.6%	29.4%
30 - 44 min.	27.0%	26.2%	27.1%	22.1%
45 - 59 min.	17.6%	17.2%	16.3%	11.0%
60 - 89 min.	21.9%	21.5%	19.2%	12.1%
90+ min.	9.1%	9.1%	7.6%	5.7%
Average Commute Time	44 min.	44 min.	41 min.	33 min.

Average Commute Time (QN) [1]
44 min.

Average Commute Time (DAC)
44 min.

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

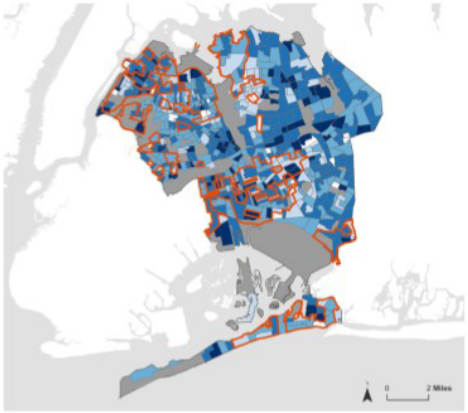
MEANS OF TRANSPORTATION & VEHICLE ACCESS

Means of Transport to Work (for workers 16+)	DACs	Queens	NYC	NYS
Car, Truck, or Van	32.6%	38.9%	26.8%	57.6%
Drove Alone	*26.9%*	*32.8%*	*22.4%*	*51.4%*
Carpooled	*5.6%*	*6.1%*	*4.4%*	*6.3%*
Public Transportation (Includes Taxicab)	*52.2%*	*46.1%*	*50.8%*	*25.4%*
Motorcycle	0.1%	0.1%	0.1%	0.1%
Bicycle	0.9%	0.6%	1.4%	0.7%
Walked	7.2%	5.8%	9.5%	5.8%
Other Means	0.7%	0.7%	0.9%	0.8%
Worked At Home	6.4%	7.8%	10.7%	9.5%

Vehicle Access by Household (Occupied)	DACs	Queens	NYC	NYS
No Vehicle Available	46.0%	36.7%	54.5%	28.9%
1 Vehicle Available	37.5%	40.3%	32.0%	32.8%
2 Vehicles Available	12.1%	17.2%	10.3%	25.8%
3 Vehicles Available	3.3%	4.5%	2.5%	8.6%
4 Vehicles Available	0.8%	1.1%	0.6%	2.8%
5 or More Vehicles Available	0.3%	0.3%	0.2%	1.1%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

INTERNET ACCESS [1]



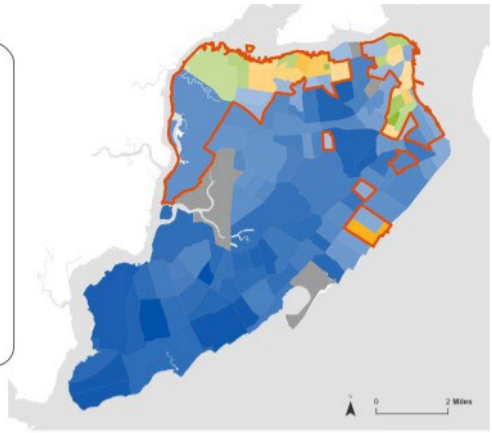
Internet Access by Household	DACs	Queens	NYC	NYS
With An Internet Subscription	85.6%	87.8%	86.3%	87.1%
Dial-Up Alone	*0.2%*	*0.2%*	*0.2%*	*0.2%*
Broadband (such As Cable, Fiber Optic, or DSL)	*69.7%*	*72.3%*	*72.9%*	*74.7%*
Satellite Internet Service	*4.1%*	*3.9%*	*3.7%*	*4.0%*
Other Service	*1.0%*	*0.8%*	*0.9%*	*0.8%*
Internet Access Without A Subscription	2.6%	1.9%	2.2%	2.4%
No Internet Access	11.8%	10.3%	11.5%	10.5%

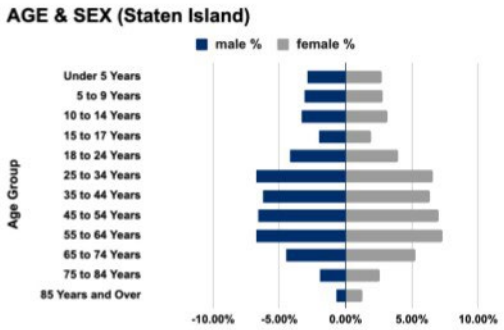
[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

STATEN ISLAND: OVERVIEW

TOTAL POPULATION [1]
493,194

TOTAL POPULATION DAC [1,2]
141,077





[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

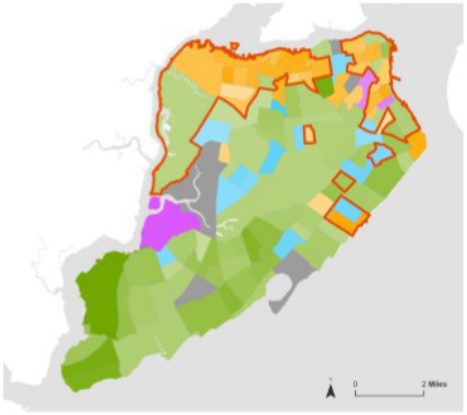
RACE & ETHNICITY

Race	DACs	Staten Island	NYC	NYS
White Alone	44.2%	69.4%	39.8%	60.7%
Black or African American Alone	27.8%	10.1%	23.4%	15.2%
American Indian and Alaska Native Alone	0.5%	0.3%	0.5%	0.4%
Asian Alone	10.8%	10.4%	14.3%	8.7%
Native Hawaiian and Other Pacific Islander Alone	0.1%	0.0%	0.1%	0.1%
Some Other Race Alone	8.2%	4.1%	14.9%	9.0%
Two or More Races	8.4%	5.8%	7.1%	6.0%

Ethnicity	DACs	Staten Island	NYC	NYS
Hispanic or Latino	**31.9%**	**18.4%**	**28.9%**	**19.3%**
White Alone	*14.7%*	*9.7%*	*7.8%*	*6.1%*
Black or African American Alone	*3.0%*	*1.0%*	*2.3%*	*1.3%*
American Indian and Alaska Native Alone	*0.4%*	*0.2%*	*0.4%*	*0.2%*
Asian Alone	*0.1%*	*0.1%*	*0.1%*	*0.1%*
Native Hawaiian and Other Pacific Islander Alone	*0.1%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*8.0%*	*3.9%*	*13.9%*	*8.3%*
Two or More Races	*5.6%*	*3.6%*	*4.4%*	*3.3%*
Not Hispanic or Latino	**68.2%**	**81.6%**	**71.1%**	**80.8%**
White Alone	*29.5%*	*59.6%*	*31.9%*	*54.7%*
Black or African American Alone	*24.8%*	*9.1%*	*21.1%*	*13.9%*
American Indian and Alaska Native Alone	*0.2%*	*0.1%*	*0.2%*	*0.2%*
Asian Alone	*10.7%*	*10.4%*	*14.1%*	*8.6%*
Native Hawaiian and Other Pacific Islander Alone	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Some Other Race Alone	*0.2%*	*0.2%*	*1.0%*	*0.7%*
Two or More Races	*2.8%*	*2.1%*	*2.7%*	*2.7%*

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE SPOKEN AT HOME; FOREIGN-BORN POPULATION [1]



Immigration stats link

% Foreign-born (SI)[1]
24.2%

% Foreign-born (DAC) [1,2]
29.0%

% Foreign-born w/ citizenship status (SI)[1]
67.7% (as percent of foreign-born pop.)

% Foreign-born w/ Citizenship status (DAC) [1,2]
58.5% (as percent of foreign-born pop.)

Language Spoken at Home (Population 5+)	**DACs**	**Staten Island**	**NYC**	**NYS**
Speak Only English	59.0%	66.2%	52.1%	69.5
Spanish	21.1%	10.4%	23.5%	14.8
French, Haitian, Or Cajun	1.1%	0.6%	2.3%	1.5
German Or Other West Germanic Languages	0.1%	0.4%	1.5%	1.3
Russian, Polish, Or Other Slavic Languages	3.8%	6.1%	3.6%	2.1
Other Indo-European Languages	5.2%	5.9%	5.5%	3.9
Korean	0.1%	0.5%	0.8%	0.5
Chinese (Incl. Mandarin, Cantonese)	4.6%	4.8%	6.1%	3.2
Vietnamese	0.1%	0.1%	0.1%	0.1
Tagalog (Incl. Filipino)	0.5%	0.5%	0.6%	0.4
Other Asian And Pacific Island Languages	1.0%	1.2%	1.1%	0.9
Arabic	1.4%	2.1%	0.9%	0.6
Other And Unspecified Languages	2.1%	1.4%	1.9%	1.2

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE SPOKEN AT HOME [1]

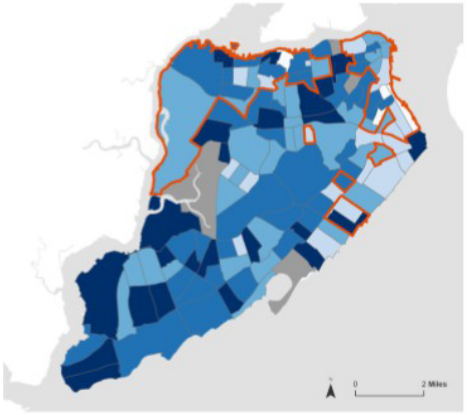
Top non-English languages in DACs *(>5,000 speakers above age 5)*:

1. **Spanish**: *28,044 speakers*
2. **Other Into-European languages (incl. South Asian languages, some European languages)**: *6,845 speakers*
3. **Chinese (incl. Mandarin, Cantonese)**: *6,068 speakers*
4. **Russian, Polish, or other Slavic languages**: *5,014 speakers*

Language Spoken at Home (Population 5+)	**DACs**	**Staten Island**	**NYC**	**NYS**
Speak Only English	78,494	307,934	4,271,921	13,177,639
Spanish	28,044	48,182	1,923,155	2,801,677
French, Haitian, Or Cajun	1,445	2,689	185,662	280,169
German Or Other West Germanic Languages	87	1,785	125,911	252,986
Russian, Polish, Or Other Slavic Languages	5,014	28,357	292,422	397,510
Other Indo-European Languages	6,845	27,610	449,051	744,335
Korean	154	2,286	62,803	91,014
Chinese (Incl. Mandarin, Cantonese)	6,068	22,481	500,659	600,113
Vietnamese	183	363	11,046	22,710
Tagalog (Incl. Filipino)	713	2,289	49,292	76,783
Other Asian And Pacific Island Languages	1,280	5,390	87,729	173,537
Arabic	1,889	9,711	75,392	115,658
Other And Unspecified Languages	2,817	6,440	157,567	226,238

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LANGUAGE SPOKEN AT HOME [1]



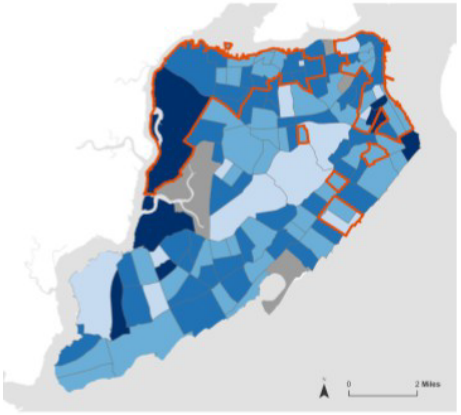
Limited English Proficiency HH (SI)[1]
6.6%

Limited English Proficiency HH (DAC) [1,2]
9.3%

Household Language and English Proficiency by Household (% of Total HH)					
Household Language	**English Proficiency**	**DACs**	**Staten Island**	**NYC**	**NYS**
English Only	N/A	56.5%	63.0%	50.6%	68.5%
Spanish	Limited English Speaking Household	**3.5%**	**1.5%**	**6.5%**	**3.6%**
	Not A Limited English Speaking Household	18.6%	10.4%	17.2%	11.2%
Other Indo-European Languages	Limited English Speaking Household	**3.0%**	**2.8%**	**3.6%**	**2.0%**
	Not A Limited English Speaking Household	8.4%	12.3%	10.5%	7.8%
Asian And Pacific Island Languages	Limited English Speaking Household	**2.6%**	**2.2%**	**3.4%**	**1.7%**
	Not A Limited English Speaking Household	3.3%	4.4%	5.4%	3.4%
Other Languages	Limited English Speaking Household	**0.2%**	**0.1%**	**0.4%**	**0.3%**
	Not A Limited English Speaking Household	3.9%	3.3%	2.4%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



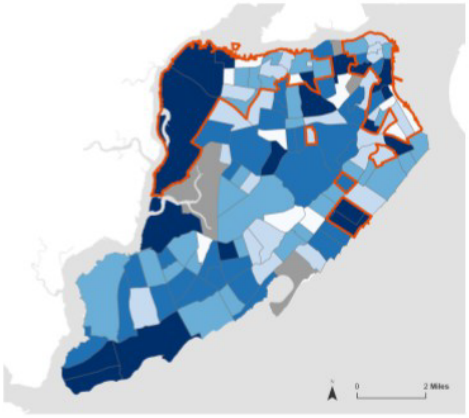
Labor Participation (SI)[1]
59.7%

Labor Participation (DAC) [1,2]
58.8%

Labor Participation Rate *by Race or Ethnicity*				
Race or Ethnicity		**Staten Island**	**NYC**	**NYS**
Race	White alone	58.9%	65.0%	63.1%
	Black or African American alone	61.1%	60.6%	61.1%
	American Indian and Alaska Native alone	59.1%	62.9%	58.9%
	Asian alone	63.2%	64.2%	64.2%
	Native Hawaiian and Other Pacific Islander alone	19.0%	65.0%	63.8%
	Some other race alone	64.6%	61.7%	63.4%
	Two or more races	57.8%	65.4%	66.6%
Ethnicity	Hispanic or Latino origin (of any race)	61.8%	62.1%	64.2%
	White alone, not Hispanic or Latino	58.4%	65.8%	62.9%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

LABOR PARTICIPATION & UNEMPLOYMENT



Unemployment Rate (SI)[1]
3.3%

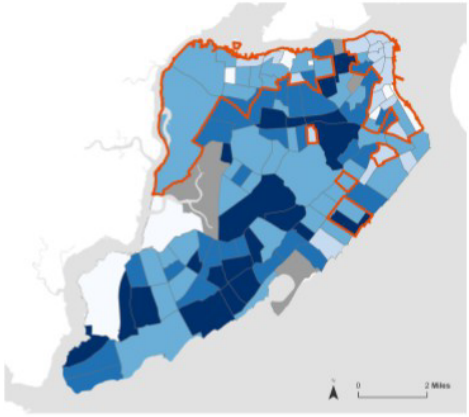
Unemployment Rate (DAC) [1,2]
3.7%

Unemployment Rate for the Pop. 16+ *by Race or Ethnicity*

Race or Ethnicity		DACs	Staten Island	NYC	NYS
Race	White Alone	4.5%	4.9%	5.5%	5.0%
	Black or African American Alone	7.6%	7.2%	9.7%	9.2%
	American Indian or Alaska Native Alone	5.2%	3.3%	10.0%	9.2%
	Asian Alone	7.4%	5.3%	6.1%	5.7%
	Native Hawaiian or Pacific Islander Alone	*0%**	*0%**	15.50%	12.00%
	Some Other Race Alone	6.5%	8.1%	10.0%	9.0%
	Two or More Races Alone	11.2%	8.8%	10.0%	9.0%
Ethnicity	Hispanic or Latino	6.1%	6.5%	9.3%	8.3%
	White Alone, Not Hispanic or Latino	4.8%	4.9%	5.3%	4.9%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

MEDIAN HOUSEHOLD INCOME [3]



MHI (SI) [1]
$89,427

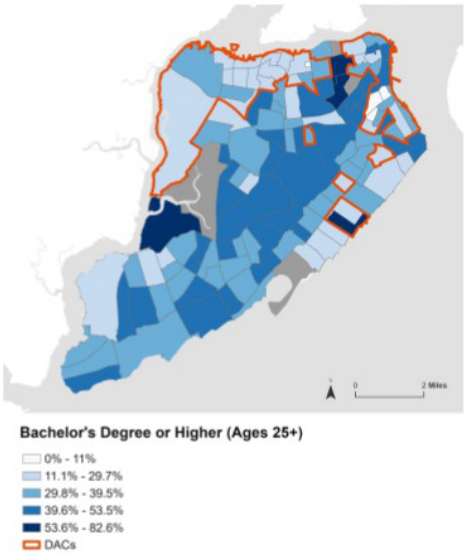
DAC MHI [1,2]
$65,076

Median Household Income by Race or Ethnicity

Race or Ethnicity		DACs	Staten Island	NYC	NYS
Race	White Alone Householder	$71,588	$95,889	$93,105	$83,877
	Black or African American Alone Householder	$53,942	$57,517	$53,095	$53,697
	American Indian and Alaska Native Alone Householder	$64,903	$80,583	$52,801	$50,731
	Asian Alone Householder	$80,737	$87,751	$76,634	$83,399
	Native Hawaiian and Other Pacific Islander Alone Householder	$28,491	*no data*	$46,009	$49,528
	Some Other Race Alone Householder	$51,539	$74,770	$45,336	$49,838
	Two or More Races Householder	$52,445	$72,058	$65,288	$68,158
Ethnicity	Hispanic or Latino Householder	$52,908	$72,303	$49,189	$55,621
	White Alone Householder, Not Hispanic or Latino	$74,833	$98,714	$102,633	$85,520

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023
[3] NYSERDA RABA Data Visualization Tool, 2023

EDUCATIONAL ATTAINMENT



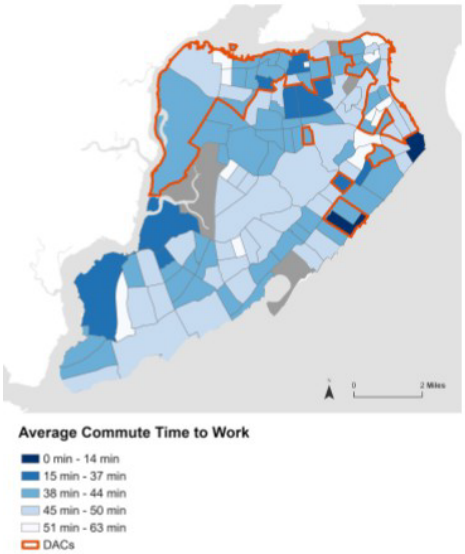
% Bachelor's or Higher (SI)[1]
34.9%

% Bachelor's or Higher (DAC) [1,2]
27.6%

Educational Attainment Level (Ages 25+)	DACs	Staten Island	NYC	NYS
Less than High School	17.8%	11.4%	16.8%	12.6%
High School Graduate or More (Includes Equivalency)	82.2%	88.6%	83.2%	87.4%
Some College or More	50.2%	58.7%	59.6%	62.2%
Bachelor's Degree or More	27.6%	34.9%	39.6%	38.1%
Master's Degree or More	10.3%	13.7%	16.7%	16.8%
Professional School Degree or More	1.9%	3.0%	4.9%	4.7%
Doctorate Degree	0.6%	0.9%	1.6%	1.6%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

TRAVEL TIME TO WORK



Travel Time to Work (for workers 16+)	DACs	Staten Island	NYC	NYS
< 5 min.	1.1%	1.1%	1.1%	2.4%
5 - 14 min.	10.6%	11.0%	8.1%	17.5%
15 - 29 min.	25.5%	24.1%	20.6%	29.4%
30 - 44 min.	17.3%	18.4%	27.1%	22.1%
45 - 59 min.	10.3%	10.6%	16.3%	11.0%
60 - 89 min.	20.4%	20.4%	19.2%	12.1%
90+ min.	14.9%	14.4%	7.6%	5.7%
Average Commute Time	45 min.	45 min.	41 min.	33 min.

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

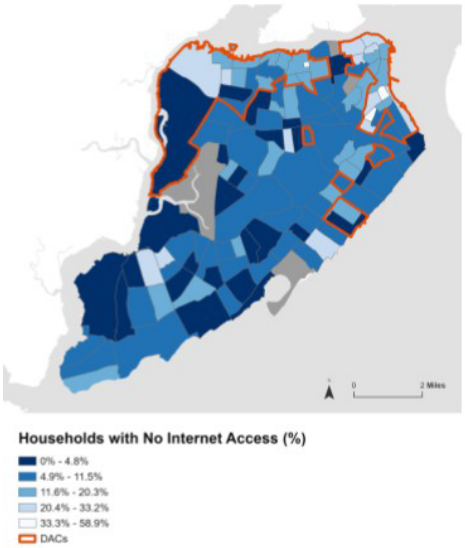
MEANS OF TRANSPORTATION & VEHICLE ACCESS

Means of Transport to Work (16+)	DACs	Staten Island	NYC	NYS
Car, Truck, or Van	52.4%	63.0%	26.8%	57.6%
Drove Alone	*44.5%*	*54.6%*	*22.4%*	*51.4%*
Carpooled	*7.9%*	*8.4%*	*4.4%*	*6.3%*
Public Transportation (Includes Taxicab)	36.8%	26.5%	50.8%	25.4%
Motorcycle	0.1%	0.0%	0.1%	0.1%
Bicycle	0.3%	0.2%	1.4%	0.7%
Walked	3.9%	2.7%	9.5%	5.8%
Other Means	1.4%	0.8%	0.9%	0.8%
Worked At Home	5.1%	7%	10.7%	9.5%

Vehicle Access by Household (Occupied)	DACs	Staten Island	NYC	NYS
No Vehicle Available	29.1%	15.4%	54.5%	28.9%
1 Vehicle Available	39.2%	36.9%	32.0%	32.8%
2 Vehicles Available	23.0%	34.0%	10.3%	25.8%
3 Vehicles Available	6.3%	9.9%	2.5%	8.6%
4 Vehicles Available	2.0%	3.0%	0.6%	2.8%
5 or More Vehicles Available	0.4%	0.9%	0.2%	1.1%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

INTERNET ACCESS [1]

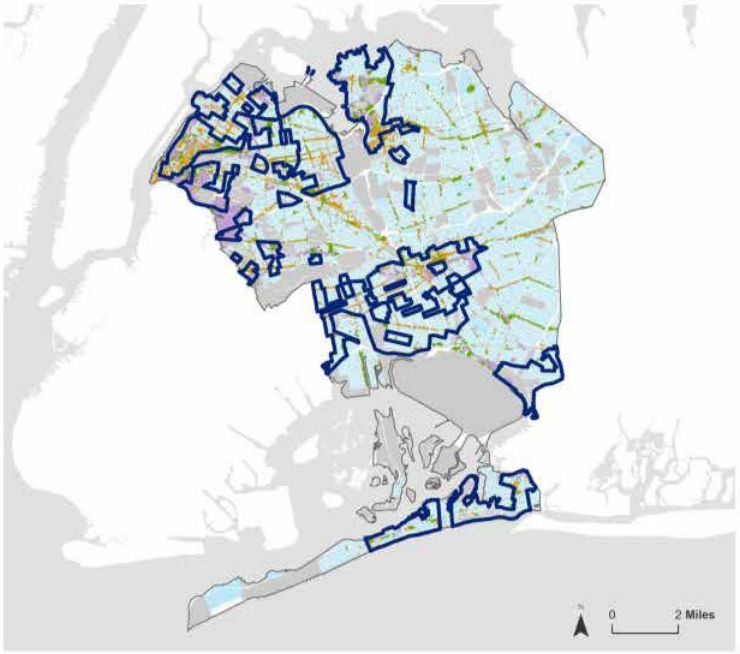


Internet Access by Household	DACs	Staten Island	NYC	NYS
With An Internet Subscription	79.8%	86.3%	86.3%	87.1%
Dial-Up Alone	*0.1%*	*0.4%*	*0.2%*	*0.2%*
Broadband (such As Cable, Fiber Optic, or DSL)	*66.9%*	*75.5%*	*72.9%*	*74.7%*
Satellite Internet Service	*3.6%*	*4.9%*	*3.7%*	*4.0%*
Other Service	*0.7%*	*0.9%*	*0.9%*	*0.8%*
Internet Access Without A Subscription	2.7%	2.5%	2.2%	2.4%
No Internet Access	17.5%	11.2%	11.5%	10.5%

[1] ACS 5-Year Estimates, 2021
[2] NYSERDA Final Disadvantaged Communities, 2023

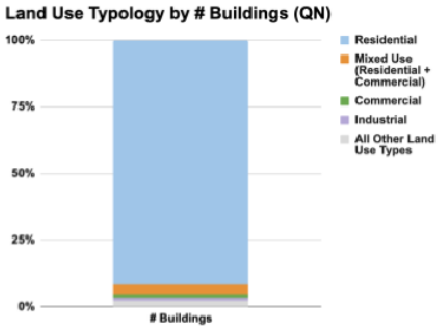
Appendix B
Complete Buildings & Land Use Data

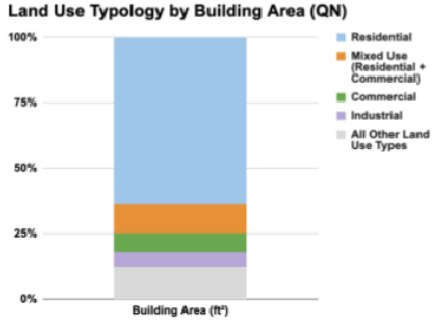
LAND USE [1]



[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

LAND USE (QN): Overall Land Use Typologies [1]



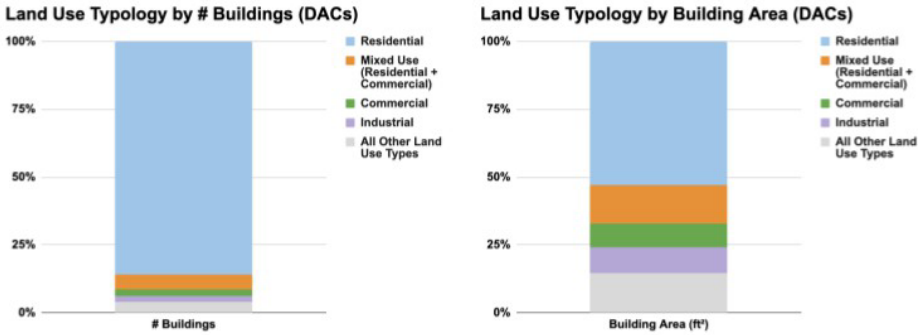


Buildings by Land Use (QN)	# Buildings	% of Total Buildings
Residential*	424,607	91.7%
1-4 Unit	396,132	85.6%
5+ Units	28,404	6.1%
0 Units or Blank	*71*	*0.0%*
Commercial*	6,986	1.5%
Small (>25,000 ft²)	6,194	1.3%
Large (<25,000 ft²)	569	0.1%
0 Commercial sq. ft. or Blank	*223*	*0.0%*
Mixed Use (residential + commercial)*	15,573	3.4%
1-4 Unit (residential)	12,333	2.7%
5+ Units (residential)	2,647	0.6%
0 Units or Blank	*593*	*0.1%*
Industrial	4,248	0.9%
All Other Land Use Types	11,392	2.5%
Total	***462,806***	**--**

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

LAND USE (DACs): Overall Land Use Typologies [1]

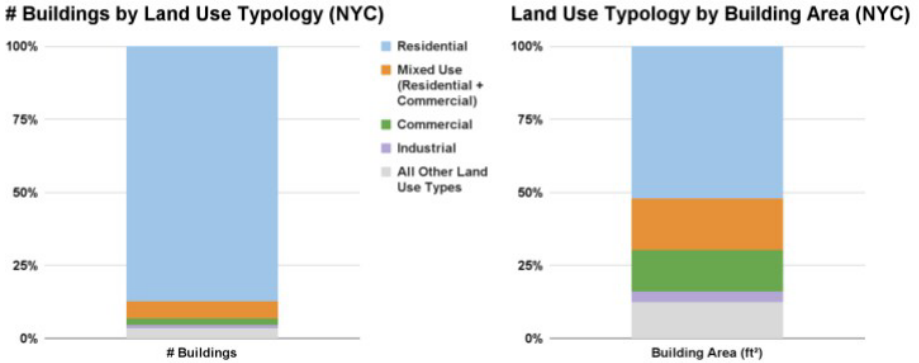


Buildings by Land Use (DACs)	# Buildings	% of Total Buildings
Residential*	106,488	85.9%
1-4 Unit	99,768	80.5%
5+ Units	6,697	5.4%
0 Units or Blank	*23*	*0.0%*
Commercial*	2,823	2.3%
Small (>25,000 ft²)	2,422	2.0%
Large (<25,000 ft²)	262	0.2%
0 Commercial sq. ft. or Blank	*139*	*0.1%*
Mixed Use (residential + commercial)*	6,913	5.6%
1-4 Unit (residential)	5,226	4.2%
5+ Units (residential)	1,380	1.1%
0 Units or Blank	*307*	*0.2%*
Industrial	2,899	2.3%
All Other Land Use Types	4,780	3.9%
Total	***123,903***	--

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

LAND USE (NYC): Overall Land Use Typologies [1]



Buildings by Land Use (NYC)	# Buildings	% of Total Buildings
Residential*	949,437	87.2%
1-4 Unit	860,466	79.0%
5+ Units	88,754	8.2%
0 Units or Blank	*217*	*0.0%*
Commercial*	23,909	2.2%
Small (>25,000 ft²)	19,328	1.8%
Large (<25,000 ft²)	3,759	0.3%
0 Commercial sq. ft. or Blank	*822*	*0.1%*
Mixed Use (residential + commercial)*	64,608	5.9%
1-4 Unit (residential)	39,544	3.6%
5+ Units (residential)	22,205	2.0%
0 Units or Blank	*2,859*	*0.3%*
Industrial	11,870	1.1%
All Other Land Use Types	39,077	3.6%
Total	***1,088,901***	--

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

LAND USE: Residential Land Use Typologies by # of Residential Units [1]

Queens

Residential Land Use Typology	# Total Residential Units	% Total Residential Units in QN
1-4 Units	**450,359**	**51.6%**
"Residential" LU	428,447	49.1%
"Mixed Use" LU	20,953	2.4%
Other LU	*959*	*0.1%*
5+ Units	**422,457**	**48.4%**
"Residential" LU	327,329	37.5%
"Mixed Use" LU	91,374	10.5%
Other LU	*3,754*	*0.4%*
Total Residential Units	***872,816***	--

NYC

Residential Land Use Typology	# Total Residential Units	% Total Residential Units in NYC
1-4 Units	**1,184,033**	**32.5%**
"Residential" LU	1,107,911	30.4%
"Mixed Use" LU	73,125	2.0%
Other LU	*2,997*	*0.1%*
5+ Units	**2,457,491**	**67.5%**
"Residential" LU	1,669,158	45.8%
"Mixed Use" LU	755,871	20.8%
Other LU	*32,462*	*0.9%*
Total Residential Units	***3,641,524***	--

DACs

Residential Land Use Typology	# Total Residential Units in DACs	% Total Residential Units in DACs	% Total Residential Units in QN
1-4 Units	**143,477**	**46.6%**	**16.4%**
"Residential" LU	133,733	43.4%	15.3%
"Mixed Use" LU	9,330	3.0%	1.1%
Other LU	*414*	*0.1%*	*0.0%*
5+ Units	**164,690**	**53.4%**	**18.9%**
"Residential" LU	116,449	37.8%	13.3%
"Mixed Use" LU	46,772	15.2%	5.4%
Other LU	*1,469*	*0.5%*	*0.2%*
Total Residential Units	***308,167***	--	***35.3%***

***35.3%** of residential units are in DACs, **46.6%** of which are in a 1-4 unit building*

[1] NYC DCP (MapPLUTO), 2023

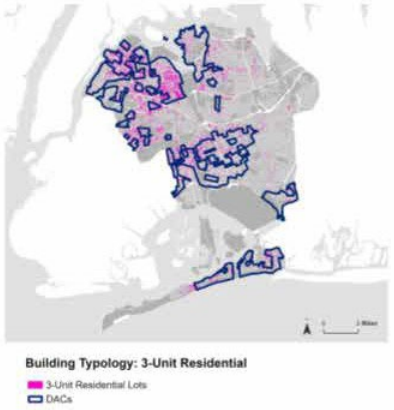
1-4 UNIT RESIDENTIAL BUILDINGS [1]

1-UNIT [1,2]

2-UNIT [1,2]

3-UNIT [1,2]

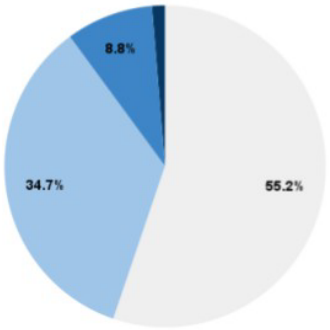
4-UNIT [1,2]



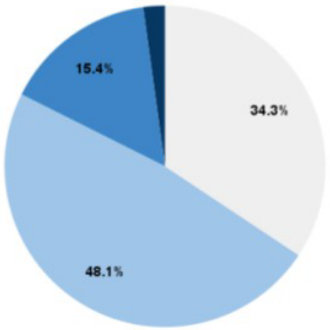
1-4 UNIT RESIDENTIAL BUILDINGS [1]

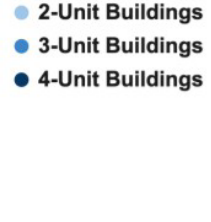
	Queens				DACs			
# Units in Building	# Lots	% of 1-4-Unit Lots	Total # Units	% of All 1-4-Units	# Lots	% of 1-4-Unit Lots	Total # Units	% of All 1-4-Units
1-Unit Buildings	151,466	55.2%			24,751	34.3%		
2-Unit Buildings	95,125	34.7%			34,647	48.1%		
3-Unit Buildings	24,101	8.8%			11,128	15.4%		
4-Unit Buildings	3,607	1.3%			1,576	2.2%		

Queens (Total)

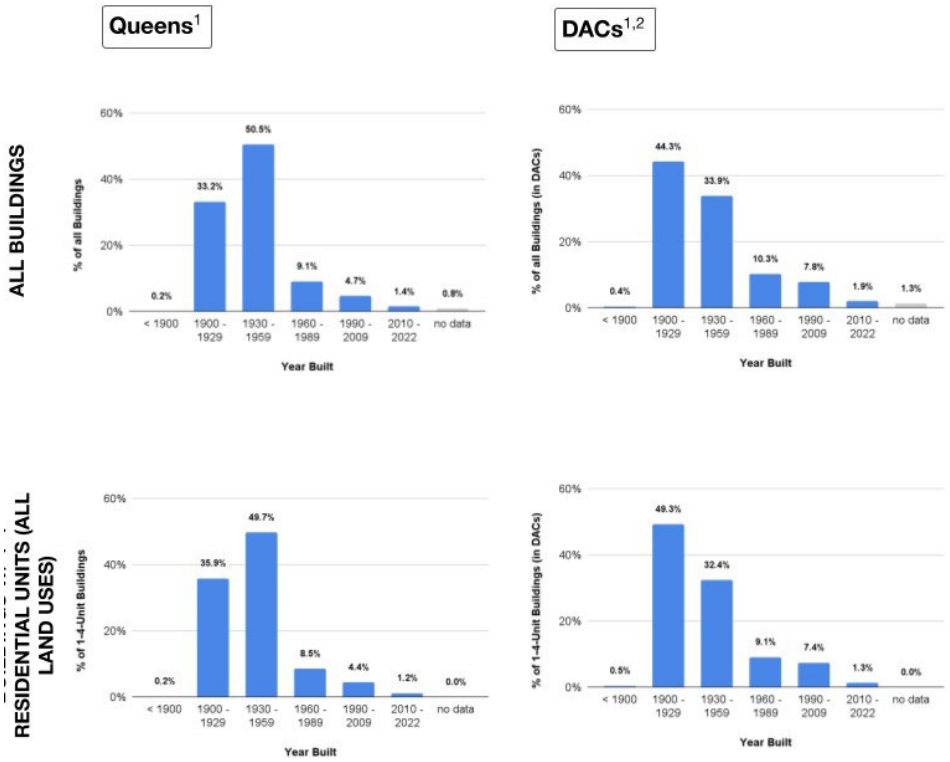


DACs





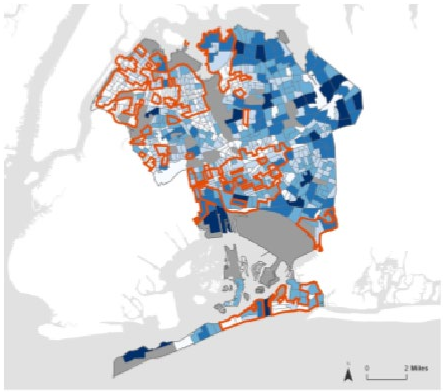
YEAR BUILT [1]



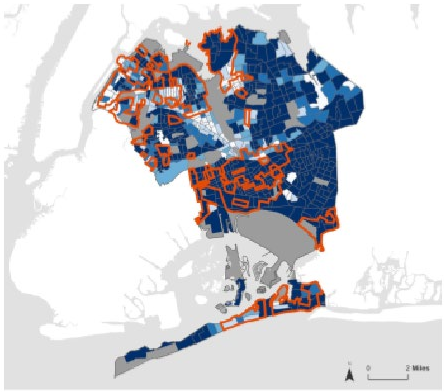
[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

RESIDENTIAL LAND USE: Occupancy, Vacancy, Tenure [1]

Housing Tenure, Occupancy/Vacancy Rates				
	DACs	QN	NYC	NYS
Occupancy Rate	88.0%	90.8%	90.5%	89.1%
Owner-Occupied	28.2%	41.2%	30.0%	48.5%
Units in a 1-4-Unit Building	**22.4%**	**32.0%**	**19.8%**	**41.8%**
Units in a 5+-Unit Building	5.7%	9.1%	10.2%	5.4%
Units in a Mobile Home/Boat/RV/etc.	*0.1%*	*0.1%*	*0.1%*	*1.3%*
Renter-Occupied	59.8%	49.6%	60.5%	40.6%
Units in a 1-4-Unit Building	24.5%	21.2%	15.0%	15.0%
Units in a 5+-Unit Building	35.1%	28.2%	45.4%	25.2%
Units in a Mobile Home/Boat/RV/etc.	*0.2%*	*0.1%*	*0.1%*	*0.5%*
Vacancy Rate	12.0%	9.2%	9.5%	10.9%
For Rent	1.8%	1.5%	2.3%	1.7%
For Sale	0.5%	0.5%	0.6%	0.6%
Other Vacant	9.6%	7.2%	6.6%	8.5%



Total Owner-Occupied Housing Units in a 1-4-Unit Building



Percentage of Total Owner-Occupied Units that are in a 1-4-Unit Building

[1] ACS 5-Year Estimates, 2021

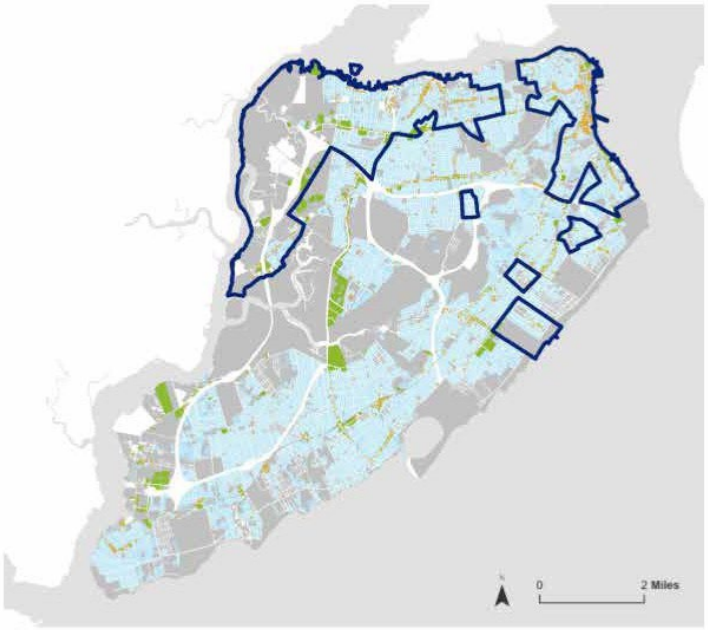
RESIDENTIAL LAND USE: Tenure by Race [1]

Ratio of Owner:Renter *by Race or Ethnicity*		DACs		QN		NYC		NYS	
		Owner	Renter	Owner	Renter	Owner	Renter	Owner	Renter
	All Householders	**32.1%**	**67.9%**	**45.4%**	**54.6%**	**33.2%**	**66.8%**	**54.4%**	**45.6%**
Race	White Alone Householder	31.7%	68.3%	47.6%	52.4%	39.4%	60.6%	64.5%	35.5%
	Black Or African American Alone Householder	33.1%	66.9%	48.3%	51.7%	27.2%	72.8%	32.2%	67.8%
	American Indian And Alaska Native Alone Householder	22.4%	77.6%	35.2%	64.9%	22.5%	77.5%	36.1%	64.0%
	Asian Alone Householder	41.6%	58.5%	51.3%	48.8%	44.8%	55.2%	50.7%	49.3%
	Native Hawaiian And Other Pacific Islander Alone Householder	66.1%	33.9%	56.5%	43.5%	32.0%	68.0%	38.7%	61.3%
	Some Other Race Alone Householder	21.7%	78.3%	28.1%	71.9%	14.3%	85.7%	21.4%	78.6%
	Two Or More Races Householder	29.0%	71.1%	36.1%	64.0%	24.8%	75.2%	37.9%	62.1%
Ethnicity	White Alone, Not Hispanic Or Latino Householder	37.3%	62.7%	52.3%	47.8%	42.7%	57.3%	66.9%	33.1%
	Hispanic Or Latino Householder	19.5%	80.5%	27.2%	72.8%	16.9%	83.1%	27.1%	72.9%

"VACANCY RATES"	DACs	Queens	NYC	NYS
"Available Housing Vacancy Rate":	**2.6%**	**2.2%**	**3.0%**	**2.6%**
For Sale + For Rent:	**2.3%**	**2.0%**	**2.8%**	**2.4%**

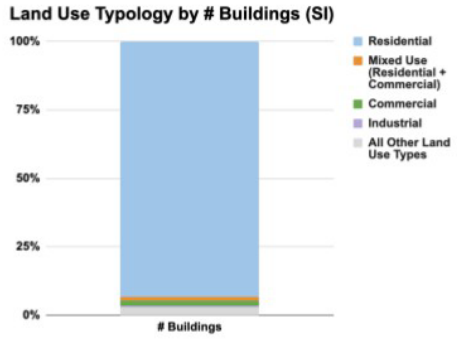
[1] ACS 5-Year Estimates, 2021

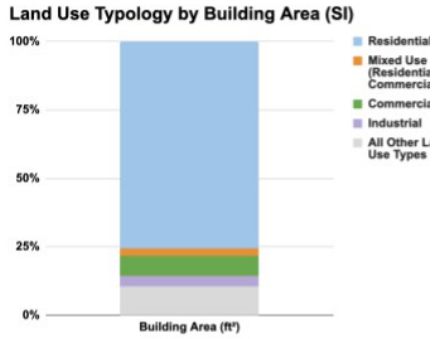
LAND USE [1]



[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

LAND USE (SI): Overall Land Use Typologies [1]





Buildings by Land Use (SI)	# Buildings	% of Total Buildings
Residential*	132,626	93.2%
1-4 Unit	125,655	88.3%
5+ Units	6,936	4.9%
0 Units or Blank	*35*	*0.0%*
Commercial*	2,391	1.7%
Small (>25,000 ft²)	2,124	1.5%
Large (<25,000 ft²)	233	0.2%
0 Commercial sq. ft. or Blank	*34*	*0.0%*
Mixed Use (residential + commercial)*	2,258	1.6%
1-4 Unit (residential)	2,069	1.5%
5+ Units (residential)	136	0.1%
0 Units or Blank	*53*	*0.0%*
Industrial	877	0.6%
All Other Land Use Types	4,162	2.9%
Total	***142,314***	--

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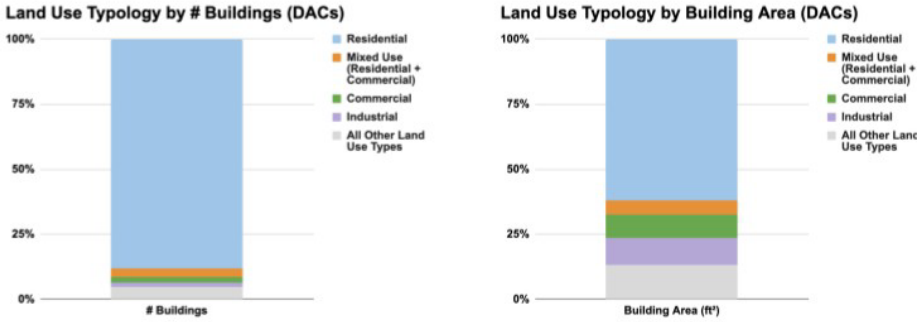
[1] NYC DCP (MapPLUTO), 2023

LAND USE (DACs): Overall Land Use Typologies [1]



Buildings by Land Use (SI)	# Buildings	% of Total Buildings
Residential*	31,298	88.1%
1-4 Unit	29,223	82.2%
5+ Units	2,070	5.8%
0 Units or Blank	*5*	*0.0%*
Commercial*	807	2.3%
Small (>25,000 ft²)	700	2.0%
Large (<25,000 ft²)	87	0.2%
0 Commercial sq. ft. or Blank	*20*	*0.1%*
Mixed Use (residential + commercial)*	1,139	3.2%
1-4 Unit (residential)	1,042	2.9%
5+ Units (residential)	82	0.2%
0 Units or Blank	*15*	*0.0%*
Industrial	622	1.8%
All Other Land Use Types	1,676	4.7%
Total	***35,542***	**--**

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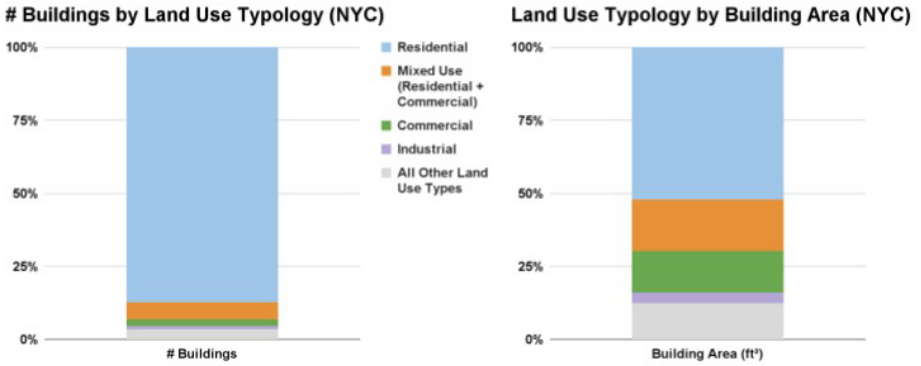
[1] NYC DCP (MapPLUTO), 2023

LAND USE (NYC): Overall Land Use Typologies [1]



Buildings by Land Use (NYC)	# Buildings	% of Total Buildings
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Commercial*	23,909	2.2%
Small (>25,000 ft²)	19,328	1.8%
Large (<25,000 ft²)	3,759	0.3%
0 Commercial sq. ft. or Blank	*822*	*0.1%*
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5+ Units (residential)	22,205	2.0%
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Total	***1,088,901***	**--**

* Categories are mutually exclusive and refer to the land use typology of the individual tax lot.

[1] NYC DCP (MapPLUTO), 2023

LAND USE: Residential Land Use Typologies by # of Residential Units [1]

Staten Island

Residential Land Use Typology	# Total Residential Units	% Total Residential Units
1-4 Units	**145,831**	**81.8%**
"Residential" LU	143,002	80.2%
"Mixed Use" LU	2,550	1.4%
Other LU	*279*	*0.2%*
5+ Units	**32,391**	**18.2%**
"Residential" LU	28,928	16.2%
"Mixed Use" LU	2,593	1.5%
Other LU	*870*	*0.5%*
Total Residential Units	***178,222***	**--**

NYC

Residential Land Use Typology	# Total Residential Units	% Total Residential Units in NYC
1-4 Units	**1,184,033**	**32.5%**
"Residential" LU	1,107,911	30.4%
"Mixed Use" LU	73,125	2.0%
Other LU	*2,997*	*0.1%*
5+ Units	**2,457,491**	**67.5%**
"Residential" LU	1,669,158	45.8%
"Mixed Use" LU	755,871	20.8%
Other LU	*32,462*	*0.9%*
Total Residential Units	***3,641,524***	**--**

DACs

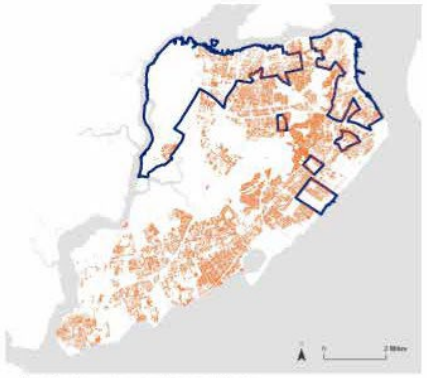
Residential Land Use Typology	# Total Residential Units	% Total Residential Units in DACs	% Total Residential Units in SI
1-4 Units	**34,714**	**66.2%**	**19.5%**
"Residential" LU	33,212	63.4%	18.6%
"Mixed Use" LU	1,377	2.6%	0.8%
Other LU	*125*	*0.2%*	*0.1%*
5+ Units	**17,710**	**33.8%**	**9.9%**
"Residential" LU	15,071	28.7%	8.5%
"Mixed Use" LU	2,051	3.9%	1.2%
Other LU	*588*	*1.1%*	*0.3%*
Total Residential Units	***52,424***	**--**	***29.4%***

***29.4%** of residential units are in DACs, **66.2%** of which are in a 1-4 unit building*

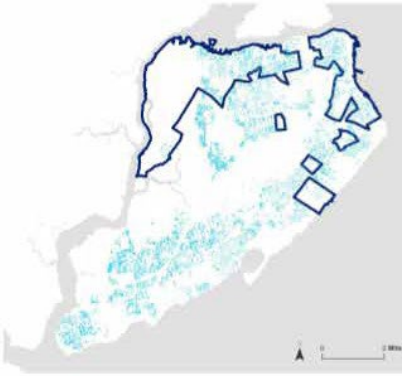
[1] NYC DCP (MapPLUTO), 2023

1-4 UNIT RESIDENTIAL BUILDINGS [1]

1-UNIT [1,2]



2-UNIT [1,2]



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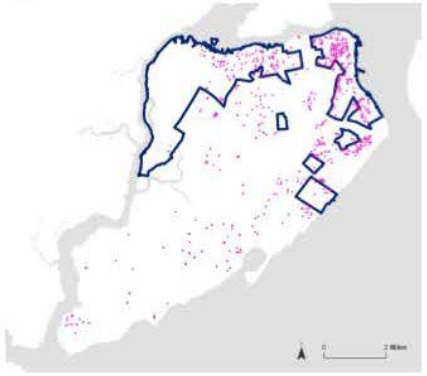
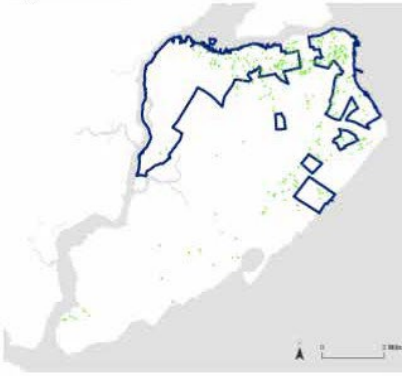


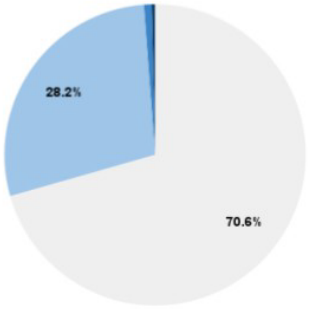
4-UNIT [1,2]



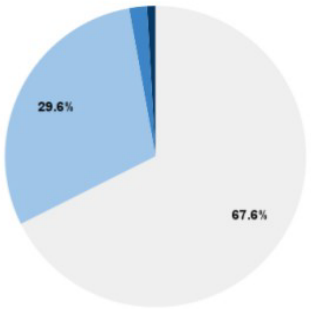
1-4 UNIT RESIDENTIAL BUILDINGS [1]

	Staten Island				DACs			
# Units in Building	# Lots	% of 1-4-Unit Lots	Total # Units	% of All 1-4-Units	# Lots	% of 1-4-Unit Lots	Total # Units	% of All 1-4-Units
1-Unit Buildings	77,005	70.6%			16,485	67.6%		
2-Unit Buildings	30,827	28.2%			7,217	29.6%		
3-Unit Buildings	897	0.8%			467	1.9%		
4-Unit Buildings	413	0.4%			223	0.9%		

Staten Island (Total)

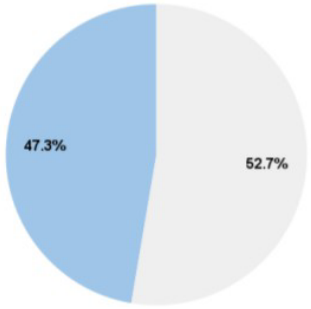


DACs



- 1-Unit Buildings
- 2-Unit Buildings
- 3-Unit Buildings
- 4-Unit Buildings

3-4 UNIT RESIDENTIAL BUILDINGS IN DACS CENSUS TRACTS [1]



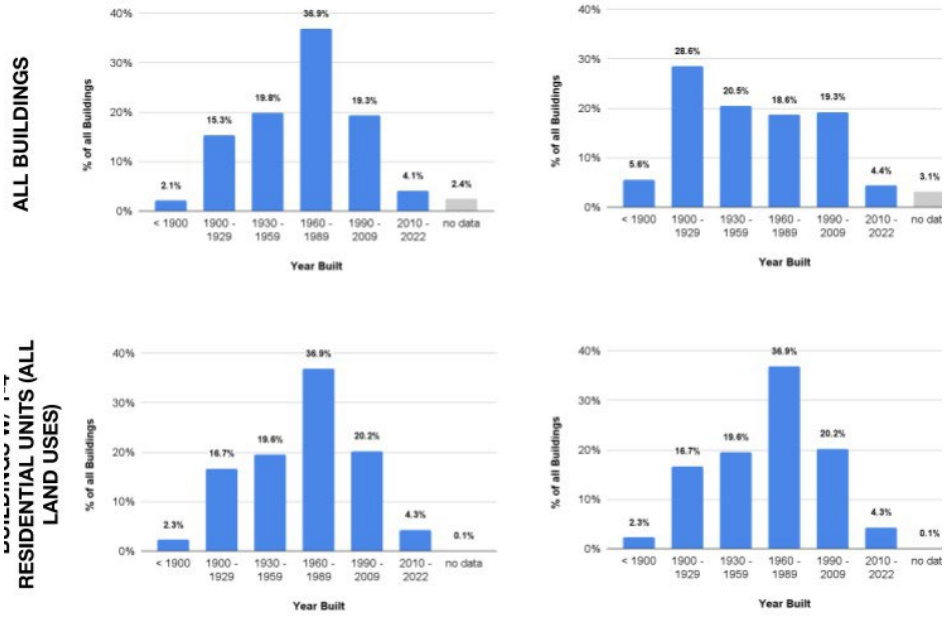
- DACs
- Non-DACs

(Roughly half of all 3-4 unit residential buildings in Staten Island are in DACs)

YEAR BUILT [1]

Staten Island[1]

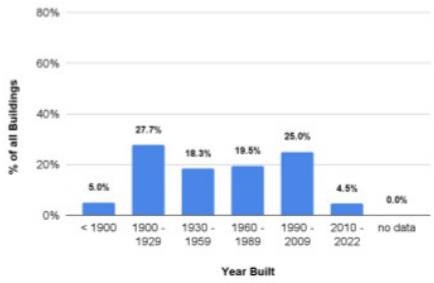
DACs[1,2]



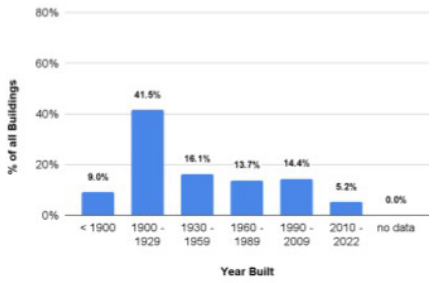
[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

YEAR BUILT: DACs 1-4-Unit Buildings [1]

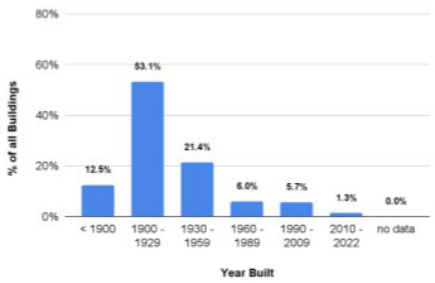
1-Unit Buildings



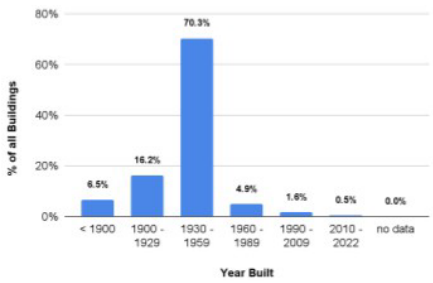
2-Unit Buildings



3-Unit Buildings



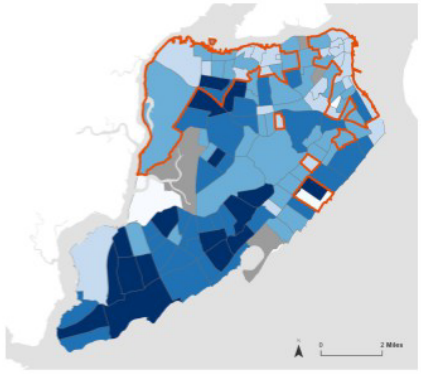
4-Unit Buildings

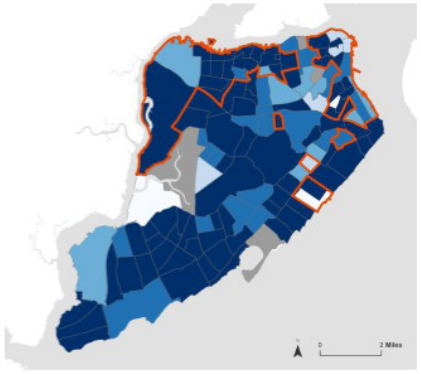


[1] NYC DCP (MapPLUTO), 2023
[2] NYSERDA Final Disadvantaged Communities, 2023

RESIDENTIAL LAND USE: Occupancy, Vacancy, Tenure [1]

Housing Tenure, Occupancy/Vacancy Rates				
	DACs	**Staten Island**	**NYC**	**NYS**
Occupancy Rate	88.8%	92.6%	90.5%	89.1%
Owner-Occupied	45.0%	63.6%	30.0%	48.5%
Units in a 1-4-Unit Building	**42.2%**	**61.3%**	**19.8%**	**41.8%**
Units in a 5+-Unit Building	2.6%	2.1%	10.2%	5.4%
Units in a Mobile Home/Boat/RV/etc.	*0.2%*	*0.2%*	*0.1%*	*1.3%*
Renter-Occupied	43.8%	29.0%	60.5%	40.6%
Units in a 1-4-Unit Building	21.8%	18.4%	15.0%	15.0%
Units in a 5+-Unit Building	21.8%	10.5%	45.4%	25.2%
Units in a Mobile Home/Boat/RV/etc.	*0.2%*	*0.1%*	*0.1%*	*0.5%*
Vacancy Rate	11.2%	7.4%	9.5%	10.9%
For Rent	4.1%	1.9%	2.3%	1.7%
For Sale	1.6%	1.5%	0.6%	0.6%
Other Vacant	5.5%	4.0%	6.6%	8.5%





[1] ACS 5-Year Estimates, 2021

RESIDENTIAL LAND USE: Tenure by Race [1]

Ratio of Owner:Renter *by Race or Ethnicity*		DACs		Staten Island		NYC		NYS	
		Owner	Renter	Owner	Renter	Owner	Renter	Owner	Renter
	All Householders	**50.7%**	**49.3%**	**68.7%**	**31.3%**	**33.2%**	**66.8%**	**54.4%**	**45.6%**
Race	White Alone Householder	57.0%	43.0%	73.6%	26.4%	39.4%	60.6%	64.5%	35.5%
	Black Or African American Alone Householder	34.9%	65.1%	35.3%	64.7%	27.2%	72.8%	32.2%	67.8%
	American Indian And Alaska Native Alone Householder	59.3%	40.7%	72.5%	27.5%	22.5%	77.5%	36.1%	64.0%
	Asian Alone Householder	77.4%	22.6%	81.1%	18.9%	44.8%	55.2%	50.7%	49.3%
	Native Hawaiian And Other Pacific Islander Alone Householder	95.1%	4.9%	95.1%	4.9%	32.0%	68.0%	38.7%	61.3%
	Some Other Race Alone Householder	40.6%	59.5%	44.7%	55.3%	14.3%	85.7%	21.4%	78.6%
	Two Or More Races Householder	39.4%	60.6%	49.8%	50.2%	24.8%	75.2%	37.9%	62.1%
Ethnicity	White Alone, Not Hispanic Or Latino Householder	64.7%	35.3%	77.1%	22.9%	42.7%	57.3%	66.9%	33.1%
	Hispanic Or Latino Householder	35.3%	64.7%	44.3%	55.7%	16.9%	83.1%	27.1%	72.9%

"VACANCY RATES"	DACs	Staten Island	NYC	NYS
"Available Housing Vacancy Rate":	**6.0%**	**3.5%**	**3.0%**	**2.6%**
For Sale + For Rent:	**5.7%**	**3.4%**	**2.8%**	**2.4%**

[1] ACS 5-Year Estimates, 2021

RESIDENTIAL LAND USE: House Heating Fuel by Tenure [1]

Owner-Occupied

House Heating Fuel for Owner-Occupied Households *(as a %age of Total Owner-Occupied Households)*	DACs	Staten Island	NYC	NYS
Utility Gas	86.1%	89.0%	73.9%	60.8%
Bottled, Tank, Or Lp Gas	2.2%	2.1%	2.7%	5.6%
Electricity	4.8%	3.7%	8.1%	7.1%
Fuel Oil, Kerosene, Etc.	6.2%	4.2%	12.8%	22.2%
Coal Or Coke	0.0%	0.0%	0.0%	0.3%
Wood	0.2%	0.1%	0.1%	2.5%
Solar Energy	0.2%	0.2%	0.1%	0.1%
Other Fuel	0.0%	0.3%	1.1%	0.9%
No Fuel Used	0.4%	0.4%	1.1%	0.5%

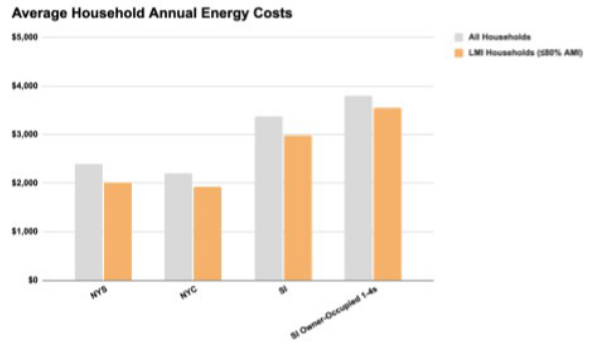
Renter-Occupied

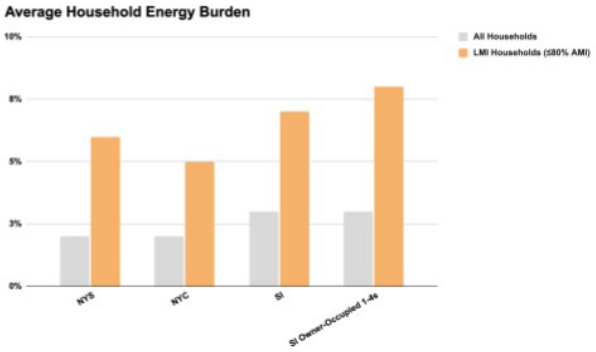
House Heating Fuel for Renter-Occupied Households *(as a %age of Total Renter-Occupied Households)*	DACs	Staten Island	NYC	NYS
Utility Gas	79.2%	81.0%	61.0%	58.3%
Bottled, Tank, Or Lp Gas	1.4%	1.7%	2.3%	3.1%
Electricity	8.9%	9.3%	16.1%	19.8%
Fuel Oil, Kerosene, Etc.	6.8%	5.3%	15.5%	14.4%
Coal Or Coke	0.0%	0.0%	0.1%	0.1%
Wood	0.0%	0.1%	0.0%	0.3%
Solar Energy	0.1%	0.1%	0.1%	0.1%
Other Fuel	0.9%	0.9%	1.8%	1.5%
No Fuel Used	2.6%	1.6%	3.2%	2.4%

[1] ACS 5-Year Estimates, 2021

ENERGY COST & BURDEN

	Annual Energy Cost		Energy Burden	
	All	LMI	All	LMI
NYS	$2,391	$2,014	2%	6%
NYC	$2,201	$1,928	2%	5%
SI	$3,369	$2,973	3%	7%
SI Owner-Occupied 1-4s	3,803	$3,554	3%	8%





[1] DOE LEAD Tool, 2018

Appendix C
Full Potential Partners

The below spreadsheet is a small excerpt of Appendix C. The full partners list is hosted online and is available for Hub partners' use. Email Kieran Micka-Maloy at kmickamaloy@prattcenter.net if you'd like access to this Appendix.

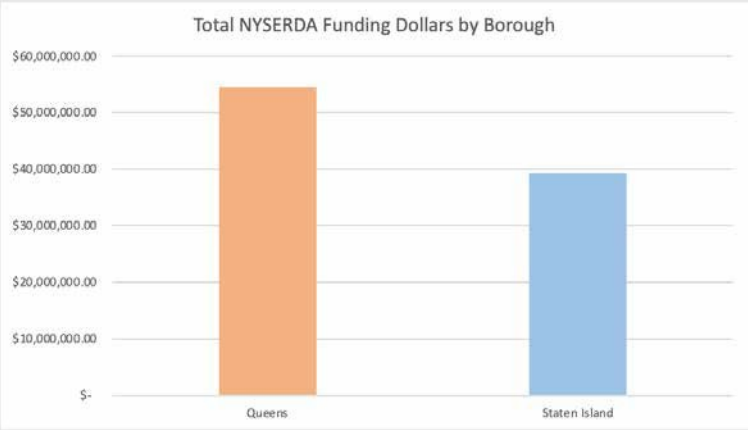
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Entry type	Name	Website	Priori	Geography	Sector	Focus area (1)	Focus area (2)	Focus area (3)	Outrea	Retro	Workfo	Wraparo	Notes
2	Organization	Queens Public Library	queenslibrary.org	☑	Queens	Government	Community institution			☑	☐	☐	☐	66 branches around Queens. NHSQ mentioned Jackson Heights, Corona, East Elmhurst, Woodside, and Langston Hughes
4	Organization	CUNY	cuny.edu	☑	NYC	Government	Community institution	Workforce development/Edu		☐	☐	☑	☐	Laguardia Community College offers career skills and workforce training programs for heat pumps, hvac, etc; also building an offshore wind program w/ Kingsborough + City Tech. Recently received huge gift to set up workforce training center. College of SI is developing an offshore wind training program.
5	Organization	NYC DOE schools	schools.nyc.gov	☑	NYC	Government	Community institution			☑	☐	☐	☐	immigrant families with kids rely on schools to get certain info. NHSQ works with some PTAs. Youth WINS works with Port Richmond and Concord HS in SI.
7	Organization	Muslim American Society	masnewyork.org	☑	NYC	Nonprofit	Community institution	Congregation	Cultural/immigrant	☑	☐	☐	☐	
8	Network	Green Faith	greenfaith.org	☑	NYC	Nonprofit	Congregation	Sustinability/resiliency		☑	☑	☐	☐	
9	Organization	Catholic Charities	catholiccharitiesny.org	☑	NYC	Nonprofit	Social services	Cultural/immigrant		☑	☐	☐	☑	Coalition of churches focused on climate change
16	Network	Eastern Queens Alliance	easternqueensalliance.org	☑	Queens	Nonprofit	Civic association	Sustinability/resiliency		☑	☐	☐	☐	Made up of 10 civic associations: Addisleigh Park Civic Organization; Concerned Citizens of Laurelton; Federated Blocks of Laurelton General; Greater TriAngular Civic Association, Inc.; Rosedale Civic Association, Inc.; Springfield/Rosedale Community Action Association, Inc.; SpringGar Community Civic Association; Springfield Gardens Taxpayers & Citizens Association; Wayanda Civic Association; St. Albans Civic Improvement Association; United Neighbors Civic Association of Jamaica, Inc.
19	Organization	Chhaya	chhaya.org	☑	Queens	Nonprofit	Cultural/immigrant	Housing	Social services	☑	☑	☑	☑	
20	Organization	NHS of Jamaica	nhsj.org	☑	Queens	Nonprofit	Housing			☑	☑	☐	☐	
21	Organization	Neighborhood Restore	neighborhoodrestore.org	☑	NYC	Nonprofit	Housing	Contractor		☑	☑	☐	☐	subcontract with home fix
23	Organization	Center for NYC Neighborhoods	cnycn.org	☑	NYC	Nonprofit	Housing	Sustinability/resiliency		☑	☑	☐	☑	HomeFix program administrator
24	Organization	Association for Energy Affordability (AEA)	aea.us.org	☑	Queens	Nonprofit	Housing	Sustinability/resiliency	Workforce development/Edu	☑	☑	☑	☐	WAP program administrator for parts of Queens
25	Organization	HANAC		☑	Queens	Nonprofit	Social services	Housing	Sustinability/resiliency	☑	☑	☐	☑	WAP program administrator for parts of Queens
27	Category	Food pantries		☑	NYC	Nonprofit	Social services			☑	☐	☐	☑	
28	Organization	Queens Legal Services	legalservicesnyc.org/our-program/queens	☑	Queens	Nonprofit	Social services			☑	☐	☐	☑	
29	Organization	Commonpoint Queens	commonpointqueens.org	☑	Queens	Nonprofit	Social services	Community institution	Workforce development/Edu	☑	☐	☑	☑	
31	Organization	Make the Road	maketheroadny.org	☑	Queens	Nonprofit	Cultural/immigrant	Social services	Workforce development/Edu	☑	☐	☑	☑	
33	Organization	NYC EDC	edc.nyc	☑	NYC	Government	Business interests	Workforce development/Edu	Sustinability/resiliency	☐	☐	☑	☐	EDC Offshore Wind NYC Waterfront Pathways Program - increase MWBE pathways into OSW industry
36	Category	BIDs	nyc.gov/site/sbs/neighborhoods/bid-directory.page	☑	NYC	Nonprofit	Business interests			☐	☐	☐	☐	
46	Network	NYC Employment and Training Coalition	nycetc.org	☑	NYC	Nonprofit	Workforce development/E	Sustainability/resiliency		☐	☐	☑	☐	
47	Network	Green Economy Network	jobsfirstnyc.org/solutions/sector-network-green-economy	☑	NYC	Nonprofit	Workforce development/E	Sustainability/resiliency		☐	☐	☑	☐	
48	Organization	HOPE Program	thehopeprogram.org	☑	NYC	Nonprofit	Workforce development/E	Green employer	Sustinability/resiliency	☐	☐	☑	☐	Job training and remedial education with a green slant, multiple programs. Runs a YouthBuild project as well.
49	Organization	Green City Force	greencityforce.org	☑	NYC	Nonprofit	Workforce development/E	Green employer	Sustinability/resiliency	☐	☐	☑	☐	
50	Organization	Soulful Synergy	soulfulsynergy.org	☑	NYC	Business	Workforce development/E	Sustinability/resiliency		☐	☐	☑	☐	
51	Organization	Solar One	solar1.org	☑	NYC	Nonprofit	Sustinability/resiliency	Workforce development/Edu		☐	☑	☑	☐	
52	Organization	Willdan	willdan.com	☑	NYC	Business	Workforce development/E	Sustinability/resiliency		☐	☐	☑	☐	Runs Willdan Clean Energy Academy
53	Organization	TMI Waterfront	tmi-waterfront.com	☑	NYC	Business	Workforce development/E	Sustinability/resiliency		☐	☐	☑	☐	joint venture of MWBEs offering offshore wind/ waterfront trainings
57	Category	Resiliency organizations		☑	NYC	Nonprofit	Sustinability/resiliency			☑	☑	☐	☑	
59	Category	Offshore wind companies		☑	NYC	Business	Green employer	Workforce development/Edu		☐	☐	☑	☐	
60	Organization	Mayor's Office of Climate and EJ	climate.cityofnewyork.us	☑	NYC	Government	Sustinability/resiliency			☑	☐	☐	☐	

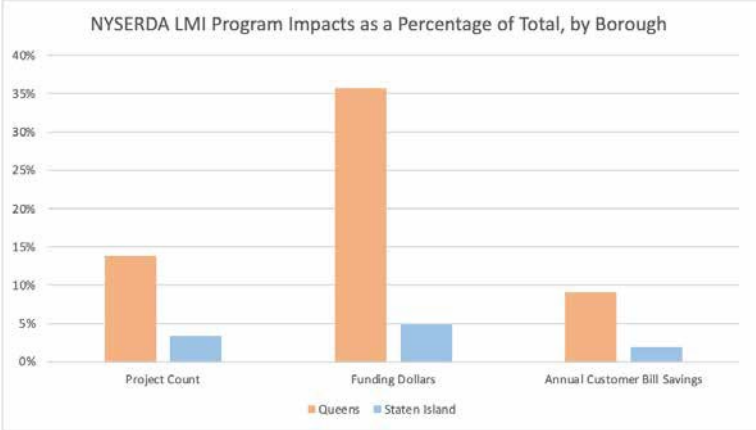
Appendix D
Regional Clean Energy Programs

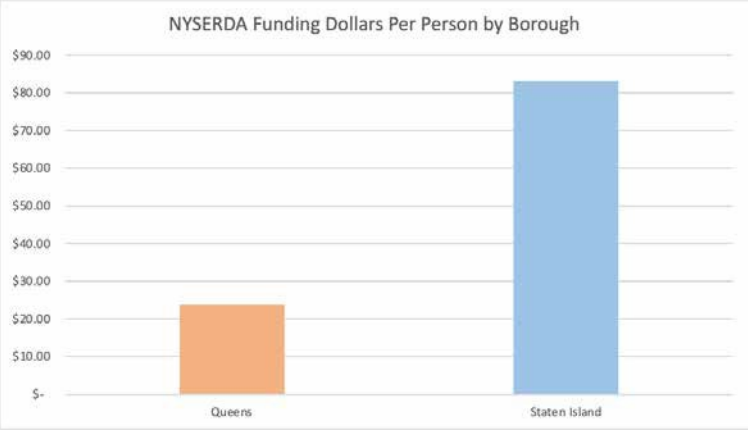
The below spreadsheet is a small excerpt of Appendix D. The full partners list is hosted online and is available for Hub partners' use. Email Kieran Micka-Maloy at kmickamaloy@prattcenter.net if you'd like access to this Appendix.

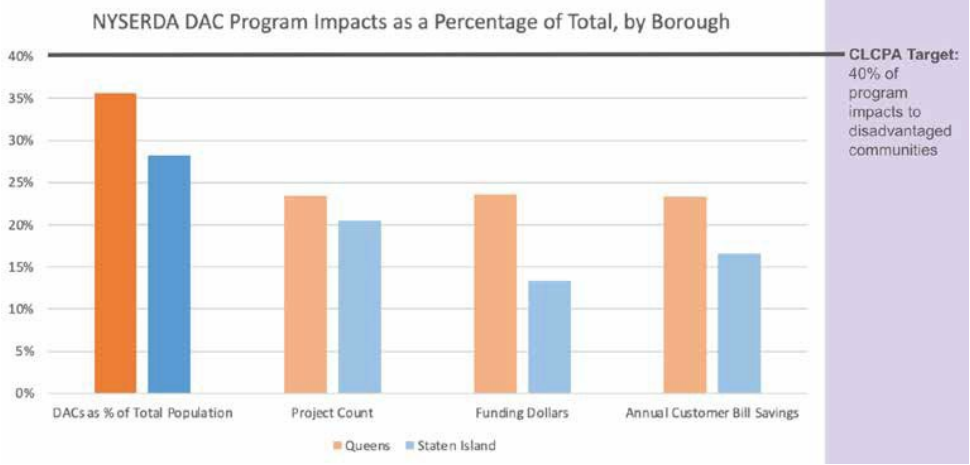
	A	B	C	D	E	F	G
1	**Program Name**	**Geographic service area**	**Location**	**Eligibility criteria/target populations**	**Brief description**	**Organization(s)**	**Source/website**
2	NYC CoolRoofs	Citywide	Remote	Anyone	10 to 11 weeks of full-time, paid work experience installing energy saving reflective rooftops at a starting wage of $16 per hour Opportunity to earn credentials in the construction sector, including 4-Hour Flagger, 4-Hour Scaffold User, Fireguard, CPR/First Aid, and Construction Site Safety Training (SST) certification at no cost.	NYC Department of Small Business Services (SBS) ; Workforce1 Industrial & Transportation Career Center ; the Mayor's Office of Climate and Environmental Justice ; HOPE Program.	
3	Civilian Climate Corps	Citywide	Brooklyn/ Remote	Formerly incarcerated, BIPOC and women preferred	Paid 3 month foundational training plus two months of building trade: construction/carpentry, low voltage electrical, plumbing , HVAC , building energy efficiency auditing	BLOCPower ; Mayor's Office of Criminal Justice	
4	Green Maintenance for Buildings Training Program	Citywide	Brooklyn	Anyone	Free full-time 9-week training program designed to provide entry-level skills necessary to work as a janitor, custodian, or porter in residential and commercial buildings.	CUNY ; CityTech	
5	SolarOne Green Workforce Program	Citywide	Queens/NYC metro area	Minorities encouraged/ preferred	4-6 weeks training in energy efficiency, renewable energy, green construction, and green building operations and maintenance.	SolarOne ; Mayor's Office for Economic Opportunity	
6	NYCHA Clean Energy Academy	Citywide	Cross-borough NYCHA complexes	NYCHA residents	16-week (280 hour) course where NYCHA residents develop the skills to install solar panels, transform heating and cooling systems, install and maintain heat pumps and learn various construction duties. Stipend provided.	NYCHA ; Public Housing Community Fund ; Laguardia Community College Funders include NYSERDA	
7	Intervine	Citywide	Bronx		10 week paid program provides foundational training for green infrastructure projects.	The HOPE Program	
8	SSBx	Citywide	Bronx		14 week classroom-based and hands-on green jobs training program. Throughout the training, our students green the local community through hands-on projects such as tree surveys, water quality testing and shoreline restoration.	The HOPE Program ; Sustainable South Bronx	
9	Green and Clean HVAC	Citywide	Bronx		12 week program on installation and maintenance of efficient heating and cooling equipment	The HOPE Program	
10	GCF Service Corps	Citywide	Cross-borough NYCHA complexes	18-24 year old NYCHA residents with GED/high school diploma	Americorps Program for NYCHA young adults. "Service initiatives respond to needs in public housing communities: cultivating and distributing fresh produce, building sustainable green infrastructure... Initiatives also include visits and service with environmental partner organizations. Classroom training includes eco-literacy and applied environmental education." Corps Members receive site safety and the OSHA-40 certification.	Green City Force	https://greencityforce.org/service-corps/
11	Willdan Clean Energy Academy	Citywide	Remote		Free courses in things like HVAC, lighting, building envelope, heating systems, EVs that offer certifications. Works to fill skill gaps identified by employer partners.	NYSERDA, Willdan, ConEd, Soulful Synergy, NYIT, others	https://www.cleanenergyacademy.org/
12	CUNY Building Performance Lab	Citywide	Mostly remote, various in person locations	facility managers, building operators, and energy professionals, CUNY students	Offers courses to building professionals to help buildings become more energy efficient and sustainable. NY Center for Energy and Carbon Management Training (E-CMT): comprehensive education in building performance and operations. Offers pathways to various professional certifications. Couples academic instruction with real-world internships through the WAP sub-grantee network.	CUNY, NYS HCR	
13	RETI Center Sollar		Red Hook,				

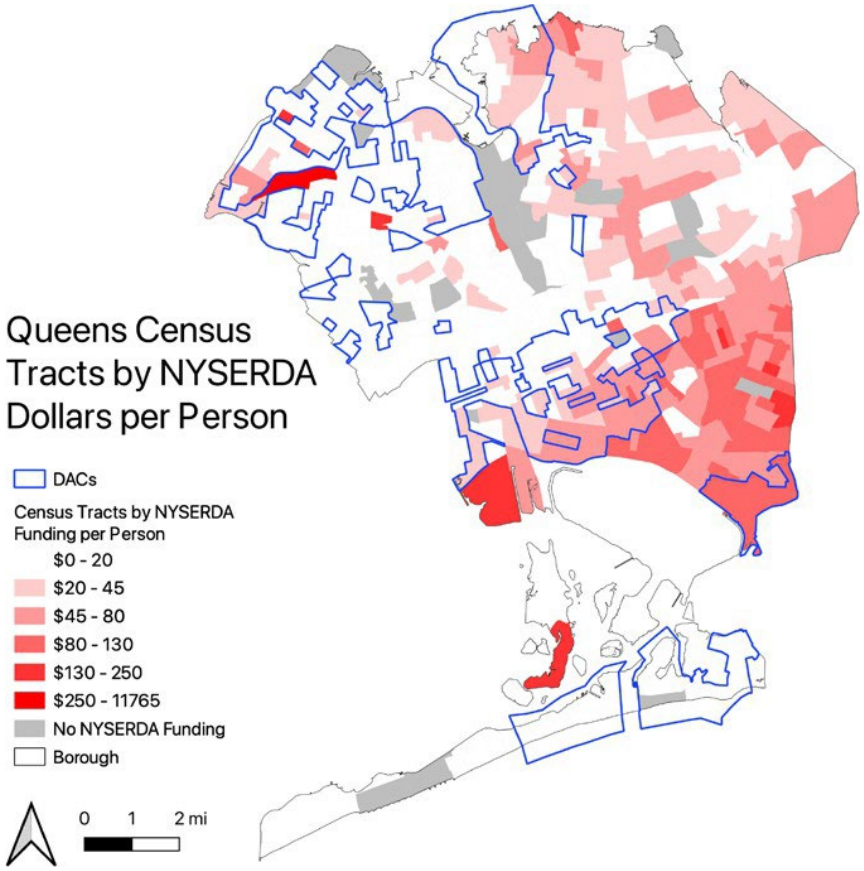
Appendix E
NYSERDA Equity Analysis Charts

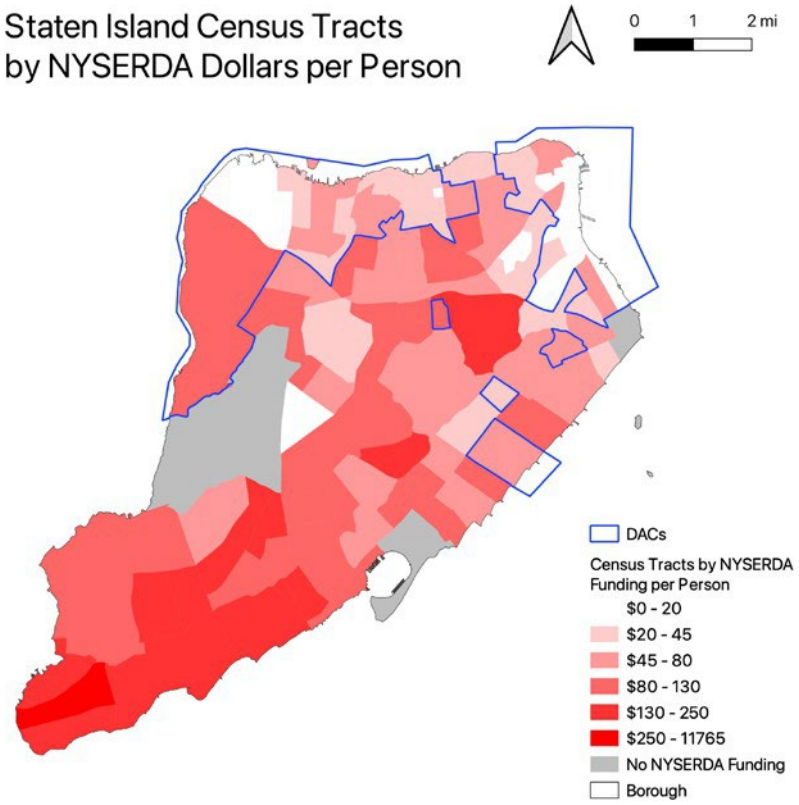




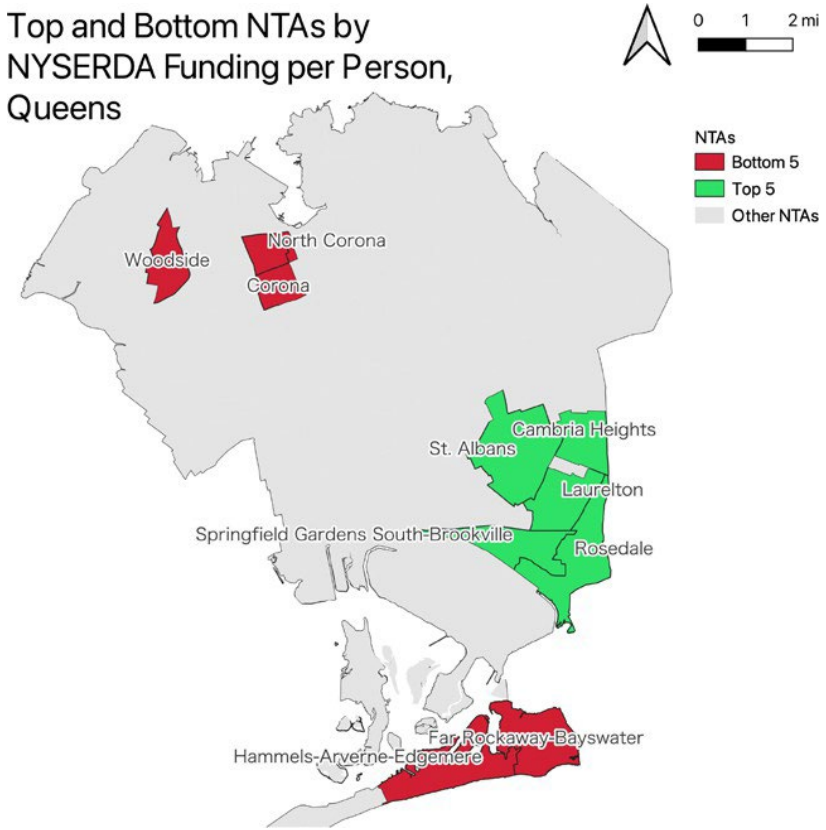




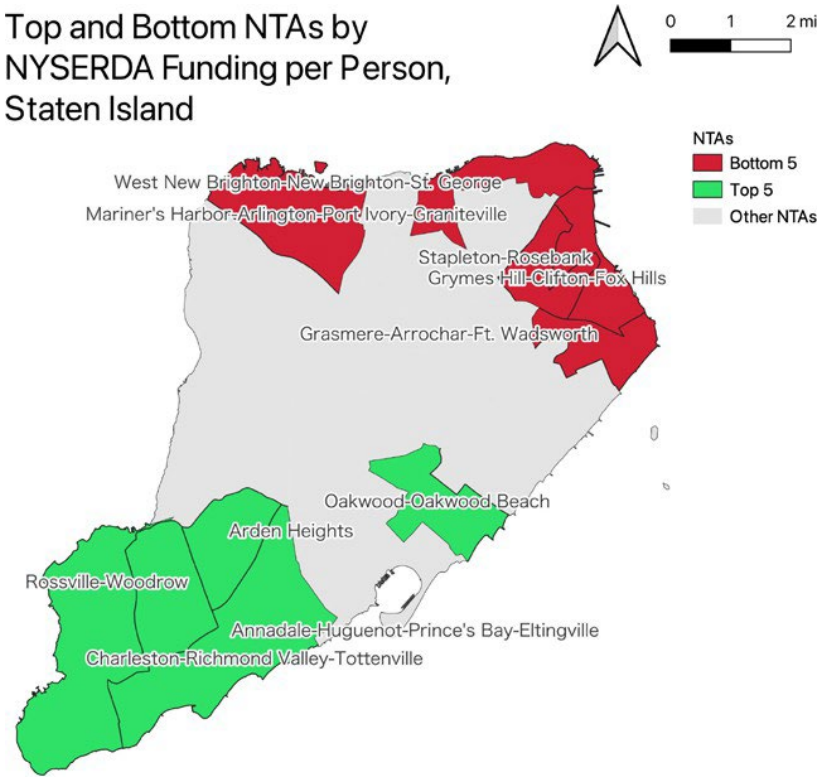

Queens Census Tracts by NYSERDA Dollars per Person
DACs
Census Tracts by NYSERDA Funding per Person
$0 - 20
$20 - 45
$45 - 80
$80 - 130
$130 - 250
$250 - 11765
No NYSERDA Funding
Borough
0 1 2 mi


Staten Island Census Tracts by NYSERDA Dollars per Person
0 1 2 mi
DACs
Census Tracts by NYSERDA Funding per Person
$0 - 20
$20 - 45
$45 - 80
$80 - 130
$130 - 250
$250 - 11765
No NYSERDA Funding
Borough

Top and Bottom Neighborhoods by NYSERDA Residential Funding per Person: Queens					
Top 5					
Neighborhood	**NYSERDA Funding per person**	**Annual Bill Savings per person**	**Median Income**	**Percent BIPOC**	**Percent Renter Occupied**
Springfield Gardens South-Brookville	$ 97	$ 174	$ 87,155	96%	40
Laurelton	$ 90	$ 125	$ 95,701	97%	20
Cambria Heights	$ 88	$ 127	$ 101,058	97%	13
Rosedale	$ 83	$ 141	$ 92,057	93%	31
St. Albans	$ 83	$ 130	$ 78,815	96%	24
Bottom 5					
North Corona	$ 4	$ 11	$ 61,438	65%	78
Woodside	$ 3	$ 6	$ 64,766	56%	61
Far Rockaway-Bayswater	$ 3	$ 4	$ 56,083	58%	70
Corona	$ 3	$ 9	$ 51,977	59%	76
Hammels-Arverne-Edgemere	$ 2	$ 4	$ 50,227	70%	64



Top and Bottom NTAs by NYSERDA Residential Funding per Person: Staten Island					
Top 5					
NTA	**NYSERDA Funding per person**	**Annual Bill Savings per person**	**Median Income**	**Percent BIPOC**	**Percent Renter Occupied**
Charleston-Richmond Valley-Tottenville	$ 177	$ 223	$ 95,114	8%	22
Rossville-Woodrow	$ 152	$ 201	$ 107,717	8%	12
Annadale-Huguenot-Prince's Bay-Eltingville	$ 151	$ 205	$ 108,693	7%	16
Arden Heights	$ 122	$ 169	$ 91,299	9%	13
Oakwood-Oakwood Beach	$ 113	$ 137	$ 83,014	13%	26
Bottom 5					
Grasmere-Arrochar-Ft. Wadsworth	$ 45	$ 68	$ 78,186	31%	35
Mariner's Harbor-Arlington-Port Ivory-Graniteville	$ 42	$ 93	$ 66,772	51%	38
West New Brighton-New Brighton-St. George	$ 33	$ 49	$ 55,165	53%	59
Stapleton-Rosebank	$ 30	$ 53	$ 54,022	47%	57
Grymes Hill-Clifton-Fox Hills	$ 22	$ 42	$ 68,906	45%	55



Queens & SI NTAs by Median Income and NYSERDA Residential Program Funding
NYSERDA Residential Program Funding
$5,000,000
$4,500,000
$4,000,000
$3,500,000
$3,000,000
$2,500,000
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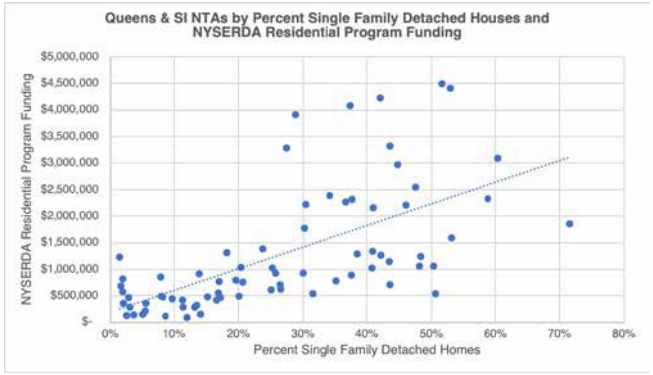
$30,000 $40,000 $50,000 $60,000 $70,000 $80,000 $90,000 $100,000 $110,000 $120,000
Median Household Income


Queens & SI NTAs by Percent Single Family Detached Houses and NYSERDA Residential Program Funding
NYSERDA Residential Program Funding
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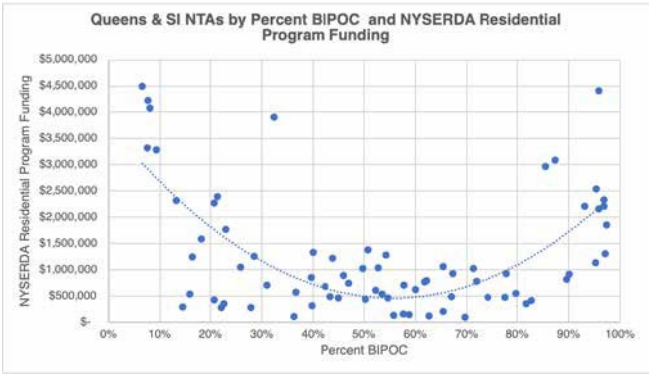
Percent Single Family Detached Homes


Queens & SI NTAs by Percent BIPOC and NYSERDA Residential Program Funding
NYSERDA Residential Program Funding
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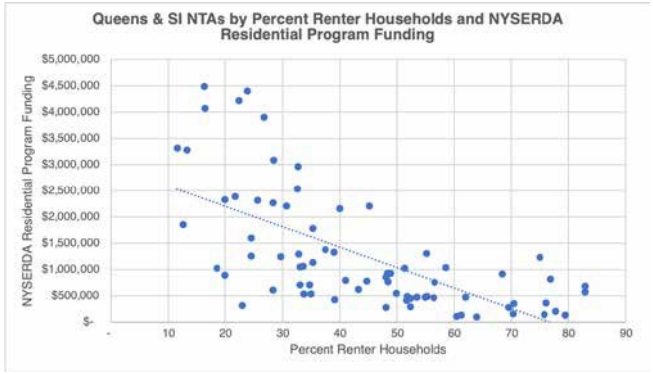
Percent BIPOC


Queens & SI NTAs by Percent Renter Households and NYSERDA Residential Program Funding
NYSERDA Residential Program Funding
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$4,000,000
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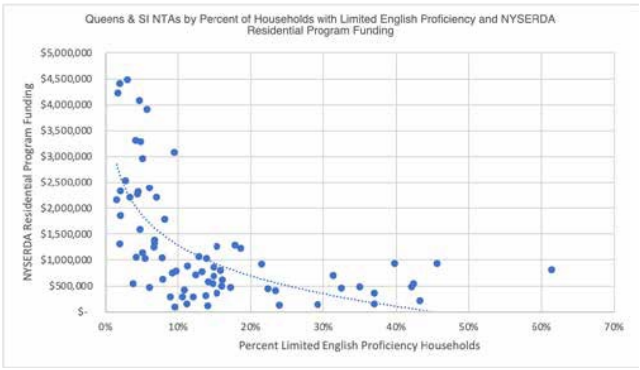
10 20 30 40 50 60 70 80 90
Percent Renter Households


Queens & SI NTAs by Percent of Households with Limited English Proficiency and NYSERDA Residential Program Funding
NYSERDA Residential Program Funding
$5,000,000
$4,500,000
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$-
0% 10% 20% 30% 40% 50% 60% 70%
Percent Limited English Proficiency Households

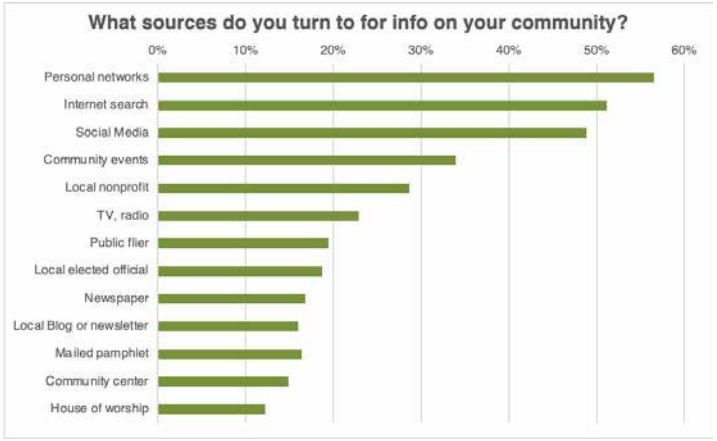
Appendix F
Public Engagement Interviews & Focus Groups

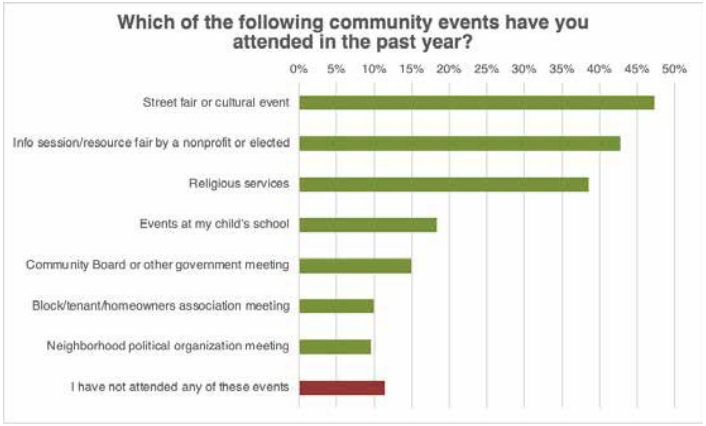
RABA External Organization Interviews				
Organization	Borough	Description	Participants	Date
Central Family Life Center	SI	Provides a variety of programming and direct services to SI North Shore communities.	Elizabeth Morgan, Director of YouthBuild IMPACT	7/25/23
Soulful Synergy	NYC	Offers workforce development training programs, including in green industries.	- Dwayne Norris, Co-founder and COO - Alejandro Alvarez, Co-Founder - Will Scherle, Director of Decarbonization	8/3/23
SI Connect	SI	Provides wraparound services to NYCHA youth and their families.	Amber Alicea, Case-manager/ Coordinator	8/7/23
Neighborhood Restore	NYC	Creates affordable housing through restoring abandoned properties for LMI homeowners.	Francesco Mollica, Construction Project Manager	8/10/23
SIEDC	SI	Fosters economic development through partnerships with businesses, including green employers, and government.	Mike Cusick, President & CEO	8/15/23
NHS of Jamaica	Queens	Promotes LMI homeownership in and around Jamaica, through programming, support with repairs, and more.	Lori Miller, Executive Director	9/5/23
Northfield Community LDC	SI	Creates and supports affordable housing in SI's North Shore, with a focus on weatherization.	- Kathleen Bielsa, Executive Director - Jim Reilly, Weatherization Director	9/6/23
Queens Borough President's Office	Queens	Hosts the Queens Climate Expo, facilitates a network of Queens CBOs working on environmental issues, supports homeowners in the wake of flooding.	Katherine Brezler, Strategic Advisor	10/19/23
Chhaya	Queens	Provides housing counseling and a variety of other direct services in South Asian & Indo-Caribbean communities.	- Tenying Yangsel, Associate Director of Programs Homeownership - Thinley Dolma, Housing Counselor	1/5/24
			- Anlisa Outar, Housing Counselor	
Eastern Queens Alliance	Queens	Coalition of civic associations that promotes environmental stewardship and education in Southeast Queens.	- Barbara E. Brown, Chairperson - Gloria Boyce-Charles, Vice-Chairperson	1/11/24

RABA Focus Groups				
Focus Group	Description	Date	Corresponding Hub Team Organizations	# of Participants
Electrify NYC (ENYC) Participants	ENYC is a City government program, administered by CBOs including KC3, NHSQ, and N4SF, that offers small homeowners guidance/assistance with making sustainability upgrades to their homes. Spoke to people who have interacted with ENYC about their experiences with the program.	8/2/23	KC3, NHSQ, N4SF	3
Youth	Spoke with teenage youth involved in Youth WINS/NYCID workforce related programs about their career goals, their knowledge of/interest in the clean energy industry.	8/8/23	Youth WINS	3
MWBE Contractors	Spoke with contractors about their experiences navigating the landscape of doing sustainability work as MWBEs.	8/14/23	BOC Network	5
Immigrant women	Spoke with women involved in New Women New Yorkers (NWNY) programs about their career goals, their knowledge of/interest in the clean energy industry.	8/14/23	NWNY	3

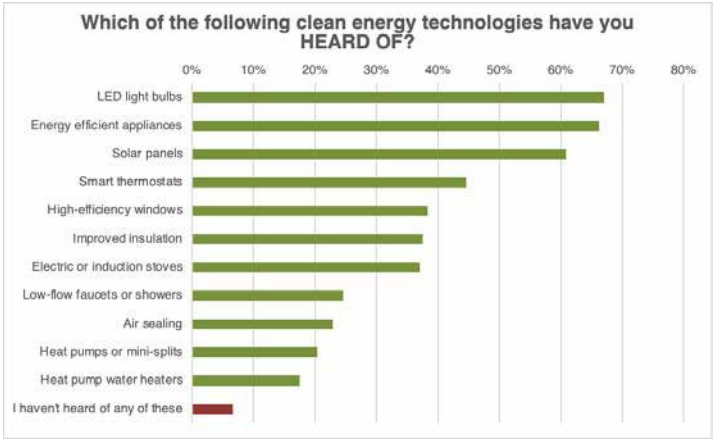
Appendix G
Full Survey Results

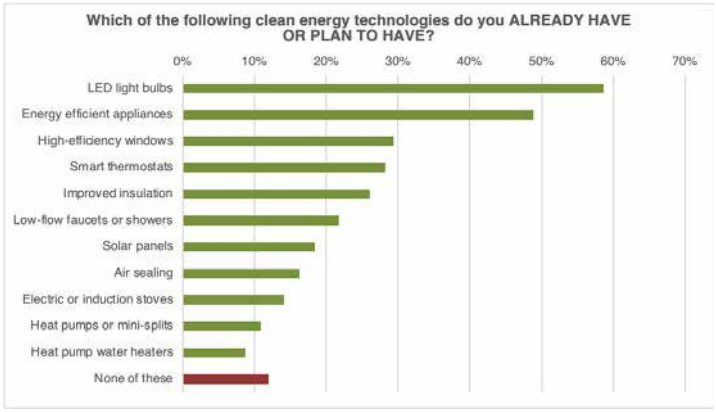
Information Sources



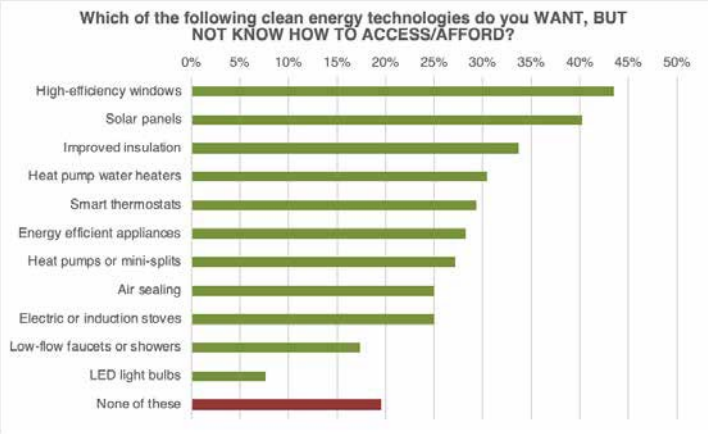


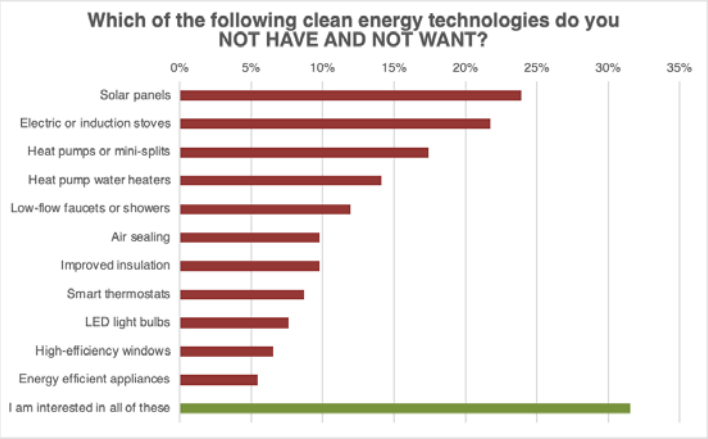
Home Energy Upgrades





Home Energy Upgrades



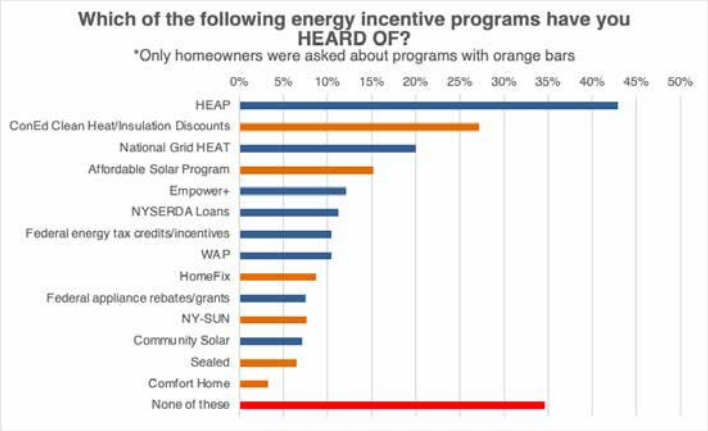


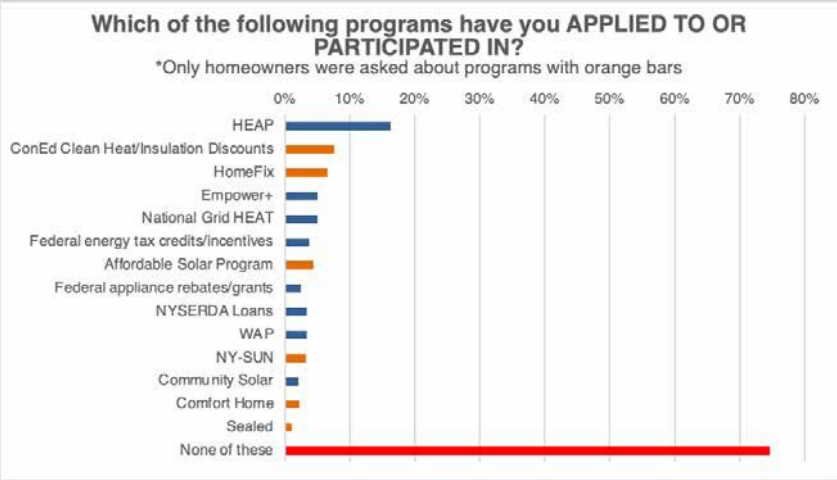
How much do these benefits of making a home energy upgrade appeal to you?* (Scale of 1-5)	
Lowering my utility bills	4.6
Improving indoor air quality	4.6
Preparing my home to withstand natural disasters and avoid power outages	4.5
Making my home's temperature more comfortable	4.4
Fighting climate change/improving the environment	4.4
Making needed home repairs like a roof replacement or mold/lead abatement as part of the upgrade	4.1
Getting my tenant to stop complaining about being cold/hot (only asked to homeowners)	*3.1*

How big of an obstacle would these be to making a home energy upgrade?* (Scale of 1-5)	
I can't afford the upfront cost of the upgrades I'm interested in	4.2
I cannot make the upgrades I'm interested in on my own as a renter (only asked to renters)	4.1
The process of receiving upgrades is daunting/complicated	4.0
I don't know what kinds of upgrades, technologies, and programs exist and what it is possible for me to do	3.8
Other home repairs or upgrades are a bigger priority for me (only asked to homeowners)	*3.6*
I don't want people coming into my home to install upgrades	2.3

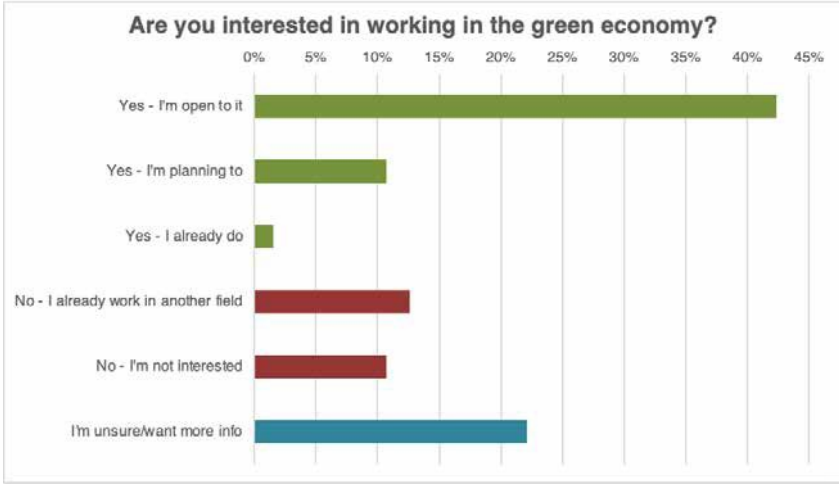
**Italicized: only asked to homeowners.* Underlined: only asked to renters

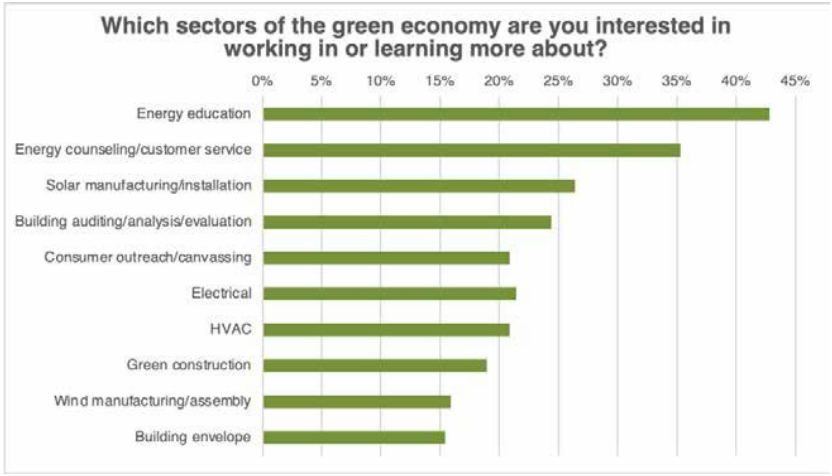
Home Energy Upgrades



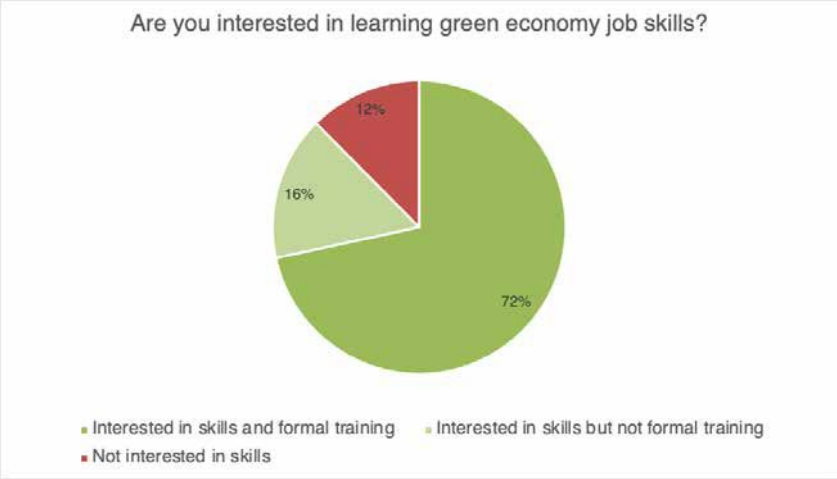


Workforce





Workforce



How much would the following encourage/enable you to participate in a green jobs training program?	
Possibility of earning better wages and benefits	4.7
Learning new skills	4.6
Doing work that helps my community and the environment	4.5
Stipend (payment) for participation	4.5
Hearing positive experiences from people who completed the program	4.4
Online option (no in-person requirement)	4.3
Someone I trust recommending the program	4.3
Free childcare during the program	3.4

How big of an obstacle would these be to participating in a green job training program?	
I don't know how to find a green job training program	4.2
I'm worried I don't have the right skills	4.1
Travel time	4.0
Work schedule / inability to take time off work	3.8
Childcare or other caretaking responsibilities and/or cost	3.6

Regional Assessment & Barriers Analysis (RABA)

Southern Tier

Acknowledgements

This study was developed by Hub Southern Tier staff with the support of Emily La, Gerri Wiley, George Homsy, Gretchen Rymarchyk, and NYSERDA and CADMUS staff.

Executive Summary

This study seeks to better understand barriers to the participation of disadvantaged communities and lower-income households in clean energy programs and workforce in the Southern Tier region. The study includes background information on the region's population, economy and energy landscape, and identifies a series of barriers and corresponding recommendations and strategies to address those barriers. The study is based on regional and state reports, a survey of residents, interviews with partners and contractors, and Hub staff experience. While aspects of commercial energy use are touched on, the report mostly pertains to residents from marginalized communities.

The Southern Tier region comprises eight counties running along the southern border of New York State. While predominantly rural in landscape, a majority and growing share of its population of 641,000 live in urban areas, with greater Binghamton and greater Ithaca—the two largest urban areas in the region—making up one-third of the population. Population in the region has been on the decline over the last several decades, especially among working-age adults.

Some 20% of the population lives in areas designated as "Disadvantaged Communities" (DACs), mostly concentrated in the cities of Binghamton, Elmira, and Bath; another 24% of the region's population live outside DACs but are considered low income. More than half of lower-income households rent their homes. People of color are two to three times more likely to live in poverty than white people.

The weatherization of low-income homes has proceeded at a steady pace over the last several years; heat pump installs have been on a rapid climb; and the number of residential solar installs peaked in 2015 and have declined since, though there has been an increase in industrial scale solar installations. In all instances, however, the pace of installs for all technologies is far from what is needed to reach the goals of the Climate Leadership and Community Protection Act (CLCPA), which aims for 100% renewable energy and ambitious greenhouse gas reductions in the next several decades.

Through surveys conducted with over 300 residents at food distribution centers and other places that serve low-income households, as well as interviews with community partners and energy contractors, barriers to the participation of DACs and strategies to overcome these barriers were identified. Among the most salient barriers were:

- Lack of awareness of clean energy programs and jobs and training in the region

- Low-income renters feeling disempowered to participate in clean energy programs since benefits accrue to the homeowner, or due to difficulties with their landlord
- Lack of training programs for clean energy jobs
- A lack of Empower+ contractors and those that also install heat pumps
- Generational oppression of poor education, unequal incarceration, divestment from neighborhoods, and persistent prejudice, place many barriers to home ownership, energy awareness and literacy, and wealth, and, consequently, to clean energy actions.

In response, our Hub recommends over the coming years:

- Enhancing our communications and marketing through targeted outreach
- Organizing community campaigns focused on renters and landlords in urban areas and low-income homeowners with high heating costs in rural areas
- Strengthening our Hubs' workforce development programs and expanding their reach to Chemung and/or Broome counties
- Strengthening partnerships with clean energy contractors to facilitate the hiring of trainees from our workforce programs
- Identifying or developing an energy literacy program that supports community engagement and a robust delivery system involving CEAs, partners, and volunteers
- Addressing legacy barriers of race and class that have led to persistent inequities, especially in terms of Black Americans. While addressing these structural barriers is not something Hubs can do on their own, we want to call attention to these structural issues, and hope that our work contributes however modestly to their dismantling.

Baseline Regional Characterization

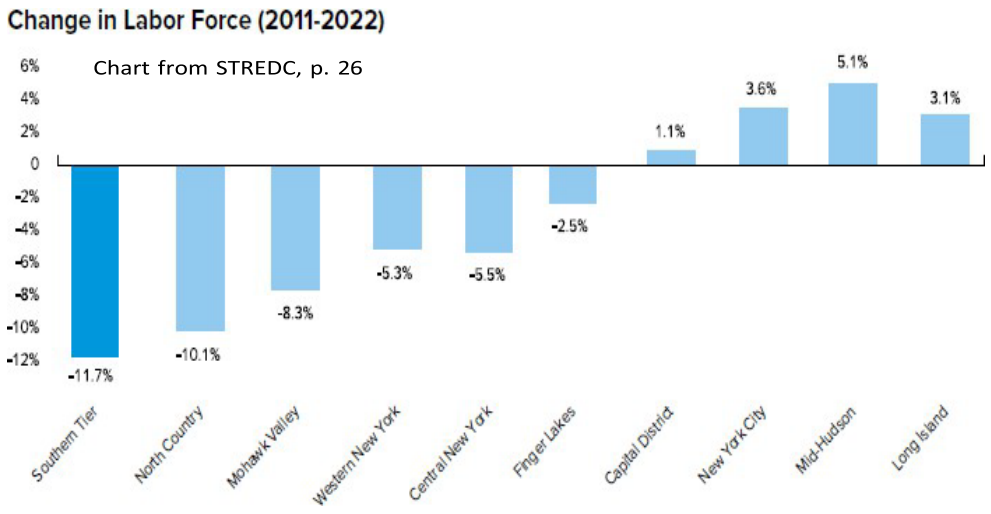
The Southern Tier region comprises eight counties running along the southern border of New York State. From west to east, these are: Steuben, Schuyler, Chemung, Tompkins, Tioga, Broome, Chenango, and Delaware. While a large portion of the region's area is rural and agriculture-based, a majority and growing share of its population of 641,000 live in urban areas, with greater Binghamton and greater Ithaca the two largest urban areas in the region, making up for one-third of the population. These two areas contain the two major universities in the region, which play a significant role in the region's economy.

Sociodemographics

An aging and declining population

In contrast to New York State overall, the population in the Southern Tier has decreased in the decades after 1990.[1] Counties saw decreases in the last decade of 1-5%, with only Tompkins County seeing an increase in population, 4%, in the last decade.[2]

This, combined with an aging population, has resulted in an "almost 12% [reduction] in the region's labor force, the steepest decline of any region in the state. The shrinking labor force raises challenges for local employers seeking a qualified workforce and limits the region's tax base."[3] About 19% of the region's population is 65 and over,[4] compared to a national average of 17.3%. Delaware County has close to 25% of its population 65+; and Tompkins County has the youngest population, with 14.6% being 65+.



White but becoming more racially diverse

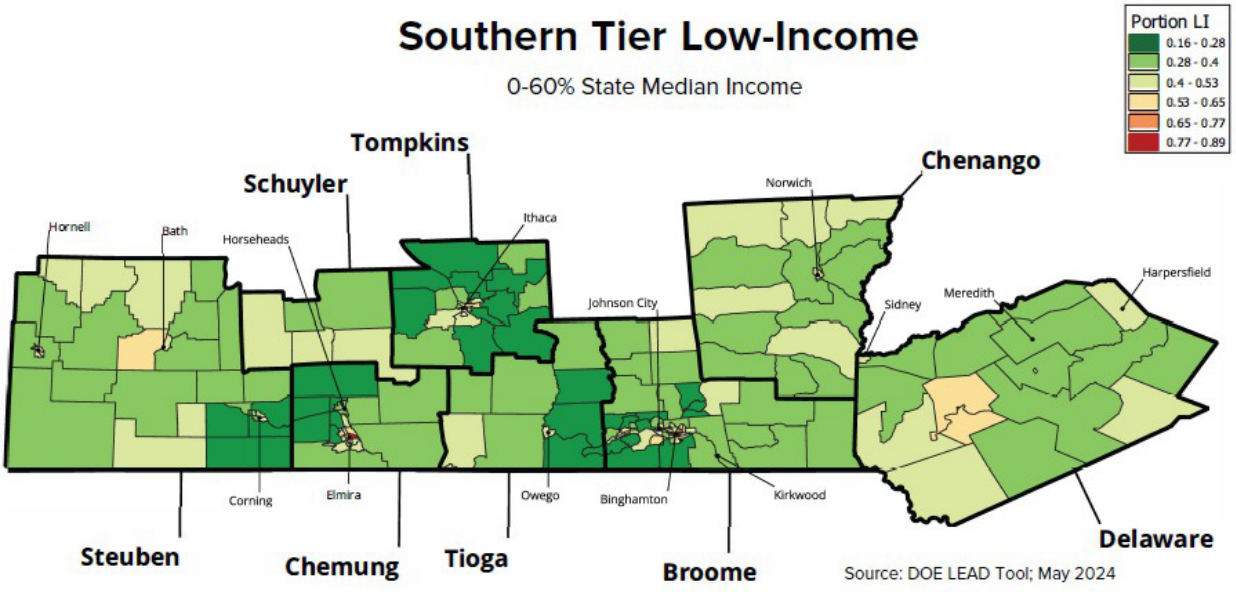
The region is predominantly white; recent Census data show 88.5% of the population reporting identifying as white alone, compared to 69% in the state.[5] There is variation among counties, with Tompkins at 81% white and Chenango, Schuyler, and Tioga around 96%. People identifying as Black make up about 5% of the region's population, with Asian and Hispanic people at close to 4% each, and "Other" (mostly mixed races) closer to 3%. However, the percentage of people of color and immigrants is on the rise—up 3 percentage points in Chenango, Schuyler, and Tioga and 15 percentage points in Tompkins over the last five decades.[6] About 7% of the population in the region reports speaking a language other than English at home, two-thirds of them living in Broome and Tompkins.[7]

Poverty, insecurity and disadvantaged communities

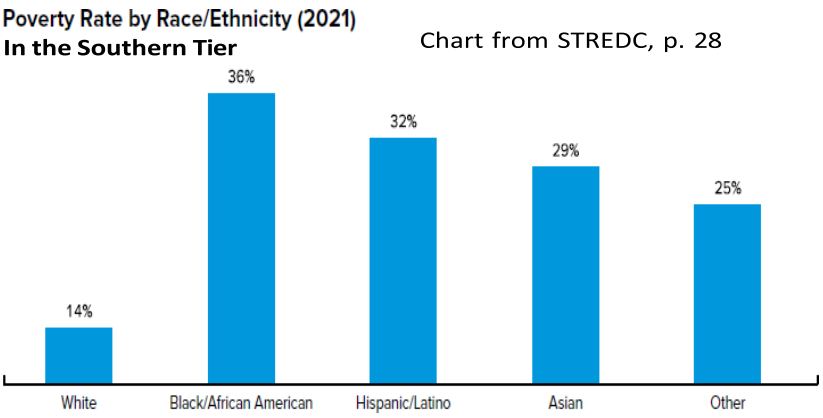
Between 11 and 19.5% of the population in each county live in poverty (NYS has an average of 14%). The higher numbers are Tompkins (16%) and Broome (19.5%), which have significant

[1] Southern Tier 2023 Strategic Plan, Southern Tier Regional Economic Development Council (STREDC)
[2] US Census 2010, and American Community Survey 2021 5-Year Estimates
[3] STREDC 2023, p. 8
[4] These and subsequent demographic data are taken from American Community Survey 2021 5-Year Estimates, unless noted otherwise
[5] Data on race from US Census Quick Facts. Accessed February 2024
[6] From USAFacts.org
[7] Census Quick Facts; accessed February 2024

undergraduate student populations whose limited income can skew poverty data. 38.5% of the households in the region qualify for the low-income EmPower+ incentive, which is based on 60% of the state's median income, with many of these households clustered in urban areas of the region (see map below).



While there are far more total white people living in poverty than people of color, non-white populations are much more likely to live in poverty. For example, "[m]edian incomes for Black residents were roughly half that of white residents, a higher level of disparity than New York State or the U.S. as a whole."[8]



LMI Households in the Southern Tier Region experienced in 2013-2015 an average energy burden of 9.8%, a bit higher than the state average of 9.2%.[9] Statewide data shows higher annual energy bills for households in single family residences ($3,557)—the most common housing type in the region—or mobile homes ($3,093) as compared to multifamily housing ($1,567-$2,644).[10] The Department of Energy's LEAD tool, using more

[8] STREDC, p. 8
[9] "LMI Market Characterization Study; Special Topic Report on Household Energy Burden" Undated (but references data and resources up through 2016); APPRISE Incorporated
[10] Ibid, Table 4.8, p. 11

recent data, shows an energy burden for LMI households in all Southern Tier counties of 7-9%, with Tompkins as an outlier at 5%.[11]

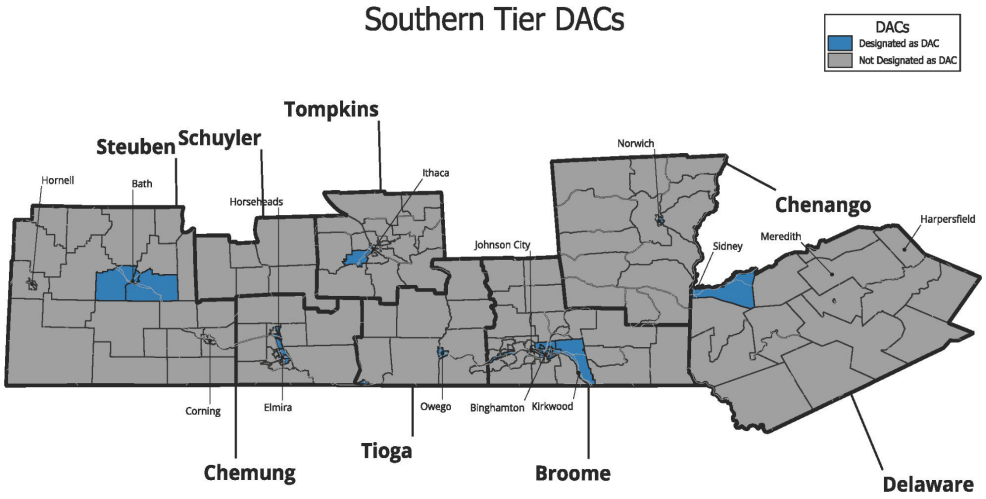
There are 121,492 residents in the Southern Tier living in census tracts designated as Disadvantaged Communities (DACs) under the CLCPA.[12] This represents 19% of the total population.

County	# of DAC tracts	Population in DACs	% of Pop in DACs
Broome	21	62107	31%
Chemung	8	23961	28%
Chenango	1	3044	6%
Delaware	1	5431	12%
Schuyler	0	0	0
Steuben	3	12029	13%
Tioga	2	7976	16%
Tompkins	2	6944	7%
TOTAL	**39**	**121,492**	**19%**

According to the DAC criteria factsheet from NYS,[13] 20% of Southern Tier households live in DACs,[14] but 24% live outside DACs and meet the criteria for low-income households. The Southern Tier is one of two regions in the state where there are more low-income households outside of DACs than in them.

Transportation

Being mostly rural counties, the region in general does not have a good public transportation system. All counties have a commute rate of 5% or less using public transportation



[11] Energy.gov, Low-Income Energy Affordability (LEAD) Tool. Accessed March 2024.
[12] Data from data.ny.gov. Accessed 4/5/24.
[13] "New York State's Disadvantaged Communities Criteria", Department of Environmental Conservation and NYSERDA, 9/23
[14] We are not sure why the difference of 1% (20% in DACs vs 19%). It may be due to different data sets used to estimate total population.

(with 5 of 8 counties 1% or less).[15] While average commuting times are lower than the state average of 33 minutes, ranging from under 20 minutes in Broome and Tompkins and a little over 27 minutes in Schuyler,[16] people are very reliant on personal automobiles, which are a significant cost and a potential barrier for low-income families to access information, jobs, and other resources.

Buildings & Sector Assessment

Building Type

Of the 306,780 housing units in the region, close to two-thirds are single-family residences, with approximately 10% mobile homes and 24% multifamily (13% in 2-4 units and 11% in 5+ units).[17] This is quite different from the state average of 46.8% single-unit structures, 2% mobile homes/other, and 51.2% multifamily homes.[18] There is some variation between counties. For example, Tompkins has 54% single-family residences, and Delaware and Tioga have 74%; Broome has 5% mobile homes, and Schuyler has 23%.

Heating fuel

Close to half of homes in the region are heated with natural gas (48%), followed by electricity and fuel oil (15% each), and then propane and other fuels such as wood or coal (11% each). Thus, approximately 74% of homes are heated with fossil fuels or combustion-based appliances. Delivered fuels, which are among the most costly, account for 37% of heating fuels. However, there is great variability among counties. Chemung, Broome and Tompkins use between 13-28% delivered fuels, whereas Chenango and Delaware are over 70%. Fewer than 7% of multifamily units rely on delivered fuels, whereas 71% of mobile homes and 45% of single-family homes rely on these more expensive fuels.

Owner-occupied and renter-occupied

In Southern Tier counties, 71% of households own their homes, with Chenango, Delaware, Schuyler, Steuben and Tioga having 73-78% ownership rates.[19] The outlier is Tompkins, which has only 54% ownership.

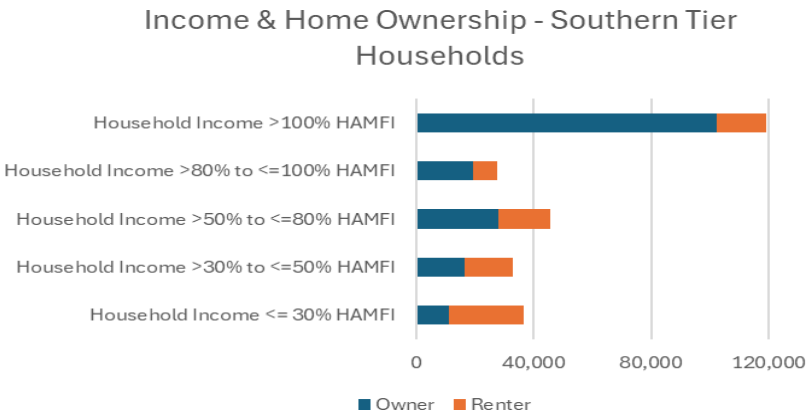


Chart source: HUD, https://www.huduser.gov/portal/datasets/cp.html#data_2006-2020

Not surprisingly, for lower-income households, the rate of homeownership decreases. Taken together across the region,

[15] American Community Survey 2022 5-Year Estimates, data.census.gov
[16] Ibid
[17] Data on building type and heating fuel from NREL ResStock (undated); provided by CADMUS in early 2024. Table 1 in the Appendix provides more complete data.
[18] American Community Survey 2022 1-Year Estimates, data.census.gov
[19] American Community Survey 2022; provided by CADMUS March 2024

slightly under half (48%) of households with incomes under 80% of the household adjusted median family income (HAMFI) own their home.[20,21]

In addition, "[f]or all residents, regardless of race, gender, or income, housing affordability is a top concern: rates of home construction have slowed across the region, and many counties saw a net loss of housing units."[22]

Clean Energy Workforce

According to NYSERDA's 2023 NY Clean Energy Job Report, there are 4,150 clean energy jobs in the Southern Tier, with 4,779 residents working in clean energy (some outside our region). The breakdown of the number of clean energy jobs by county (with the number of residents working in clean energy) is shown in the table on the right.

Broome	**Chemung**	**Chenango**	**Delaware**
1,383 (1,187)	646 (568)	221 (288)	159 (181)
Schuyler	**Steuben**	**Tioga**	**Tompkins**
70 (200)	682 (1,456)	98 (151)	891 (748)

While data on a regional level is not available, about three-fourths of the clean energy jobs in the state were categorized as "Building decarbonization and energy efficiency" (73.8%), with "Renewable electricity generation" (15.2%) and "Clean and alternative transportation" (7.9%) making up the bulk of the rest.

Training

The region has a strong higher education presence, but there are limited training opportunities for clean energy work. The most salient include:

- SUNY Delhi offers an HVAC associates degree. According to their website, their graduates have 100% job placement in the HVAC industry.[23]
- Since 2021, Tompkins-Seneca-Tioga BOCES has offered a heat pump installation training out of its campus in Ithaca. This 3-month course has attracted 5-18 participants in several cohorts. Recent enrollment has been lower, and only one more offering is planned for the fall of 2024.
- CCE-Tompkins offers the Energy Warriors Green Career Pathways training program. This uses the nationally recognized "Roots of Success" Environmental Literacy curriculum and incorporates hands-on components, including a paid weatherization component and certifications.
- New Energy New York, the battery tech center out of Binghamton, offers an "Academy," with microcredentials and a 10-week online training course. Many of the courses are free.

[20] HUD, Comprehensive Housing Affordability Strategy Data, based on American Community Survey data 5-year estimates 2016-2020.
[21] Excluding Broome and Tompkins counties, where significant numbers of university students skew income data, 56% households in this income group own their home.
[22] STREDC, p. 8
[23] delhi.edu/academics/majors-programs/associates/heating-ventilation-air-conditioning/

- Other related training includes a 4-month program in Residential Electricity offered by Broome-Tioga BOCES. Several unions offer training in electrical work and carpentry. Alfred State College, in Alleghany County, to the west of Steuben, offers an HVAC & Plumbing 2-year program that includes heat pump installation. SUNY Morrisville in Madison County, to the north of Chenango, offers a bachelor's degree in Renewable Energy.

Utilities

NYSEG—New York State Electric & Gas—serves almost all the region's residents with electricity and about 40% of households with natural gas.[24] In 2023, a rate case was approved, with a 62% increase in electricity delivery charges over a period of 18 months (a smaller increase for natural gas), as well as increases in basic service charges for electricity and gas. The increase in rates has all but guaranteed that a switch from heating with natural gas to heat pumps will come with an increase in heating bills.

The utility offers support for energy efficiency measures through rebates. Over the last several years, NYSEG has been installing "smart meters," which have enabled rollouts of an opt-in demand-response program to reduce summer peak load and an opt-in time-of-use rates plan. NYSEG has in place a "Non-Pipe Alternatives" project in the town of Lansing (Tompkins County) to reduce natural gas demand and avoid the need to build out additional gas infrastructure.[25] The project provides additional incentives for homes and businesses to switch from natural gas to heat pumps for heating.

National Grid also serves a very small corner of Chenango County with electricity, and Penelec—a Pennsylvania-based company—serves a small sliver in Tioga County.

In addition to these investor-owned utilities, there are five village-led utilities in the Southern Tier: the villages of Bath (Steuben), Watkins Glen (Schuyler), Groton (Tompkins), Endicott (Broome), and Greene (Chenango). There are also two electric cooperatives in the Southern Tier: the Steuben Rural Electric Coop and Delaware County Electric Coop.

In the past, a handful of municipalities in Broome, Chemung, and Tioga counties received renewable energy through Community Choice Aggregation (CCA) arrangements in their communities. However, all have discontinued these practices as the price of Renewable Energy Credits (RECs) increased, and they were no longer competitive with standard utility pricing.[26]

While the EPA shows two-thirds of energy produced in upstate NY is emission free, NYSEG's fuel mix—what the utility purchases on behalf of its customers—is the inverse: close to

[24] Figures provided by NYSEG, March 2024
[25] https://www.nyseg.com/ourcompany/reliableservice/reliability-projects/non-pipe-alternatives
[26] Gerri Wiley, email exchanges in March 2024

two-thirds is combustion based.[27] And NYSEG's share of emission-free electricity supplied to consumers has been in decline, going from about 66% in 2009 to 38% in 2022.[28]

Regional Partners

There are three major sets of partners that assist in the energy work in our region: energy contractors, agencies serving low-income households, and, within these, those that provide affordable housing and housing repairs.

Energy Contractors

These are the contractors who carry out the clean energy improvements in people's homes. These include home performance contractors, HVAC installers who work with heat pumps, and solar installers.

While there are a few dozen participating Empower+ contractors listed serving our region,[29] only eight of these have offices in the region, and four of these are Weatherization Assistance Program (WAP) agencies. Of the other four, two are from the Binghamton area—Insulation Man and Foam It—and two, Halco and Isaac, each have a satellite office in the region. These four plus Simply Installs/Simply Home Performance conducted two-thirds of the Empower+ work in the region over the last months.[30] The WAP agencies that offer Empower+ often prioritize WAP over Empower+ and often have long waiting lists, making prompt access to their services challenging. The result is a small pool of Empower+ contractors serving the region.

In contrast, there are scores of local heat pump installers that serve our region.[31] However, of these with local offices, just Halco and Isaac participate in Empower+. Other Empower+ contractors partner with heat pump installers, but, in effect, there is an extremely small pool of contractors that can help low-income households with energy efficiency and clean heating concerns in a streamlined manner. Contractor capacity for LMI work may be further constrained when additional incentives from the Inflation Reduction Act for customers at 81%-150% AMI are available through the Comfort Home program, as this program draws from the same contractor pool described above.

NYSERDA's online directory of solar contractors serving residential and small commercial customers lists over 150 contractors serving each county in our region. However, most of these contractors are from outside the region, including NYC.

Of all the above contractors, few are owned by women, minorities, or service-disabled-veterans. To our knowledge, these are limited to three woman-owned (or co-owned) businesses: Insulation Man (home performance), LaMorte Electric (heat pumps) and Finger Lakes Renewables (solar).

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[27] NYGATS - NYS DPS, included in a presentation by Gerri Wiley 1/12/24
[28] Ibid.
[29] https://www.nyserda.ny.gov/Contractors/Find-a-Contractor/Empower-Plus-Contractors
[30] Response to NYS FOIL request. Received 4/29/24
[31] https://cleanheat.ny.gov/find-a-contractor/

Key Partners

A number of government and other agencies that work with our focus population are key partners for our work. Department of Social Services offices in each county, which administer, among other things, the Home Energy Assistance Program (HEAP); Offices for the Aging; and CAP agencies, many of which administer the federal WAP program, are very useful to address challenging situations. NYSEG and its consumer advocates can often provide extra support for vulnerable residents.

Home repairs

A subset of partners are affordable housing agencies, which often offer funds for repair for lower-income households. The USDA's Rural Development program offers such funds, as well as additional funds for energy work, for income-eligible rural households.

Regional Assets

According to the Southern Tier's 2023 Strategic Plan, ours is the top region in NYS for concentration of advanced manufacturing and electronics jobs. "Manufacturing is expected to grow by 9% over the next 5 years."[32] The first of the "Five Pillars of Regional Investment" listed in the region's 2023 Strategic Plan is related to clean technology:

> "**Position the Southern Tier as a dynamic, ever-evolving hub for cleantech**. The Southern Tier is emerging as a global leader in battery technology innovation and manufacturing…….Local manufacturers are exploring novel technologies to sustainably diversify the region's energy mix, and the Southern Tier has the opportunity to position itself as a hub for the cleantech industry, creating a distinctive economic cluster and competitive edge to support business and talent attraction" (p. 10).

The two strategies in the plan related to this pillar are to amplify the existing partnerships and build on state and federal investments, and to "[a]ddress challenges in the electrical grid to increase power capacity and ensure a fast and reliable transition to clean energy and energy storage solutions" (p. 11). In addition, the report states,

> "The New Energy New York (NENY) Battery Tech Hub, led by Binghamton University, is growing the region's battery technology sector and cementing the Southern Tier as a national leader in researching, developing, and manufacturing battery technology, including American-made lithium-ion batteries and next-generation technologies."

One planned regional action is to expand workforce training opportunities in clean energy. "NENY projects the funding awarded to date will generate 10,000 new jobs in the coming decades" (p. 35).

[32] STREDC 2023, p. 8

As noted earlier, the region has strong assets in higher education. Over 65,000 students are enrolled in the region's higher education institutions, with Cornell University (25,900 enrolled) and Binghamton University (18,600 enrolled) making up over two-thirds of these.

Baseline Assessment of Clean Energy Program Participation

Residents in the Southern Tier can access a variety of energy-related programs to help them reduce their energy use and bills and power and heat their homes with renewable energy. The most prominent residential programs are included in the table below.

Program Name	Description	Administration
Empower+	No-cost energy assessments and upgrades for LMI households	NYSERDA; work done through network of private contractors
Weatherization Assistance Program (WAP)	Similar to Empower+ but funded by U.S. Dept of Energy.	NYS Homes & Community Renewal; subcontracted to county agencies
Residential Energy Audit Program	No-cost energy assessment for market rate homeowners of 1–4-unit homes	NYSERDA
Comfort Home	No-cost energy assessment and incentives for market-rate households for insulation, air sealing and windows	NYSERDA
Independent Energy Efficiency Program	Incentives for municipal electric customers for energy efficiency, heat pumps, appliance rebates, etc.	Independent Energy Efficiency Program, a nonprofit serving municipal electric companies
Clean Heat	Incentives for heat pumps	Utilities with NYSERDA support
NY Sun	Rebates for solar installs	NYSERDA
Solar Energy System Equipment Credit	NYS Tax credit for solar installs equal to 25% of the cost up to $5,000	NYS
Subscription Solar	Subscription-based service to commercial solar farms that grant resident a discount (usually 5-10%) on their utility bill from credits from solar	Solar farms in conjunction with the utilities
Inflation Reduction Act	Rebates and tax credits for energy efficiency, heat pumps, and solar	Federal government
Home Energy Assistance Program (HEAP)	Subsidies for heating bills for low-income households; also assistance to repair and replace heating equipment, and subsidy for cooling	Office of Temporary and Disability Assistance (OTDA); provided through county Dept of Social Service offices
Energy Affordability Program (EAP)	Utility bill discount program for low-income households	Established by PSC; administered by utilities
Electric Vehicle and Charging Incentives	There are federal and state incentives for purchasing new and used Electric vehicles (EVs) and for installing EV charging ports at home	NYS, IRA, NYSERDA

Finger Lakes Climate Fund	Carbon offset program providing grants to lower-income households for clean energy projects that displace carbon emissions	Sustainable Finger Lakes
Financing	Financing for NYS residents for clean energy work. Reduced rates for lower-income residents.	NYSERDA

Statewide residential programs

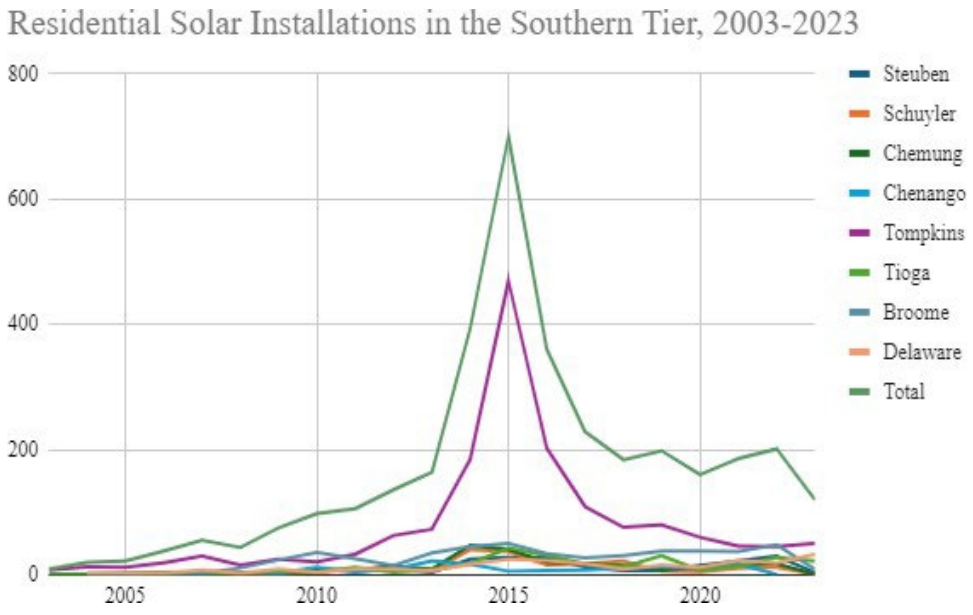
According to NYSERDA's EmPower+ Participation data available in Open NY, 4,005 EmPower+ Tier 1 projects have been completed throughout the Southern Tier since 2018 through January 2024, with more than one-third of the projects in Broome County (1,470). The number of projects completed hover between 600-800 a year (average 666) in our region. At this pace, it would take 146 years to retrofit all low-income units.[33] It is true that thousands have already been weatherized through decades of energy programming. However, the current pace appears woefully inadequate to reach all the remaining homes in the timeframe laid out in the CLCPA.

County	**Number of Tier 1 Projects Completed (2018 - Jan. 2024)**
Broome	1,470
Chemung	430
Chenango	363
Delaware	108
Schuyler	111
Steuben	452
Tioga	421
Tompkins	650
Total	4,005

Average savings from the work was estimated to be $417 for the first year, though NYSERDA noted that this was an overestimate, with actual annual savings being closer to $292.[34]

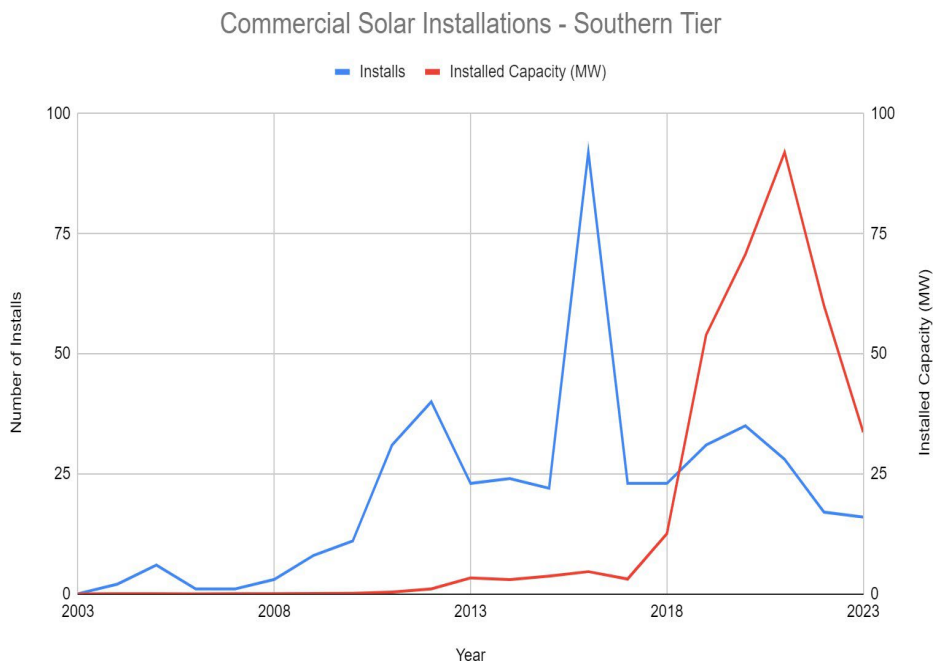
Solar Installs

Over the last 20 years (2003-2023), there have been 3,500 residential solar installations in the Southern Tier region.[35] Close to half of the total installations (1,634) were in Tompkins County; Broome and Tioga counties follow, with 512



[33] Calculations based on the assumption that the 31.7% of the population with two times the poverty rate or under live in the same proportion of housing units, representing some 97,352 units.
[34] See disclaimer on estimated vs actual savings at data.ny.gov
[35] All information on residential and commercial solar installs from NYSERDA, on https://data.ny.gov. Accessed April 2024.

and 273, respectively. Installations peaked in 2015 with 699 in total, largely the result of the Solar Tompkins campaign going on at the time. From 2017 to 2022, installs hovered around 200 a year, but they dropped in 2023 to 120 for reasons that are not clear. The 2015 peak speaks both to the effectiveness of the solarize campaign's approach in Tompkins County and that the boost from the campaign was not sustained over the long term to ensure a steady and growing number of installs. There were at least two other Solarize campaigns in the region that followed Solarize Tompkins, with more modest results.



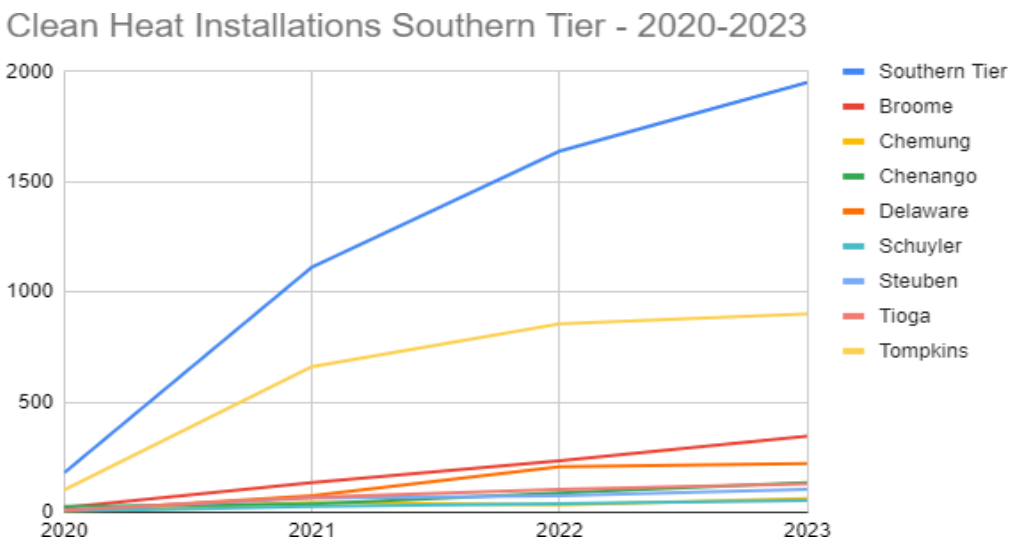
Commercial solar installs peaked in 2016, also a likely result of the Solar Tompkins campaign (77 of 92 were in Tompkins County). While install numbers have dropped since then, the amount of solar capacity has increased, with larger and larger projects. In 2013, the average size of an install was 0.14 MW; in the last four years, it has been more than 10 times that, between 2 and 3.5 MW, representing the larger solar farms that have been developed around the region. And there are many more in the pipeline. Total solar capacity from commercial installs over the last 20 years is 342 MW; there are currently 369 MW of solar in the development pipeline, which, if completed, would more than double our region's total installed capacity.

Heat Pump Installs

According to NYSEG Clean Heat NY data,[36] installations of heat pumps in the region have increased significantly over the last three years (2021-2023), from 1,112 to 1,951 a year, an increase of 75%. While increases have been seen in all counties, those with the largest growth over the last two years of installs are Chenango (262%), Delaware (192%), and Broome (156%). This growth may be related to the Clean Heating & Cooling campaign, HeatSmart Southern Tier, that serves these counties. That said, Tompkins County leads the region in terms of numbers of installs, with 2,417 over the last three years, which is more than half of the total installs in the region (4,702).

[36] Information on heat pump installs from email with NYSEG employee on 3/19/24.

Of these installations, 3,715 were air-source heat pumps, 281 ground-source, 673 heat pump water heaters, and 33 commercial and industrial projects.



There are still over 200,000 housing units reliant on fossil fuels for heating in the region.[37] At the current pace of installs, it would take us over 100 years to switch all of these to heat pumps. Furthermore, the data does not show how many of these households were LMI; we suspect that LMI households are installing heat pumps at a much lower rate than those with higher incomes, potentially leaving this population even further behind.

Of the 199 municipalities in the region, as of April 2024, 118 were participating in, or had participated in, the Clean Energy Communities program.[38] This represents 59% of the total municipalities. Participation rates significantly by county, with 100% of Schuyler municipalities having participated and 31% of Chenango's. A portion of these municipalities have carried out "Community Campaigns," engaging residents around heat pump installs, electric vehicle purchases or weatherization projects.

Clean Heating & Cooling Campaigns

In the period of 2018-2022, there have been three Clean Heating & Cooling (CHC) campaigns in the region, covering all eight counties. HeatSmart Tompkins, the first such campaign in the state, served Tompkins and Chemung counties. HeatSmart FLX South served four counties of Schuyler and Steuben in the Southern Tier and Seneca and Yates in the Finger Lakes. HeatSmart Southern Tier is the only currently active campaign, run by NEST, located in Broome County. The table to the right summarizes the results from each campaign, along with a total for all CHC

Campaigns	NYSERDA Funding	Leads	Installs	$ per Lead	$ per Install
FLX South	$177,504	172	79	$1,032	$2,247
Southern Tier	$460,303	293	39	$1,571	$11,803
Tompkins	$810,920	970	328	$836	$2,472
Statewide	*$5,420,000*	*8,918*	*1,597*	*$608*	*$3,394*

[37] NREL Restock (undated), provided by CADMUS, April 11, 2024
[38] Email communications with Clean Energy Communities coordinators, March 2024

campaigns carried out in the state.[39]

The region has had a few other initiatives promoting clean energy. Sustainable Finger Lakes has run pilot programs to promote heat pumps in rental units and mobile homes. The mobile home heat pump pilot program helped stack incentives, with additional funding from the pilot and Finger Lakes Climate Fund, and had, as of April 2024, installed 15 of the goal 50 systems.[40] They also have a long-standing carbon offset program, which provides additional funding to an average of 10 clean energy projects a year for LMI households. The City of Ithaca's "Green New Deal" is based on a local 2019 resolution to reach carbon neutrality in government and community operations by 2030.[41] The City hired several staff and contracted with BlocPower to oversee the Green New Deal implementation. While clean energy installations in the City have not significantly increased, some progress has been made, including the approval of a new building energy code.

Stakeholder and Community Engagement

To learn about barriers to clean energy adoption among lower-income households, we engaged low-income residents, nonprofit partners that serve them, and energy contractors who work with them. Our Community Energy Advisors (CEAs) surveyed over 300 residents in person or over the phone and interviewed 26 nonprofit partners and 10 energy contractors. The main questions for which we sought answers were:

1. What barriers stymie the participation of low- and moderate-income people in clean energy programs and jobs?
2. What has worked to overcome these barriers and facilitate this participation?
3. How do our focus residents, as well as partners and contractors, perceive the clean energy landscape—the programs and the work itself?

Methods

We chose in-person interviews to ensure we would reach our focus audience and eliminate any barriers to survey participation. CEAs went to places where many or most of the people were known to be low- or moderate-income, such as free food distribution sites, and provided participants with a $10 gift card for completing a 1520-minute survey with the CEA. A handful of people CEAs had advised in the past were also interviewed over the phone. CEAs also chose the key partners in each of their counties and contractors to conduct semi-structured interviews. Four housing agencies, two utility employees, eight government agencies, and 12 other nonprofit organizations, including advocacy and citizen groups, were interviewed. These were done live in person, over the phone, or online as a conversation. In addition to receiving their input, an added benefit was strengthening relationships with these organizations and businesses.

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[39] Data: NYSERDA CHC Installer Reporting Dashboard; accessed 5/9/24; installs include ASHPs, GSHPs, HP water heaters, and weatherization measures). Spending refers to NYSERDA funds given to the community campaigns, and does not include incentives for the residents.

[40] Conversation with Holly Hutchinson, 4/26/24

[41] https://www.cityofithaca.org/642/Green-New-Deal

Most questions for residents were open-ended, with different sets of questions for those who had applied for programs and those who hadn't. CEAs coded the answers to the resident surveys in real time using pre-prepared categories, when applicable, or new ones. This coding was revisited by CEAs in several sessions dedicated to analysis of the results. CEAs and other Hub staff were involved in the creation of the questions, the administering of surveys and interviews, and analysis. This helped them become more intimately familiar with the reality of our region and to build their capacity as grassroots educator-researchers. This fits with how we see the work of the Hub as one of learning over time how to be increasingly effective through research, experience, and peer learning. Copies of the questions for the resident, partner, and contractor surveys can be found as an Appendix.

Results

Resident Interviews

Major results from the resident survey are grouped below into five categories of respondents, including those who hadn't applied to any energy programs; those who had applied; those who had work done; and those who didn't. Different questions were asked of those who had applied for or participated in energy programs versus those who hadn't. All respondents answered questions about clean energy jobs and about their perception and concern about climate change.

Respondent Group (Number of respondents: 273)[42]	**Results**
Never Applied (208)	• 30% said they didn't know about programs; 15% said they were renters and/or their utilities were included in the rent and thus believed the programs were not relevant for them. Another 13% said they were unsure whether they would qualify. 10% said their home didn't need the help or was already energy efficient. And there were other answers from 1-4% including cost, not wanting people in their homes, the application is too hard, etc.
Applied (65)	• Program: Primarily applied for Empower or Empower+ (57%), with smaller numbers to WAP (17%) and other programs • 23% said they learned about the program through nonprofits. This was followed by utilities (8%), with smaller numbers for word-of-mouth, media, and internet.
Applied and got work done (39)	• 60% of those who applied had had work done. • 64% of these noticed reduced energy bills; and 49% mentioned increased home comfort. Other impacts included improved health, less labor compared to heating with a wood stove, and being too early to tell as the work was recently completed.

[42] Not all the 311 were included in this analysis, due to a change in the way we counted responses of participants who had just applied for HEAP. We changed the wording in our survey to ask about energy programs aside from HEAP.

	While we didn't ask about their motivations, a few mentioned environmental benefits. • When asked what helped them be successful in getting work done, 41% mentioned the incentives provided, and 31% said supportive contractors and nonprofits or other partners (e.g., NYSEG). A number of people also mentioned that it was just a necessity that pushed them to get the work done. • Regarding what they would change about the program to help more people participate, 23% mentioned advertising the program more, 18% suggested more incentives, and 10% requested less paperwork or help with it.
Applied and didn't get work done (25)	• 25 of the 65 people who applied for the program didn't get work done. Of these, 44% (11 people) had qualified but still hadn't had work done; many were waiting for a next step. 32% (8) were waiting to be contacted by a contractor or program administrator; and 24% (6) didn't qualify, mostly due to being over income. • Of those who had applied and didn't get work done, 5 suggested increasing awareness of the programs, 4 wanted shorter waiting times, and 3 suggested additional incentives and less or easier paperwork.
All Respondents (311) re: Clean Energy Jobs	• 89% had some awareness of the term "Clean Energy." However, the largest percentage of respondents (37%) was categorized as knowing just "a little," compared to the 13% and 18% who were categorized as knowing "a great deal" or "a lot" based on their responses. Two of the most common comments about what constitutes clean energy were related to solar and wind energy. • When asked about clean energy jobs, 73% said they didn't know much about them. However, of the 80 people who responded with a comment about what they knew about clean energy jobs, 30 mentioned something to do with solar power, either seeing panels, or knowing someone who worked as an installer. Heat pumps were not mentioned at all in the context of clean energy. 68% of respondents said they did not know anyone with a clean energy job. However, some of these worked in the same building with a Weatherization Assistance Program, so in part, this reflects the misunderstanding of what a clean energy job is. Of the 75 who said they knew someone with a clean energy job, only about 30 actually reflected a definition of a clean energy job that might match ours. Others were about construction or HVAC in general; one said they knew someone "who worked on natural gas wells." • The most common barrier cited to more people entering clean energy jobs (40%, or 125 respondents) was a lack of awareness of these jobs or misconceptions about them. The second

	highest response (23%) was that people lacked the training or skills to do the work.
All respondents (311) re: Climate Change	• In response to the question, "Do you believe that climate change is really happening?" 62% answered "Yes, definitely," 26% answered "Yes, somewhat," 8% answered "No," and 4% did not provide a response. There were mixed statements about whether they attributed climate change to human activity or natural causes. Many commented on having observed weather pattern changes themselves. • In response to the question "How concerned are you that climate change is happening?", 32.8% expressed being very concerned, 37% reported being somewhat concerned, 9.7% stated they were somewhat unconcerned, 15% mentioned being very unconcerned, and 5.5% did not provide a response. Many of those who indicated some level of concern manifested that concern for future generations in particular. • In response to the question "How much do you agree or disagree with the following statement?: 'I believe my actions have an influence on climate change.'", 32.2% strongly agreed, 37% somewhat agreed, 12% neither agreed nor disagreed, 9.3% somewhat disagreed, and 9.3% strongly disagreed.

Partner & Contractor Interviews

Summaries of responses from the partner and contractor surveys are provided in the table below, with a focus on questions related to barriers and possible solutions.

	Partners (26)	**Contractors** (10)
Barriers to clean energy program participation	• Lack of awareness of the programs or the benefits (13) • Cost of energy projects and lack of funding (12) • Lack of funding for housing repairs (roofs, asbestos, lead, etc.) needed before energy work could be completed (6) • Lack of trust in energy programs or utilities (and conflate this with a utility program) or concerned about a scam (cited by at least 5 partners) • Challenges for renters and getting landlord support for this kind of work (4)	• Almost all contractors cited other physical issues in the home that need to be addressed before energy work can take place. Five contractors mentioned hoarding specifically as an issue. Other home infrastructure issues included roofing, wiring, asbestos, or lack of access to spaces where work was needed • Insufficient funding was cited by 7 of 10 contractors, which included changes to and decreases in incentives or the cost of installation increasing due to inflation • 6 contractors cited a complicated application

		process; several mentioned specifically the loan process as being difficult • Other barriers included challenges of communicating with customers, and several mentioned other contractors inflating prices and a lack of competition
Strategies for Overcoming Barriers	• Having personal interactions both for education and outreach and following and offering personalized support (13). Often referred to as "case workers" • Coordination with partner agencies to share information and be able to refer people to the Hub for support • Increase funding for programs, as well as address the stigma associated with receiving financial support	• Setting clear expectations and communicating clearly with customers (6) • Referring customers to other agencies for help with other home problems and being trustworthy and respectful • Being prepared for challenging situations in people's homes and making sure staff are trained for this
Suggestions for the Hub	• Help simplify the application process, or help people with applications • Help to incubate or support new NYSERDA-participating contractors	• Clear communication with contractors, help market more of their work, and spread the word about workforce opportunities • Need more training for workforce in clean energy and more and consistent funding for clean energy projects from NYSERDA

Barriers & Opportunities

Based on the engagement of residents, partners and contractors, our research, and our own experience, we have identified the following major barriers to the participation in clean energy programs and workforce for DACs and low- and moderate-income residents. We include this as a table with related recommendations and opportunities (strategies). While most of the barriers that are included are accompanied by recommendations and feasible strategies, we do include a significant historical structural barrier that is far beyond our resources to address.

Clean Energy Upgrades

Key Barriers	Recommendations	HUB Opportunities (Strategies)
I) **Lack of Awareness of Clean Energy & Programs, and Low Energy Literacy** – People are not aware of clean energy programs and jobs and funding available because information is not reaching them – Lack of energy literacy in general regarding the existence or importance of weatherization or other clean energy technologies and jobs	Hub: significantly Increase and diversify marketing focusing on media that people use or places where people go NYSERDA: Work with utilities and OTDA/HEAP to provide simple, attractive education on Empower+, Clean Energy Hubs, energy literacy through bills, and HEAP letters. Make Empower+ an opt-out program NYSERDA: Work with the state education department to ensure energy literacy is part of NYS school curricula Hubs statewide: Research and identify or develop curriculum on basic energy literacy for residents that can be shared via Hubs, utilities, partners, volunteers, etc.	Develop a communications plan to increase the reach and impact of HUB marketing using diverse media and diverse messaging for different audiences based upon information gathered through the RABA survey Possible strategies include developing specific materials for renters and landlords, use of QR codes, placing print materials in trusted partner agencies, making income guidelines more prominent in our communications, and featuring testimonials of local residents who use the programs Identify and partner with trusted, well-connected individuals who are informal leaders in priority communities to share information with residents in ways that are appropriate for that community Provide incentives to DAC residents to participate in energy literacy programs Gauge interest from other Hubs to work on an energy literacy curriculum and work with those who are interested
2) "Split Incentive" + <u>Landlords</u> – Don't see the value or not interested (often absent) in the programs – Concerned about code violations or getting in trouble <u>Renters</u>	Hub: Renter and landlord-focused campaigns to dispel concerns and show benefits Hub: Develop resource for landlords to help encourage tenants to participate in energy programs NYS: Increased energy	Conduct focus groups and further research to learn what type of communications works to capture the attention of renters and landlords. Learn from Sustainable Finger Lakes' pilot with renters Develop materials focused

– Don't see the value when they have no economic incentive (don't pay utilities, HEAP covers cost) – Renters not invested for the long term in the dwelling they rent – Distrust landlord or think rent will go up	efficiency standards for rental housing and enforcement of these NYS: Programs that support home ownership for lower-income households	on landlord and renter concerns; dispel myths; raise awareness of benefits (monetary and not) Develop draft language for leases that encourage tenant participation in energy programs Facilitate peer-to-peer landlord sharing to allay concerns and share information. Connect landlords with Code Enforcement officers to help both understand energy programs and dispel misconceptions Provide incentives for renters, e.g., a $100 gift card, to participate in programs
3) Empower+ application process is challenging for many low-income residents Online application is challenging, especially when relying on mobile phones Locating the necessary supporting documentation in a timely manner can be difficult	Hub: Make information and application and support available in person at places frequented and trusted by our focus population NYSERDA: Make mobile-friendly application; allow contractors to complete application with resident during audit	HUB staff meet in person with applicant: provide regular office hours at community partner spaces (e.g. libraries, food distribution sites); or provide transportation to meeting site Create or support statewide task force working with NYSERDA, OTDA, SNAP, HCR and utilities to reduce barriers to access each other's programs. Look into opt-out Empower+ for SNAP and HEAP recipients
4) Mismatch between Resident Home's Needs & Contractors' Abilities & Incentive structure Private contractors focus on big ticket items—HVAC, large surfaces of insulation; caulking or smaller jobs do not make financial sense for them; education and direct installs are often omitted. Older homes are rarely brought to "heat pump ready" state, as they require	NYSERDA: restructure incentives to encourage contractors to do all the work, including the small jobs, needed to get a home heat pump ready NYSERDA: Explore non-market-based approaches to weatherizing LMI homes NYSERDA: Enhance the match-making capabilities of the application to the	Explore a robust Civilian Climate Corps, funded by the state, to systematically weatherize LMI homes to get them heat pump ready. Or have salaried state workforce doing this work. Pilot separating the energy audit from the work, so that the audit report includes a comprehensive list of work to be done to reach "heat pump ready" standards and

high labor, low-cost work that isn't profitable to contractor Contractors who focus on insulation may not be able to handle HVAC interests of clients or be qualified for work on mobile homes	contractor, to pair residents' interests and realities with appropriate contractors	ensures resident education and direct install measures are carried out. Pilot social enterprises who are focused on workforce development and weatherization, whose funding allows them to do comprehensive weatherization work on homes.
5) Cost of Energy Improvements: LMI residents often cannot afford improvements that go beyond grants Incentives for clean energy projects such as heat pumps and solar are not sufficient or accessible (in the form of tax credits) for LMI residents Agencies with funding do not coordinate their work LMI homes on natural gas do not qualify for heat pump incentives Contractors provide all-or-nothing quotes that require customer contribution	Hub: Enhance collaboration among agencies serving LMI populations to facilitate funding and coordination of energy projects Hub: Explore if new IRA and OTDA funding addresses cost barrier NYSERDA: Provide extra scrutiny to contractor proposals that exceed grant amounts	Connect with apprenticeship programs to do work at lower-than-market cost Direct low-income residents to new IRA and other sources of funding (Finger Lakes Climate Fund) to make up the gap NYSERDA scrutinizes quotes to ensure contractors provide line-item quotes for proposals that exceed grant amounts, and make clear that customer is not obligated to pay to have some work completed, in most situations
6) Costly structural repairs slow or stop energy improvements particularly for LMI homeowners (e.g., roof or septic systems, asbestos) There are very limited funds for home repairs in existing programs and long wait lists with partner agencies, like Bishop Sheen, INHS, etc.	Hub: Help municipalities access additional funding for their residents NYSERDA: HUD, NYSERDA, USDA, OTDA and HCR (WAP) work together to address home repair needs NYSERDA reconsider program rules to see if contractors can be allowed to do some limited work before the structural issues are addressed	Hub: Connect municipal officials with CEC program, and with opportunities and organizations to access CDBG funding Hub staff work with NYSERDA to better coordinate with WAP and/or Community Action agencies, which can do some repairs to maximize what WAP and Empower can do. Explore county-based OCFS "Single Point of Entry" as model, which has special committee to help coordinate funding for difficult cases

Clean Energy Workforce & Stakeholder Engagement

Key Barriers	Recommendations	Opportunities (Strategies)
1) **Lack of awareness of clean energy jobs and related training**	Hub: Improved marketing of existing training and job opportunities	Develop workforce outreach plan that builds on successful recruitment through in-person outreach, personal networks of former participants, and trusted community partners Work closely with CEAs in respective counties to leverage their partner relationships, particularly with workforce development, and connections with residents
2) Many residents in region **do not have access to workforce training**	Hub: Build up effective WFD programming in Chemung and Broome counties in collaboration with community partners Hub: Strengthen relation-ships with related WFD programs in the region	Replicate successful Energy Warriors program in other counties where we have strong CCE and other partner support Connect with existing WFD programs in the region to collaborate more closely and to better be able to refer interested residents to them. These organizations include TC3, BOCES, SUNY Morrisville, and NENY
3) Interested trainees lack **transportation** to training & jobs—not having access to reliable transportation or driver's licenses	Work with partners to support trainees getting a driver's license Prioritize collaboration with energy contractors that don't require employees to have a personal vehicle Provide transportation assistance to those in rural areas to get to training	Work with partners to share costs to pay for driving school for trainees; incorporate driving training and assistance getting a license in our Hub workforce training Prioritize collaboration with contractors that can support employees with getting drivers' licenses Work with CCE Tompkins Way2Go program and other transportation agencies to find transportation assistance for trainees
4) **Availability of jobs**—There is not strong or large demand	Hub: Include in Community Campaign criteria for	Hub: Connect trainees to other opportunities like

for clean energy jobs	contractors a requirement to take on trainees for OJT or internships NYSERDA: Incorporate into participation agreement with contractors the expectation to take on WFD trainees from approved training programs Hub long-term goal: Create a clean energy social enterprise that is focused on providing job opportunities and OJT in the field and encourage entrepreneurship NYS: Provide clean energy entrepreneurship support especially for minority-, women-, and SDV-owned businesses and people from disadvantaged communities NYS: Create a clean energy job portal for the state	apprenticeships and further education Find and replicate examples of social enterprise established elsewhere Work with energy contractors to ensure the trainees are coming with the preparation required for the jobs.
5) **Lack of Empower+ contractors** Few local Empower+ contractors serve the region Fewer contractors provide both Empower+ and heat pumps	Facilitate existing contractors involved in building trades to become participating contractors Facilitate existing Clean Heat contactors to become Empower+	Hub: Systematic outreach to building contractors with information about becoming an Empower+ contractor NYSERDA: Subsidize training for contractors interested in participating in Empower+; provide special support for new Empower+ contractors during their first year
6) **Contractors are almost exclusively white** People of color do not see themselves as part of this field. There are few employers that can provide culturally sensitive work environments	Hub long-term goal: Create a clean energy social enterprise that is focused on providing job opportunities and OJT in the field and encourage entrepreneurship NYS: Provide clean energy entrepreneurship support especially for minority-, women-, and SDV-owned businesses and people from disadvantaged communities	Identify and work with contractors of color, who are motivated to help diversify the workforce
Stakeholder Engagement: 7) LMI residents **lack**	Research, identify and/or create a program that	Build off Energy Navigators program, and volunteer

opportunities or spaces to meaningfully engage in shaping our energy future Lack awareness of existing spaces and understanding of the importance of clean energy Lack training or energy literacy to participate meaningfully Lack incentives or support to take time to participate	provides training, support and a space for members of DACs to participate meaningfully in clean energy discussions and actions	programs housed at CCE offices in each of the counties Have a staff person dedicated to resident engagement on this level Provide incentives to low-income residents to participate in such spaces, such as gift cards or stipends

Of all these barriers, we would like to highlight two. The first loomed largest in our interviews: a lack of awareness of the clean energy programs and related workforce opportunities. This ignorance appears to be what stymies the largest number of people from taking advantage of clean energy programs. As indicated above, of the hundreds of residents interviewed, only about one-fifth had applied for a clean energy program (not counting HEAP). Of the rest, the major reason for not applying was not knowing about such programs or being unsure of whether they would qualify.

When asked about clean energy jobs, almost three-fourths of respondents said they didn't know anything about these jobs and believed that lack of awareness was the main reason people weren't going into this field, followed by lack of training opportunities. Lack of information or understanding of the programs was one of the top barriers cited by partners interviewed as well. In our own experience, we find ignorance to be a major barrier. This is not only about energy programs, but energy literacy in general, with many people having little idea of what type of heating or insulation they have in their home or what a kWh or BTU is.

The second is historical structural inequities. As noted in NYS's 2023 DAC report:

> "[M]any barriers based on historical patterns of decision-making have prevented the social mobility of certain population groups while promoting the social mobility of others, resulting in disproportionate exposure to risks and limited access to mitigation and adaptation services and commodities today. Support of social mobility will be a critical element in addressing barriers and opportunities in disadvantaged communities; without that support, disproportionate exposures and inequitable access are likely to increase."[43]

While this analysis of structural barriers did not emerge from our engagement of residents and partners, it resonates with our own experience: those with higher incomes are able to afford to participate in the clean energy transition, and those who are poor are not. Lower-

[43] New York State Disadvantaged Communities Barriers and Opportunities Report, December 2021.

income households are more likely to rent; and renters are those who feel most powerless to make such changes in their lives. In our region, Black people heavily confront these inequities. While issues of tax reform, guaranteed income, housing policy, and reparations are beyond the scope of this report and the work of the Hub, we highlight these as important structural changes that would go a long way in reducing barriers to participation in the clean energy transition.

Recommendations & Next Steps

We have identified the following priority recommendations and arranged them into three time periods. Short term refers to implementation in 2024; medium term includes recommendations to be implemented during the remainder of the Hub contract, through mid-2026. These we feel confident in being able to implement with existing resources, except when noted. Long term refers to recommendations that are outside of the Hub's capacity to implement in these coming years, requiring additional time and resources.

Short Term

- With Hub team, develop implementation plan for these recommendations, with measurable outcomes to track progress against.
- Design two sets of community campaigns: one focused on urban renters and landlords, incorporating peer-to-peer sharing among landlords; the other on rural homeowners who heat with delivered fuels and/or live in mobile homes. Work with CEC coordinators and municipalities where feasible.
- Design a communications plan to support the above, as well as significantly extend our reach to audiences throughout the region. Use focus groups to inform the plan, and work in collaboration with the other four regions that share our Communications Manager.
- Identify and formalize a process of energy advising that is centered around the residents' realities and draws on insights from CEAs, other Hubs, and partners, and a "case worker" approach. This includes intake, application support, and referral to and collaboration with other partner agencies.
- Enhance our Hub's current workforce offering to include a hands-on, whole-home weatherization component, energy assessments, and energy literacy training.
- Approach partners in Chemung and/or Broome counties about a clean energy workforce pilot using the Energy Warriors approach.
- Gauge interest of other Hubs in statewide energy literacy curriculum; form working group with those interested and develop shared vision.

Medium Term

- Implement the community campaigns and communications campaign.
- Pilot a clean energy workforce training in Chemung and/or Broome counties.
- Identify and/or develop energy literacy and clean energy community engagement curriculum, in coordination with other Hubs and partners.
- Identify Empower+ contractors who would like to participate in Clean Heat, and vice-versa, and provide support to them with the certification process.
- Hub staff work with NYSERDA to better coordinate with WAP and/or Community

Action agencies, which can do some repairs to maximize what WAP and Empower can do.

Long Term

- In coordination with other Hubs and partners, build up system for large-scale delivery of energy literacy curriculum, through a network of volunteers and partners, including educational organizations.
- Pilot a social enterprise that can help DAC households reduce energy use and install heat pumps and solar, whose focus is not profit but training people from disadvantaged backgrounds to do this work.
- **NYS, Statewide:** Develop a strong framework for collaboration among OTDA, Weatherization Assistance Program, NYSERDA and affordable housing agencies to address structural home repairs.

We plan on consulting with other Hubs around the state about our recommendations and strategies to gain and share insights and work together where appropriate.

It may be useful to point out that the market-based approach pursued by the state over the last two decades has fallen far short of the pace needed to achieve the state's climate goals. The state may want to consider other approaches to scale the work being done. One could be to work with the federal framework to leverage the developing Climate Corps to systematically ramp up work to retrofit homes and do related repairs for low-income residents. Having an army of workers who go door to door, home to home, in DACs to weatherize and repair homes at no or little cost to the owner could significantly increase the pace of the energy transition, especially when the Corps members are from the DACs themselves.

As noted earlier, a large portion of work needed to get older homes to be heat pump ready requires significant labor to find and seal gaps and leaks in small areas throughout a house, a kind of work that private contractors seem to be rarely interested in, as there is a low chance of profit. Having state-funded workforce not tied to making a profit would address this mismatch between home needs and contractor priorities. Our Hub has some initial experience with having workforce trainees from DACs go into people's homes to insulate rim joists through our "Cozy Basements" program, which has successfully tied workforce development with weatherization. But a comprehensive program would have to be much more robust to make significant progress towards our goals, more consonant with the Civilian Conservation Corps from a century ago, which provided us with parks, trails, roads, dams, tree-plantings, and flood control that still benefit U.S. residents almost 100 years later.

Appendices

Table 1. Housing Type by County

	Broome		Chemung		Chenango		Delaware		Schuyler		Steuben		Tioga		Tompkins	
Housing Units	*89831*		*38256*		*24698*		*31235*		*9442*		*48911*		*22276*		*42131*	
mobile home	4843	5%	2179	6%	3632	15%	5085	16%	2179	23%	7022	14%	3632	16%	2663	6%
Multifamily 2-4 units	17191	19%	5569	15%	2906	12%	1695	5%	726	8%	4843	10%	1453	7%	7022	17%
multifamily 5+ units	13075	15%	4116	11%	1937	8%	1453	5%	0	0%	3390	7%	726	3%	9685	23%
single family attached	1453	2%	726	2%	0	0%	484	2%	242	3%	726	1%	484	2%	1453	3%
Single family detached	53269	59%	25666	67%	16223	66%	22518	72%	6295	67%	32930	67%	15981	72%	21308	51%

Table 2. Regional Demographics

	Region Overall	Broome	Chemung	Chenango	Delaware	Schuyler	Steuben	Tioga	Tompkins
Total population	641,376	198,591	84,456	47,407	44,644	17,920	94,153	48,567	105,638
Population change 2010-2021	-2.5%	-1.0%	-4.9%	-6.1%	-7.0%	-2.3%	-4.9%	-5.0%	4.0%
Population/square mile		282	207	53	31	55	67	93	223
Income & Poverty									
Median income, 2018-2022		$58,317	$61,358	$61,741	$58,338	$61,316	$62,506	$70,247	$69,995
Persons in poverty		19.5%	15%	12%	15%	12%	13%	11%	16%
Educational Attainment - High school (or equivalent) or less for population 25 and over	40.8%	40%	44.8%	52.4%	49.4%	44.2%	43.5%	43.1%	22.5%
Unemployment rate	6.3%	7.5%	6.2%	7.0%	4.7%	5.7%	6.3%	5.9%	4.7%
Race & Languages									
White alone	88.5%	84.4%	87.9%	96.3%	94.1%	96.1%	94.5%	96.1%	80.9%
Black or African American alone	4.9%	7.0%	6.2%	1.1%	2.4%	1.1%	1.7%	1.2%	4.6%
Asian alone	3.9%	5.0%	1.6%	0.6%	1.3%	0.6%	1.6%	0.8%	10.2%
Hispanic or Latino	4.0%	5.1%	3.5%	2.5%	4.7%	2.0%	1.9%	2.2%	5.5%
Other (mostly 2 or more races)	3.2%	3.7%	4.3%	2.0%	2.2%	2.1%	2.1%	1.8%	4.3%
white alone, 1972		98.5%	96.3%	99.2%	99.1%	99.3%	98.9%	99.1%	95.9%
Languages other than English spoken at home	7.0%	9.9%	4.7%	4.2%	6.2%	3.2%	5.5%	2.6%	16.0%

(% of persons age 5+, 2018-2022									
Transportation									
Public Transit use		3.0%	2.5%	0.1%	1.0%	0.2%	0.1%	0.2%	5.2%
Walk & Bike		4.4%	1.9%	4.1%	7.5%	4.2%	5.1%	2.7%	13.4%
Average Commute time (minutes)		19.8	22.2	23.4	25.7	27.2	22.8	24	19.8
Electric car ownership (includes BEVs and PHEVs)	5121	1394	441	203	240	142	476	260	1965
Housing characteristics									
Home ownership rates		65.0%	67.0%	75.0%	76.0%	75.0%	73.0%	78.0%	54.0%
% Rental Households with Rents above the Affordability Threshold	46.3%	49.9%	50.4%	41.4%	49.5%	41.1%	38.7%	44.9%	54.8%
Heating Energy									
Gas, propane	58.9%	67.7%	75.3%	31.4%	26.1%	44.2%	65.3%	45.1%	59.1%
Electric	16.4%	16.7%	14.1%	16.7%	11.9%	16.7%	13.9%	12.0%	23.6%
Fuel oil, kerosene	14.5%	10.5%	5.9%	33.7%	42.8%	20.3%	6.3%	28.7%	7.6%
Other (coal, wood)	10.3%	5.1%	4.8%	18.3%	19.1%	18.9%	14.5%	14.2%	9.7%

Surveys for residents, nonprofits, and contractors are included as separate documents.

Western New York Clean Energy Hub

Regional Assessment and Barriers Analysis

(RABA)

Final Report

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PUSH Buffalo

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Executive Summary

RABA Purpose and objectives

The purpose of the WNY Regional Clean Energy Hub's Regional Assessment and Barriers Analysis (RABA) is to provide local communities with baseline information and data about socioeconomic conditions, workforce and labor market trends, the impact of climate change and environmental pollution, and barriers and opportunities associated with a just transition to a clean, renewable energy economy. The RABA will inform the development of the Hub's equitable engagement strategy, including how the Hub can best leverage sector-based stakeholder networks to deliver NYSERDA programs to Disadvantaged Communities (DACs). The WNY Hub has conceived of the RABA as a *living project* that will iterate and be updated over time as new data becomes available, new trends emerge, and new relationships are cultivated with stakeholders and program participants. The ongoing participation of these groups, and the local knowledge they possess, are absolutely essential for the Hub's vision of the RABA to be realized. As a result, the WNY Hub will seek to organize a permanent formation of community advisors who can be called upon to ground truth, trouble shoot, and problem solve in support of the Hub's mission.

The WNY Hub prioritized the following objectives for the RABA:

- Raise public awareness among key stakeholders and community residents of both the goals of the Climate Leadership and Community Protection Act (CLCPA or Climate Law) and how the WNY Regional Clean Energy Hub intends to operate as a tool to meet the goals of the Climate Law, in particular, within DACs;
- Identify existing or emergent networks of sector-based stakeholders that could be engaged to contribute meaningful information and insights about population-level barriers related to social determinants of health and access to clean energy and energy efficiency;
- Collect critical insights from stakeholders through in-depth interviews;
- Measure or test stakeholder insights against the direct lived experiences of marginalized (BIPOC; low-to-moderate income) community members through focus group conversations across the five counties of the region;
- Deliver a set of baseline analyses and recommendations for mitigating or overcoming barriers to access faced by low-to-moderate income households and DACs.

Key Findings

- DACs in WNY are highly racialized. BIPOC residents are disproportionately represented in DACs. While BIPOC residents constitute approximately 22% of the overall population in WNY, around 49% of residents of DACs in the region are BIPOC.

- DAC populations are concentrated in the City of Buffalo. Nearly 50% of all DAC households in the region are located in Buffalo.
- Income inequality is high across the region. The top 20% of income earners generate 42% of the region's income, while the bottom 20% of earners account for slightly less than 3% of the region's income.
- Social determinants of marginalization are disproportionately concentrated in DACs. The number of single-parent households, persons with limited English language proficiency, adults without high school equivalency or college degrees, households without vehicles, and persons with limited or no broadband internet connections are higher in DACs across the region compared to non-DACs.
- The housing stock in WNY is old. Housing in DACs, however, is considerably older and in relatively worse condition compared to housing outside of DACs.
- Housing cost burdens are high across the region, in particular for renters. Renters represent a majority of occupied households in DACs. More than 50% of renters residing in DACs pay more than 30% of their income on housing costs, a standardized measure of housing affordability.
- NYSERDA's means-tested energy efficiency programs (Assisted Home Performance, EmPower, and EmPower+) have reached only a fraction of eligible households in WNY. From 2011-2022, approximately 12% of residents eligible for Assisted Home Performance incentives received support from NYSERDA. From 2018-2023, less than 4% of residents eligible for EmPower/+ received assistance. On average, approximately 2,000 total means-tested energy efficiency projects have been completed annually in recent years. Projects in rural counties have received relatively larger per unit investments and higher associated energy and utility bill cost savings.
- From 2008-2023, NYSERDA's NY-SUN residential rooftop solar incentives reached less than 1% of eligible households in the region. Installations in the region have generally grown since 2008 with periods of fluctuating growth and decline since 2014.

Summary of Community Engagement

The WNY Hub team that carried out the RABA project, created a two-phase approach to community engagement that relied on qualitative research methods for data collection and analysis and support from Hub subcontractors that volunteered to connect the RABA team with existing partners or community members. The first phase involved stakeholder list-building followed by a series of in-depth stakeholder interviews with 17 participants from across WNY. The second phase featured focus group conversations with 54 low-to-moderate income residents and members of DACs located in the City of Buffalo (3), Niagara Falls (1), and the Southern Counties of WNY (1). Additional information about community engagement is included in the report below.

Identification of Barriers, Opportunities, and Recommendations

Significant barriers to accessing energy efficiency and clean energy opportunities, and achieving a just transition for all communities, abound in WNY. The region's old housing stock, disparate homeownership rates, uneven access to basic and reliable transportation and communication infrastructure, and high rates of racial and economic inequality together create particular challenges for residents of DACs. The substandard condition of older housing in DACs often prevents energy efficiency and clean energy projects from moving forward due to the presence of environmental hazards (e.g., lead, mold, asbestos) or roof and foundation issues. High rates of renter occupancy in DACs leaves renters at the mercy of private landlords that may not feel incentivized to participate in NYSERDA programs where they may face out of pocket expenses. Uneven access to reliable public or private transportation and highspeed internet makes it difficult for residents to learn about and engage in program opportunities, enroll in job training, or connect to gainful employment. Generational forms of racial

and economic inequality leave many residents distrustful of both government services and solutions offered by for-profit companies. Residents of DACs can at the same time feel left behind by public sector investments and targeted by e.g., energy service companies that promise household energy savings while locking residents into deceptive terms.

Opportunities to address these barriers exist at different levels. State lawmakers and regulators have opportunities to adopt policies to create new investments in pre-weatherization and pre-electrification readiness that will then enable participation in energy efficiency and clean energy programs. New state investments in affordable and reliable transportation options and broadband connectivity in both rural communities and DACs will create conditions for broader program participation and access to clean energy jobs. NYSERDA has opportunities to make changes at the program level by increasing per unit investments to ensure energy and utility bill savings are equitably distributed across counties and urban, suburban, and rural communities. NYSERDA has an opportunity to increase access to distributed solar for low-to-moderate income households through a recent federal Solar for All award. The WNY Hub is in a position to provide more targeted outreach to landlords to increase participation rates and build brand identity/loyalty that distinguishes it from both government and for-profit actors that operate in communities without the same levels or degrees of trust.

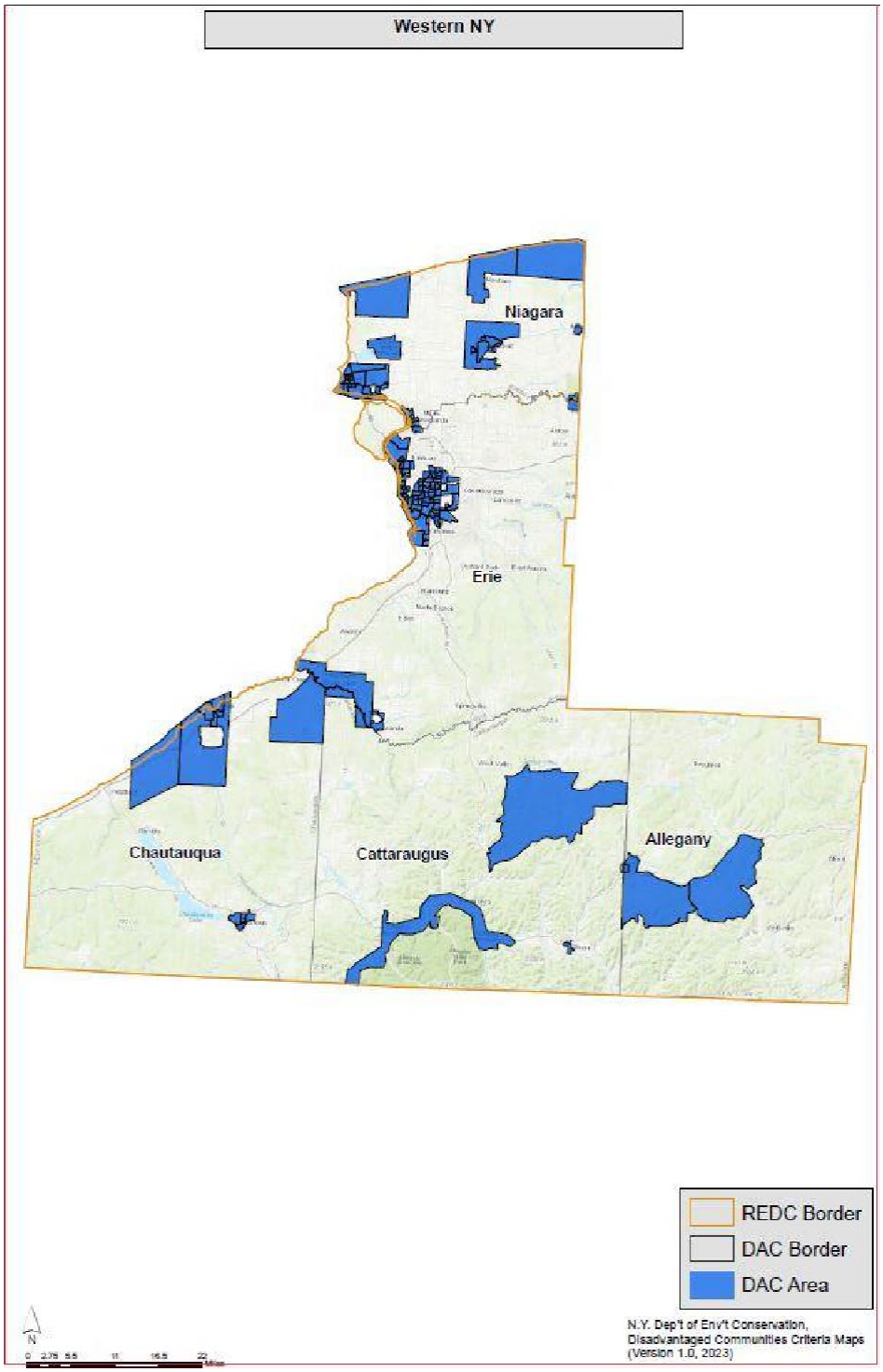
A complete breakdown of barriers, opportunities, and recommendations are included in the report.

Baseline Regional Characterization

The WNY Regional Clean Energy Hub covers the five counties of WNY, which include Niagara and Erie counties in the north and Allegany, Cattaraugus, and Chautauqua counties in the south (Southern Counties of Western New York or SCWNY). The City of Buffalo, in Erie County, represents the major urban center of the region. The region is home to 126 Disadvantaged Communities (DACs) that were formally designated by the state's Climate Justice Working Group (CJWG) on the basis of 45 indicators related to both Environmental Burdens and Climate Change Risks, and Population Characteristics and Health Vulnerabilities.[1] Erie County possesses the largest share of DACs in the region - 58% of total DAC Census tracts - followed by Niagara County with 27%, Chautauqua County with 9%, Cattaraugus County with 4%, and Allegany County with 2%. In order to ensure a more just and equitable transition to a clean energy economy that benefits all New Yorkers, the state's Climate Law, passed in 2019, mandates that DACs receive a minimum of 35% to 40% of climate and clean energy investments. The WNY Hub is focused on reducing barriers in and increasing opportunities for low-to-moderate income residents and members of DACs.

Figure 1. NYSERDA's Disadvantaged Communities (DACs) Map of WNY[2]

[1] See: https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria
[2] See, https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria



Below is a baseline characterization of the region, drawn from secondary data sources, that begins to paint a picture of what conditions are like across DAC vs. non-DAC communities. The characterization provides insights into various social determinants of marginalization and inequity that are further explored through the interview and focus group data that we present later in the report.

Baseline Regional Sociodemographic

Race and Ethnicity

White residents comprise the largest racial-ethnic group in the overall population of WNY and represent a majority of the region's DAC residents. Black, Indigenous, and People of Color (BIPOC) residents, however, make up a disproportionate share of DAC residents in the region as a whole and in the City of Buffalo, the region's largest population center. The City of Buffalo is home to just over 50% of the region's DAC residents despite accounting for just under 20% of the region's overall population. Nearly three quarters of all Census tracts in Buffalo are DACs. Historical patterns of disinvestment (e.g., redlining) and racial segregation in Buffalo have created extreme disparities of concentrated disadvantage for BIPOC communities.

Table 1. Comparative Racial-Ethnic Breakdowns of WNY and City of Buffalo

	Five-County WNY Region		City of Buffalo	
	Total Population	DACs	Total Population	DACs
White	1,099,551 (77.7%)	203,278 (51.9%)	120,650 (43.6%)	63,187 (31.9%)
Black or African American	137,267 (9.7%)	99,877 (25.5%)	89,381 (32.3%)	78,835 (39.8%)
Hispanic or Latinx	77,832 (5.5%)	42,692 (10.9%)	34,037 (12.3%)	28,523 (14.4%)
Asian	45,284 (3.2%)	21,542 (4.5%)	21,031 (7.6%)	18,619 (9.4%)
Indigenous, Native Hawaiian, or Pacific Islander	7,076 (0.5%)	4,308 (1.1%)	830 (0.3%)	396 (0.2%)
Two or More Races	45,284 (3.2%)	18,409 (4.7%)	9,962 (3.6%)	7,923 (4%)
Other Race	4,245 (0.3%)	1,567 (0.4%)	830 (0.3%)	594 (0.3%)
Total Number of Persons	1,415,124 (100%)	391,673 (100%)	276,721 (100%)	198,077 (100%)

Households and Families

DACs are characterized by much higher instances of children living in single parent households relative to regional households. Namely, 15.6% of all households in WNY's DACs are headed by single parents, compared to just 9.7% of households in the region. More consequentially, over half (52.8%) of all children in DACs live in households headed by single parents, versus just one-third (33.3%) of all WNY children. Buffalo contains roughly half (49.8%) of households living in DACs, despite accounting for only 19.8% of all households in the region. DACs in the City contain a disproportionate share of single-parent households. Roughly 85% of all single-parent households in Buffalo are situated within the City's DACs.

Educational Attainment

Compared to the overall WNY region, people living in the area's DACs are less likely to hold either a college degree (32.6% of adults 25 years or older across the region v. 19.8% in DACs) or a high school equivalency (just 8.3% of adults 25 years or older in the region lack this qualification, compared to 14.6% in DACs). Nearly half (46.5%) of all adults (25 years or older) who lack a high school diploma or equivalent live in WNY's DACs. The educational situation for the City of Buffalo is even more extreme than the regional context, with nearly nine out of every ten adults (89.3%) without a high school equivalency concentrated in the City's DACs.

Language

Across WNY, roughly 43,000 persons aged five or older speak English "less than very well," a term synonyous with limited English proficiency (LEP). Spanish is the primary language of nearly 30% of LEP persons in the region, followed by Asian or Pacific Island languages (19.6%) and all other languages (15.7%). Within DACs, however, Spanish is the most commonly spoken language at home for LEP persons (37.6%). More than half (53.1%) of all LEP persons – and 66.8% of LEP persons who are primarily Spanish speakers – live in DACs. In Buffalo, nearly all persons (92.4%) with LEP live in DACs. Spanish is the most common language spoken at home by such persons, regardless of where in the City they live.

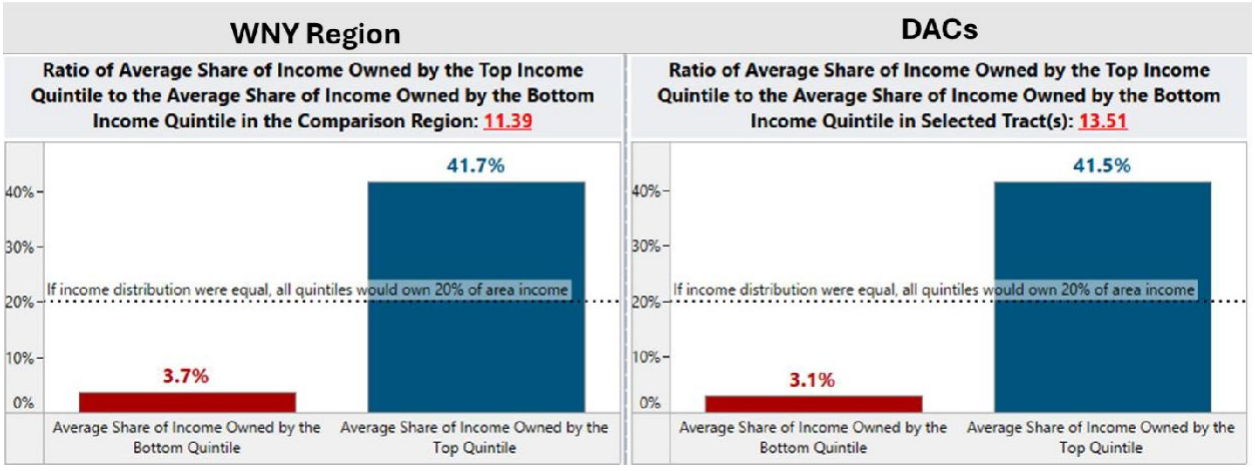
Internet Access

Slightly more than 20% of persons in WNY are un- or under-connected to broadband Internet: in addition to the 5.4% of persons who lack both a computer and an Internet connection, 4.4% of persons have a computer with no Internet subscription, and another 10.4% of persons have a computer but can only access the Internet through a dial-up connection or via their mobile phone plan. Within DACs, the percentage of un- and under-connected persons is expectedly higher, at 25.7%. The concentration of un- and under-connected persons in DACs is more extreme in Buffalo than in the region as a whole. More than eight out of ten Buffalo residents with no or limited broadband Internet connectivity at home live in the city's DACs.

Income Inequality

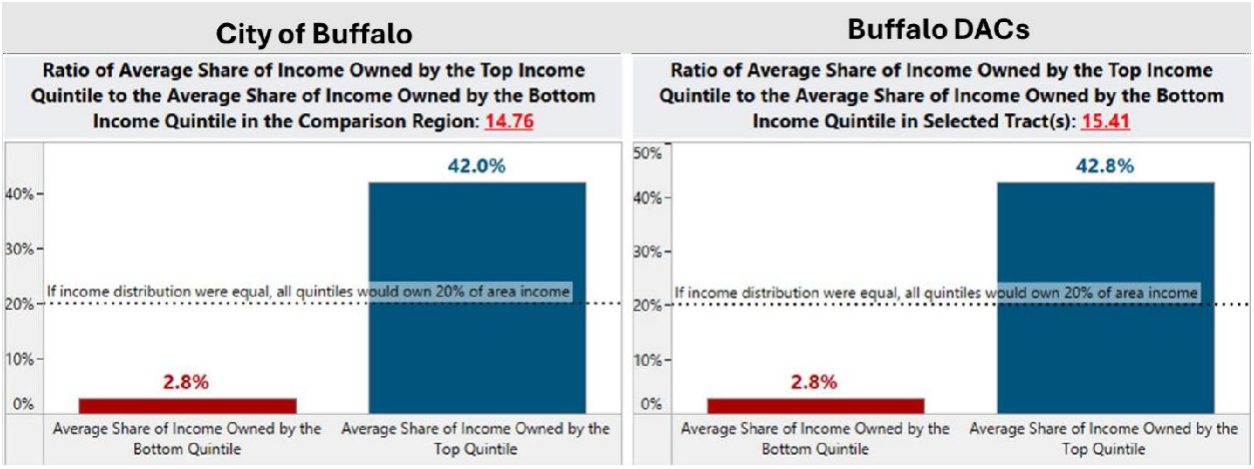
One popular way to study income inequality is to examine the ratio of income earned by the top 20% of earners (i.e., the top *quintile*) to the bottom 20% (bottom quintile). If income were distributed perfectly evenly, then any group that accounts for 20% of the population should own or earn 20% of aggregate income. To the extent that the share of a given quintile (e.g., the upper quintile) deviates from this expectation, the income distribution is unequal. The following graph shows the average (census tract-level) share of income owned by the bottom quintile of households relative to the average (tract-level) share of income owned by the top 20%. The lefthand panel of the figure makes this comparison for the WNY region as a whole, while the righthand side shows corresponding data for all DAC tracts in WNY. Notably, while the ratio of top share to bottom share is slightly larger in DACs, indicating slightly more income inequality, the distribution is not substantially different from the overall regional income distribution – which itself is highly uneven.

Figure 2. Income Inequality in the WNY Region



This same situation holds in the City of Buffalo. Importantly, the income distribution in Buffalo is meaningfully more uneven than the regional distribution, with the bottom 20% of households owning, on average (recall: these figures are tract-level averages) just 2.8% of aggregate income, compared to 42.0% for the top 20%.

Figure 3. Income Inequality in the City of Buffalo



Commuting and Vehicle Ownership

Across the region, it is very rare for owner-occupied households to lack access to a vehicle – just 4.1% of such households do not have a vehicle at home. By contrast, more than one-quarter (27.0%) of renter-occupied households lack vehicle access. Not surprisingly, lack of vehicle access is more extreme in DACs: 7.5% of owner-occupied and 38.0% of renter-occupied households in DACs do not own a vehicle. In terms of commuting patterns for labor force participants aged 16 years or older, nearly eight out of ten (76.8%) workers drive to work alone in a private automobile. Just 2.5% of WNY workers commute to work via public transit. In DACs, however, reflecting the longstanding observation that residents of low-income communities tend to have smaller ecological footprints than their more affluent counterparts, public transit riders make up 6.8% of all commuters. DAC residents are also much more likely than regional averages to carpool (10.2%, v. 7.6%) or walk (4.3% v. 2.9%) to work.

Summary

True to the name “disadvantaged” communities, DACs in WNY compared to non-DAC communities, are characterized by higher concentrations of marginalized populations, especially BIPOC residents, single-parent households, persons with limited English proficiency, adults without high school equivalency degrees, adults without college degrees, households without vehicles, and persons with limited or no broadband Internet connections. They are also communities with more pronounced levels of income inequality, and they are primarily clustered in the City of Buffalo. Notwithstanding the evident challenges that exist in disadvantaged spaces, however, DACs appear to be building blocks for more sustainable development practices, as evidenced by comparatively less environmentally harmful commuting patterns and increased propensity to walk, bike, or use public transit to get to and from work.

Buildings and Sector Assessment

Housing Stock

The housing stock in WNY’s DACs is considerably more diverse – and outwardly more supportive of higher density, mixed income settlement patterns – relative to the overall region. Across WNY, single-family structures dominate the housing

landscape, accounting for nearly two-thirds of all units (62.5% single-family detached units plus 2.8% single-family attached units). Doubles (two-family units) make up 14.3% of the regional housing stock, with a mix of three-plus-unit structures and mobile homes accounting for the remaining 20.4% of housing units. By contrast, the housing stock in DACs is split almost evenly between single-family homes (48.0% detached plus 3.2% attached) and lower-cost options. Doubles make up over a quarter of all DAC housing units (26.2%).

Figure 4. Housing Stock Characteristics in the WNY Region

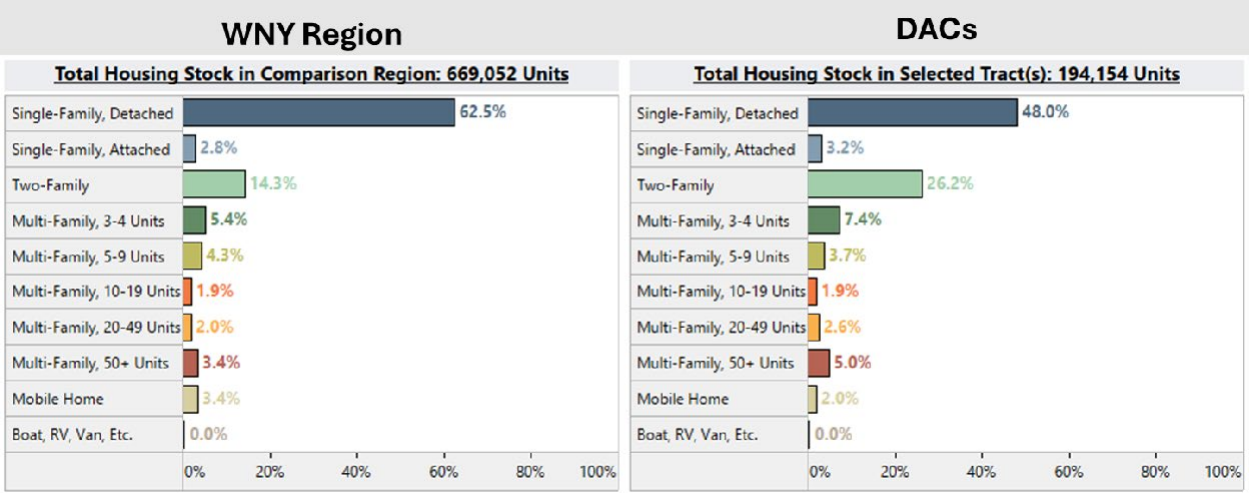
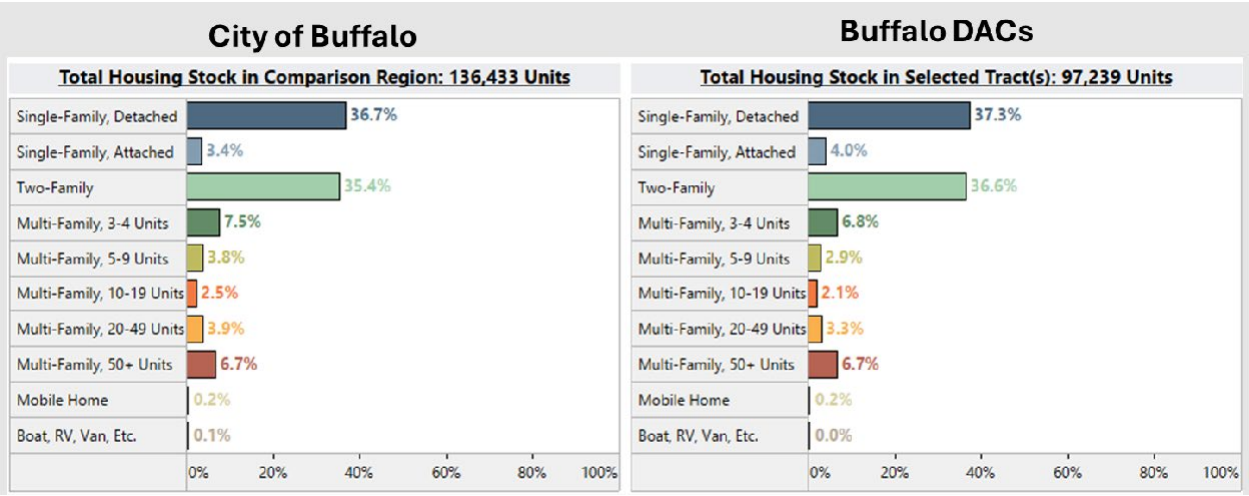


Figure 5. Housing Stock Characteristics in the City of Buffalo

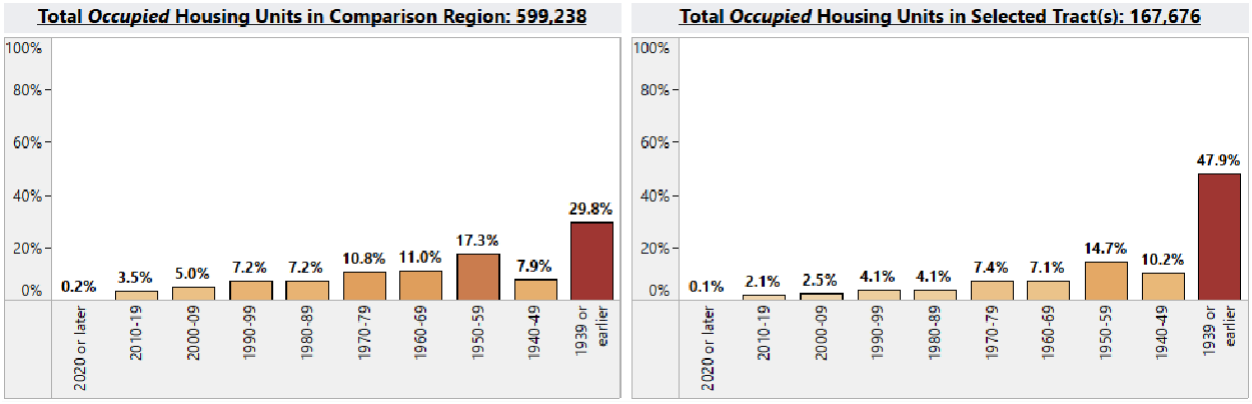


Age of Occupied Stock

In a region that is well known for having an old housing stock, it should come as no surprise that the plurality of occupied housing units in WNY were built prior to 1940. However, the stock in DACs is *considerably older* than the average regional stock. Compared to 29.8% of WNY housing units being built before 1940, around half of all DAC units (47.9%) were constructed before World War II. The implication is that DAC residents, who were already determined by NYSERDA to bear a

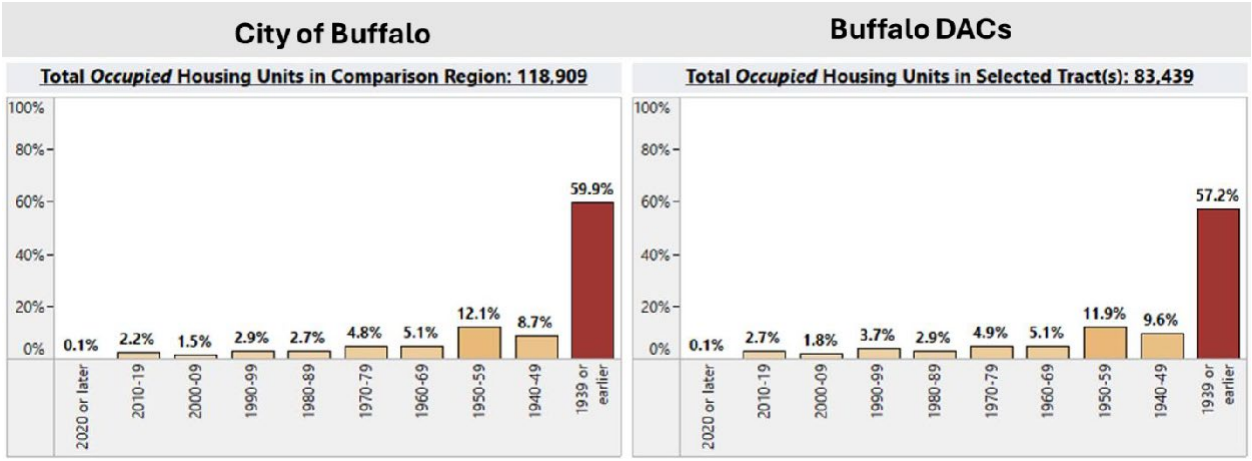
disproportionate share of the region's environmental and social burdens, are also more likely to live in older housing subject to deterioration, lack of weatherization, and costly upkeep and maintenance routines.

Figure 6. Age of Occupied Housing Units in the WNY Region



As the region's principal city and site of some of the region's earliest urban developments, Buffalo's housing stock is much older than regional averages. On this matter, there are few observable differences between Citywide conditions and DAC conditions. Regardless of where in Buffalo one lives, they are likely dwelling in housing that was built several generations ago.

Figure 7. Age of Occupied Housing Units in the City of Buffalo



Household Energy Type

The dominant source of home heating fuel in WNY and the City of Buffalo is methane gas (85.1%), with electricity coming in a distant second place (9.7%). This regionwide pattern is mirrored in WNY's and Buffalo's DACs, though DAC homes are slightly more likely to use electricity (11.0%).

Figure 8. Household Energy Type in the WNY Region

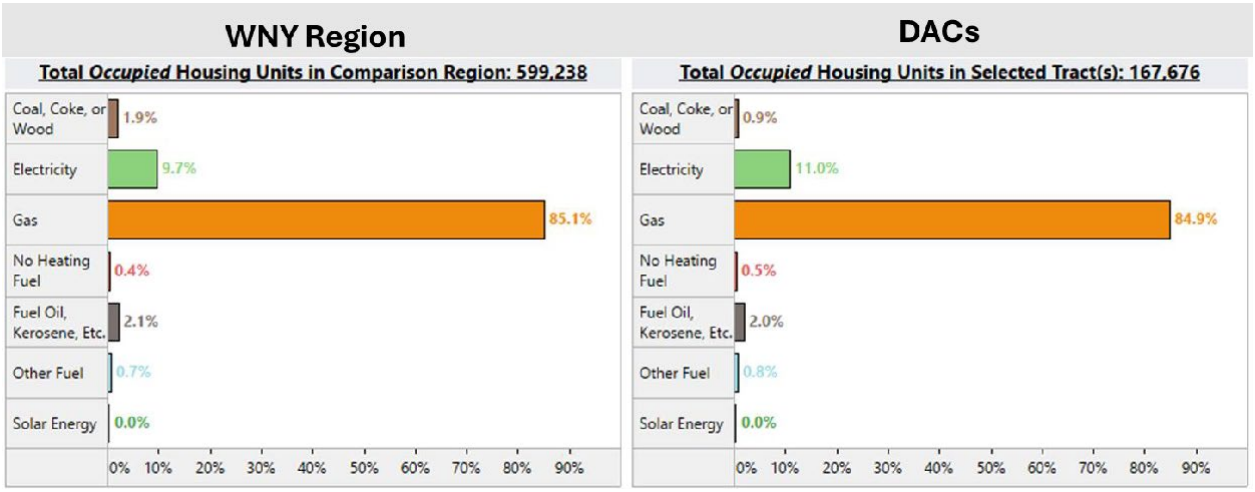
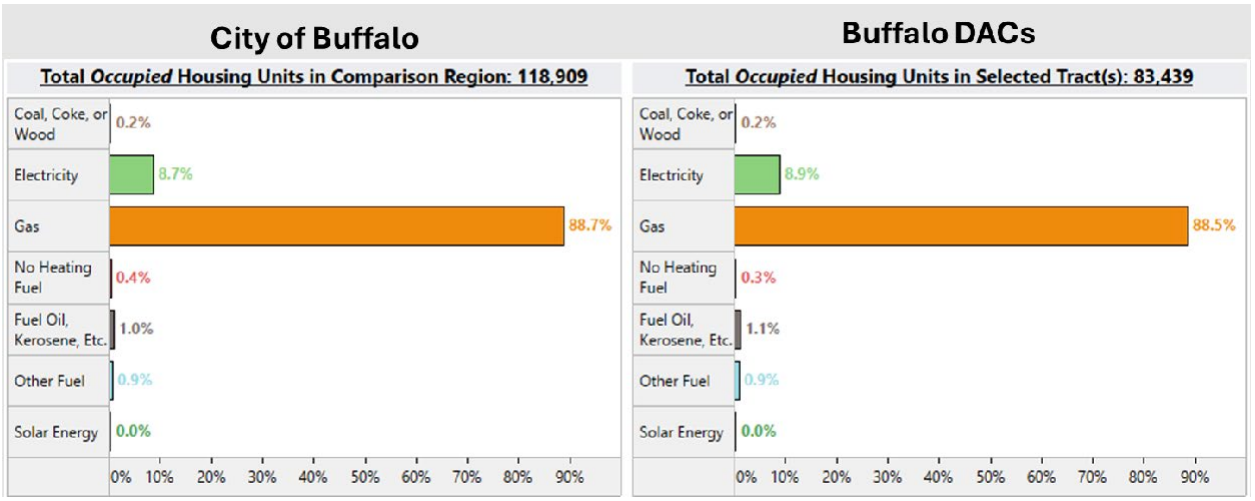


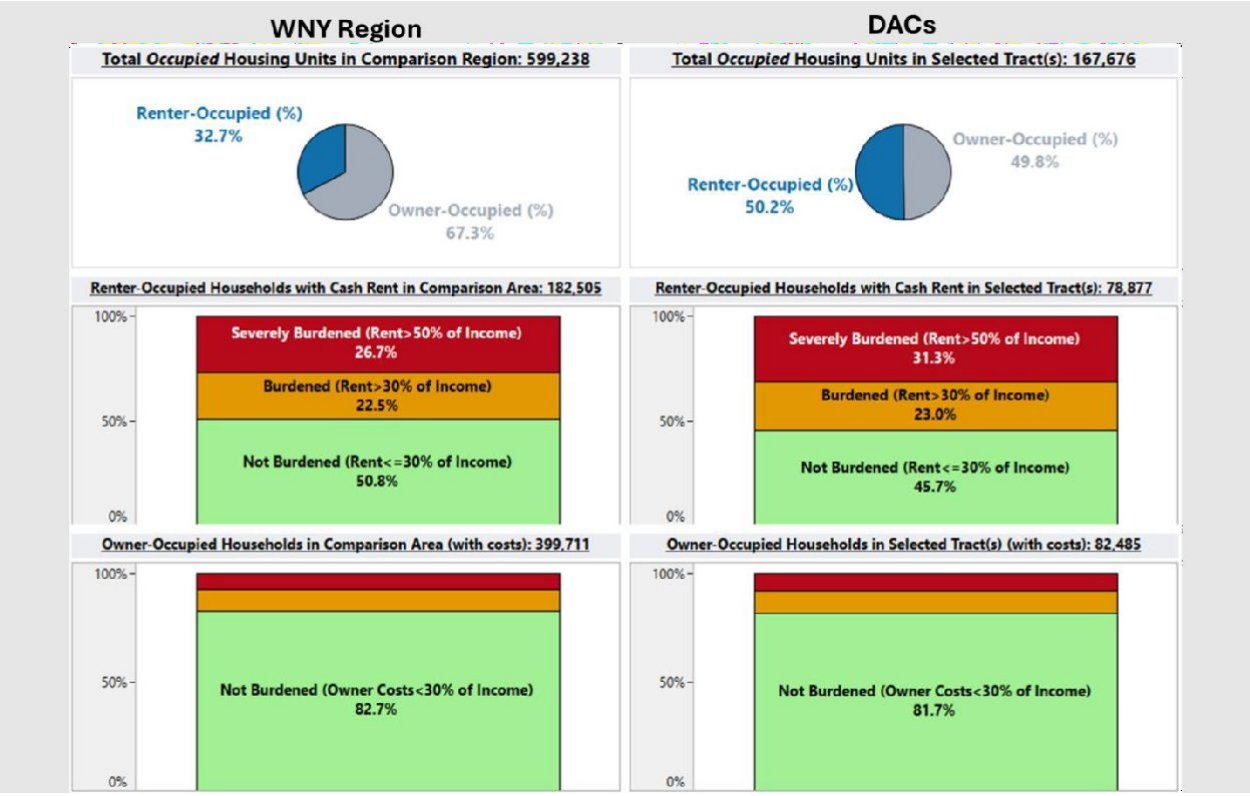
Figure 9. Household Energy Type in the City of Buffalo



Tenure and Housing Cost

The following figure compares the entire WNY region to WNY DACs on housing tenure (top-third), renter housing cost burden (middle-third), and owner housing cost burden (bottom-third). Whereas owner-occupied households enjoy a supermajority (67.3%) across the region, renters are a majority of occupied households in DACs (50.2%). While, at least at the regional scale, there are few differences in patterns of housing cost burden between the overall region and its DACs, cost burden rates are high – especially for renters. Roughly half of all renter-occupied units in WNY (49.2%) are cost-burdened (i.e., use 30% or more of their income on housing). This number grows to slightly more than half (54.3%) in DACs. For owners, cost burden rates are 17.3% overall, and 18.3% in DACs.

Figure 10. Tenure and Housing Cost in the WNY Region



In Buffalo, where renters are a majority of all households (57.4%) and DAC households (59.9%), over half of renter-occupied housing units are cost-burdened: 51% of tenant households in Buffalo spend 30% or more of their gross monthly income on housing, whereas 55% of tenant households in Buffalo's DACs live in this situation. These numbers do not deviate too markedly from region-wide figures, signaling that renters everywhere in WNY struggle with housing affordability – cost-burden is not just a problem for City residents. On the owner-occupied side, 17.8% of Buffalo's homeowner households are cost-burdened, compared to 19.4% of such households in the City's DACs. Once again, these patterns do not deviate considerably from broader regional trends.

Summary

Compared to their parent region, DACs in WNY contain more diverse housing stocks with more balance between single- and multi-family units, older housing structures, significantly greater rates of renter occupancy, and somewhat greater struggles with housing affordability. Coupled with the sociodemographic disparities identified previously, one can conclude that WNY's DACs are spaces in which marginalized population subgroups struggle to make ends meet from within an aging, seemingly distressed built environment.

Regional Clean Energy Workforce

Based on data for the period of 2016 –2022 issued by the U.S. Energy and Employment Report (USEER) for the five counties of WNY, overall, the region's clean energy workforce appears to be on an upward trajectory, particularly in the solar power generation industry sector, the high efficiency HVAC and clean heating and cooling sector, and the energy storage sector in Erie County. Jobs in the hydroelectric power generation industry in Niagara County also grew substantially during this period. And the rate of employment growth in the advanced materials and insulation sector in all but Allegany County showed a positive

upward trend. While these trends represent positive developments for the clean energy economy in the region, the rate of fossil fuel industry job growth in many cases matched or exceeded the rates of clean energy job growth. See Appendix 1 for a complete break down of employment trends.

Regional Partners and Assets

We identified a list of 45 potential regional partners and assets (see Appendix 2) during initial RABA stakeholder engagement and networking through the WNY Hub subcontractor team. The following organizations participated in in-depth stakeholder interviews and made a commitment to work with the Hub to help overcome barriers to participation faced by the region's DACs.

Community Health Center of Buffalo (CHCB)

CHCB is a federally qualified healthcare provider for low-to-moderate income families, BIPOC residents, and refugee and immigrant populations. CHCB operates in the City of Buffalo, the City of Niagara Falls, and the City of Lockport, and could emerge as an outreach and equitable engagement partner through patient referrals.

Every Person Influences Children (EPIC)

EPIC is a Niagara County-based childcare provider for refugee and immigrant families and low-to-moderate households in Niagara Falls and Lockport. EPIC could help promote Hub services and direct clients to the Hub.

ACCORD Corporation

ACCORD provides a range of direct services (housing, childcare, food, domestic violence, and business services) to residents of Allegany County and is interested in working with the Hub to connect participants with NYSERDA energy efficiency programs.

Jamestown Public Utilities Company

The Jamestown PUC is a pioneering micro-grid developer and electricity provider based in Jamestown, Chautauqua County. They're committed to work with the Hub to raise public awareness of the benefits of energy efficiency and clean energy.

Baseline Assessment of Clean Energy Program Participation

Baseline of Regional Clean Energy Programs

An analysis of publicly available NYSERDA energy efficiency and clean energy program data reveals that programs and incentives have only reached a small fraction of eligible residents in the region (see Appendix 3). From 2011-2022, approximately 12% of the 69,000 residents eligible for Assisted Home Performance incentives received support from NYSERDA totaling $18.1 million of direct investment. From 2018-2023, less than 4% of the 253,000 residents eligible for EmPower/+ received assistance totaling $53.7 million of direct investment. On average, approximately 2,000 total means-tested energy efficiency projects have been completed annually in recent years. Projects in rural counties have received relatively larger per unit investments and higher associated energy and utility bill cost savings. From 2008-2023, NYSERDA's NY-SUN residential rooftop solar incentives reached less than 1% of eligible households in the region. Installations in the region have generally grown since 2008 with periods of fluctuating growth and decline since 2014.

Existing NYSERDA Community Campaigns

NYSERDA's Clean Energy Communities program provides opportunities for municipal governments to propose and implement community campaigns in the areas of community solar, clean heating and cooling, and electric vehicles. The table below breaks out completed community campaigns by location in the WNY region.

Table 2. Completed Community Campaigns in WNY[3]

Community	County	Community Population	Number of DAC Tracts	List of Completed Community Campaign Actions
City of Dunkirk	Chautauqua	12,563	5	• Community Campaigns - Community Solar - Tier 1 (200 points) - 5/21/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 5/21/2024
City of Niagara Falls	Niagara	50,193	17	• Community Campaigns - Community Solar - Tier 1 (200 points) - 7/30/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 7/30/2024 • Community Campaigns - Community Solar - Tier 3 (500 points) - 8/20/2024
City of North Tonawanda	Niagara	31,568	5	• Community Campaigns - Community Solar - Tier 1 (200 points) - 7/2/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 7/9/2024 • Community Campaigns - Community Solar - Tier 3 (500 points) - 8/20/2024
Erie County	Erie	919,040	73	• Community Campaigns - Community Solar (200 points) - 7/27/2021
Town of Aurora	Erie	13,782	0	• Community Campaigns - Community Solar - Tier 1 (200 points) - 7/2/2024
Town of Evans	Erie	16,356	0	• Community Campaigns - Community Solar - Tier 1 (200 points) - 7/16/2024
Town of Porter	Niagara	6,771	0	• Community Campaigns - Community Solar - Tier 1 (200 points) - 4/10/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 4/10/2024
Village of Hamburg	Erie	9,409	0	• Community Campaigns - Community Solar - Tier 1 (200 points) - 6/26/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 7/2/2024
Village of Westfield	Chautauqua	4,896	0	• Community Campaigns - Clean Heating and Cooling - Tier 1 (500 points) - 8/20/2024 • Community Campaigns - Clean Heating and Cooling - Tier 2 (500 points) - 10/3/2024

[3] See, https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Communities/Tracking-Progress/CEC-Map

Village of Youngstown	Niagara	1,935	0	• Community Campaigns - Community Solar - Tier 1 (200 points) - 4/23/2024 • Community Campaigns - Community Solar - Tier 2 (300 points) - 8/20/2024

Stakeholder and Community Engagement

Outreach Tools and Methods

The WNY Hub team that carried out the RABA project created a two-phase approach to community engagement. The first phase involved building a list of regional stakeholders from a cross-section of relevant fields and sectors, including healthcare, local government, non-profit social movement and service providers, philanthropy, and religious faith leaders. The list initially grew out of conversations with Hub subcontractors – Cornell Cooperative Extension-South; Cornell Cooperative Extension-North, VIA WNY-211, the WNY Sustainable Business Roundtable, Monarch of Infinites Possibilities, and Erie County government, and Inclusive Prosperity Capital – and snowballed as the team made initial inroads through phone and email outreach, and completed stakeholder interviews. By the conclusion of the project, the RABA team invited 84 stakeholders to participate in (a.) an introductory 1-on-1 meeting to introduce the Hub and the purpose of the RABA project, and (b.) a 90-minute in-depth interview. Seventeen stakeholders completed interviews. The team recorded and transcribed all completed interview conversations. The interviews were designed to capture population-level or field-level insights about social determinants of health, climate and environmental vulnerability, and access to both clean energy and energy efficiency services as well as more general social and health services across the region. Participants were invited to reflect on the Hub's intended role in delivering services and programs to DACs and then offer recommendations for effective program design and community engagement.

The second phase of stakeholder and community engagement prioritized focus group conversations with low-to-moderate income residents and members of DACs. The team collaborated with Hub subcontractors to organize and facilitate several of the focus groups and relied on support from stakeholders engaged in phase one to locate, schedule, and promote additional focus groups. The team opened up the first focus group opportunity to PUSH Buffalo members. The group represented a racially and ethnically diverse cross section of Buffalo's residential population. The next three focus groups centered the participation of Black residents from Buffalo's East Side. Neighborhoods on the East Side rank as some of the most disadvantaged communities in the region. The fifth focus group occurred in the city of Niagara Falls and included participation by Black residents of the city. The team organized two final focus groups in the town of Cuba in Allegany County and in the city of Olean in Cattaraugus County. Participants in these conversations were predominantly white. Focus group participants responded to a similar set of questions to those used in the in-depth interviews. The team sought to measure or test some of the insights shared in the interviews against the various accounts of barriers and opportunities that focus group participants contributed to the conversations in order to deepen our understanding and appreciation of population-level and individual-level experiences faced by residents of the region's DACs. A total of 53 people participated in the focus group conversations. Participants were provided with gift cards to compensate them for their time and local knowledge. Again, the team recorded and transcribed each focus group conversation. Transcripts from both the in-depth interviews and focus groups were coded for key themes using a combination of inductive and deductive methods that corresponded with the barriers categories used in the statewide barriers report by NYSERDA.

Table 3. Focus Group Discussions

Focus Group Discussions			
Date	Location		Number of Participants
	DACs Represented	County	
February 14, 2024	West Side (City of Buffalo)	Erie	7
March 3, 2024	East Side (City of Buffalo)	Erie	8
March 11, 2024	East Side (City of Buffalo)	Erie	8
March 18, 2024	East Side (City of Buffalo)	Erie	10
April 9, 2024	Niagara Falls	Niagara	8
May 10, 2024	Cuba	Allegany	5
May 22, 2024	Olean	Cattaraugus	8

Stakeholder and Community Feedback - Climate Change and Local Environmental Pollution Impacts on WNY DACs

For the purposes of the RABA, the team defined extreme weather events, such as blizzards, windstorms and rising temperature, as climate change impacts; soil, air, and water contamination stand as varieties of environmental pollution. Accounts of extreme weather events provided by stakeholders and community members occurred more frequently in conversations with residents of Buffalo and Niagara Falls. The blizzard of 2022 was particularly devastating for residents in the City of Buffalo, where the official death toll reached 49 residents. Participants shared feelings of being overlooked, that they didn't feel that local and state government had adequately prepared or protected vulnerable communities ahead of the storm.

> *"It's hard to prepare for something like if you don't have a job. You can't buy stuff later. Some people got to eat what they buy. You know, they don't have the ability to put stuff away and save it. And then when the storm comes, you're unprepared, right? So, people were shaming people that just didn't have the resources. I know that that was payday. It looks like Friday I was about to get my check and go shopping. But I couldn't get my check. I could not go shopping and didn't get groceries in a storm trying to get from point A to point B."*
>
> **Focus group participant from the East Side of Buffalo**

One interview participant, who is a leading provider of community-based health care services in Western New York, noted how the blizzard had a disproportionate impact on low-income zip codes in Buffalo that suffered from prolonged power outages due to failed electrical infrastructure. Another stakeholder concluded that the disparate impact of the storm on primarily Black communities revealed the systemic racism that persists in the city of Buffalo.

Elsewhere in the region, extreme weather events have had a less pronounced and violent impact on residents living in the Southern Counties of WNY though many participants noted the disruptive impacts of windstorms and lowland flooding. Residents living in rural areas shared experiences of isolation, anxiety over late insurance payments, and hardships they've encountered when roads flood and they're unable to access basic needs like food for short periods of time.

Generally, across the region, participants shared a belief that extreme weather events are happening more frequently and are having a direct negative impact on the livelihoods of DACs in Western NY. Rising temperatures and heat waves represent a particularly acute stressor for members of DACs who have underlying health conditions. Participants residing in DACs in Buffalo and Niagara Falls noted struggles to cope with extreme heat when air conditioning is not widely available or affordable. For more vulnerable residents, the only path to managing extreme heat at home is to request a recommendation from a medical

doctor to the Department of Social Services, which creates additional bureaucratic hurdles to clear. Many residents face increased electricity bill costs to operate air conditioning units in their homes, many of which remain un-weatherized, which can serve as another deterrent. Outside of the home, neighborhoods on the East Side of Buffalo suffer from a lack of shade and tree canopy cover that can help reduce the urban heat island effect. An overriding sentiment shared by participants in Buffalo and Niagara Falls was that summers in the region are becoming more stressful and anxiety inducing due to climate change impacts.

For residents in the Southern Counties of WNY, extreme heat has created stress and social isolation, in particular for children and seniors who are already physically isolated in rural communities and must endure rising temperatures without easy access to cooling centers. Southern counties are predominantly agricultural communities. Stakeholders and focus group participants believe climate change impacts are threatening the viability of farming as invasive plant species proliferate and contribute to low yields of corn for livestock and costly agricultural crop management practices.

> *"The invasive weeds are not responsive to pesticide and mixing it with corn becomes less valuable. Weed monitoring and pest management have become ultra burdens although we live in an agricultural area, we don't raise much food in these areas. A lot of our agriculture is based on corn livestock crops. But we're trying to open the door about those climate issues because it all makes everything expensive."*
> **Agricultural sector professional from Cattaraugus County**

As noted above, most houses in Western NY DACs are old and suffer from disrepair and disinvestment. Participants acknowledged that an all-too common standard of living for residents of DACs includes exposure to toxic lead paint, asbestos inside the home, poor indoor air quality, a lack of weatherization improvements, and legacies of industrial pollution that has left behind brownfields and Superfund sites in their communities. Residents of the Southern Counties of WNY on the other hand, shared a belief that environmental conditions, in particular air quality, in their communities are better compared to their counterparts in Buffalo and Niagara Falls due in part to underdevelopment and deindustrialization.

> *"I've been allowed to live in places where all sorts of toxicity exist."*
> **Focus group participant from the East Side of Buffalo**

Focus group participants from Buffalo and Niagara Falls described the impact of environmental pollution at the neighborhood level. Soil contamination means gardens cannot be grown in those areas and participants see the rise and incidence of cancer in their neighborhoods as a direct result of exposure to toxic water, soil, and air. Air pollution from heavily-trafficked highways, like the Kensington Expressway, built as part of urban renewal strategies in the 1950s and 1960s, contribute to high rates of asthma and other respiratory illnesses. A Buffalo-based community health care leader confirmed that elevated asthma and cancer rates can be found in neighborhoods that sit adjacent to the Kensington Expressway. Other participants reported either experiencing directly themselves or witnessing others in the community experiencing additional respiratory diseases such as bronchitis, and COPD; cardiovascular disease; breast, colon and thyroid cancers; allergies; and autoimmune diseases. The consistent exposure to all kinds of environmental pollution compounds the socioeconomic challenges DACs in the region face as residents are forced to pay for healthcare to address symptoms while the underlying causes in the community continue to create harm.

Stakeholders and focus group participants from the Southern Counties of WNY talked about the higher standard of air quality they experience due to a lack of industrial pollution as a point of pride. Participants, however, did describe the potential negative environmental and public health impact of smoking tobacco and trash-burning by low-income families due to a lack of garbage collection services. As tobacco products are cheap in the Southern Counties, smoking rates are among the highest in

New York State. As a result, second-hand smoke is a leading cause of childhood asthma. Another more acute source of environmental pollution that participants identified was sewage discharge from a wastewater treatment facility in Cattaraugus County and its negative impact on water-based recreational activities in the area.

Stakeholder and Community Feedback – Access to Clean Energy

Stakeholders and community members talked extensively about the poor quality of housing found across DACs due to the age of the housing stocks, income inequality, lack of access to funding and financing, and disinvestment by large numbers of absentee landlords who too often speculate on real estate in the region. Substandard housing quality ranked as perhaps the largest barrier to accessing clean energy. What home repair programs do exist appear to advantage homeowners over renters, or in some cases particular residents or communities, and aren't funded in sustainable ways or administered to ensure streamlined access with minimal eligibility restrictions to overcome. When funding runs out or enrollment windows close, residents of DACs grow distrustful of government sponsors and community-based program implementers.

Residents of the Southern Counties of WNY discussed a deficit of qualified contractors and workers in their communities which increases labor costs and the overall cost of services, degrades the quality of the services that are provided, and contributes to long project lead times and completion times. Travel and transportation logistics serve to disincentivize participation in clean energy programs for both residents and contractors. For residents of rural DACs who work long hours at multiple part-time jobs, the lack of public transportation options and the high cost of private transportation make it difficult to participate in community outreach and engagement activities to learn about program opportunities. For contractors, lengthy travel distances between jobs eat into the money they'd otherwise earn for completing projects.

In recent years, large numbers of immigrants and refugees have moved to or been resettled in urban DACs. As a result, language access has emerged as a big challenge for service providers to manage and for new arrivals to overcome. Information about clean energy programs and the benefits of clean energy has failed to flow freely to these communities. Stakeholders and focus group participants from urban DACs noted that flows of reliable and factual information about clean energy are interrupted by deceptive direct-to-consumer and door-to-door marketing activities of energy service companies (ESCOs) that are ubiquitous in those communities. For many rural communities, misinformation about the threats of climate change and the benefits of a transition to clean, renewable energy shapes negative perceptions and works to politicize solutions and divide communities.

> *"You know climate change may or may not be real. They're not sure about that. So, you know, I think it goes along with the political climate of the times."*
>
> **Stakeholder interview participant from Allegany County**

Barriers and Opportunities

Outlined below is a comprehensive list of barriers and opportunities that accurately summarizes the insights shared by stakeholders and community members.

Table 4. Barriers and Opportunities - Physical and Economic Conditions and Structures

Barrier Subcategory	Barrier Identified	Recommendations and Opportunities to Address Barrier

Housing Quality	Housing stocks within DACs are among the oldest in the country and suffer from deferred maintenance, disinvestment, the presence of health and safety hazards like lead, mold, asbestos, and knob and tube wiring. As a result, housing stocks in DACs require substantial investments in weatherization and electrification readiness measures.	**NYS:** Enact the Green Affordable Pre-Electrification (GAP) Fund (S8535/A9170). The GAP Fund would direct new investments toward energy efficiency and building electrification readiness while codifying tenant protections. *[HPHC]* **NYSERDA:** Capture and publish data on program deferrals due to pre-existing conditions in order to establish the scope and scale of the problem. *[HPLC]* **WNY Hub:** Leverage federal IRA funding and state and local housing improvement funds to target comprehensive investments in DACs within the City of Buffalo using funds that have been secured by the WNY Hub lead, PUSH Buffalo. *[HPLC]*
	Absentee landlords engage in speculative real estate activities that contribute to the persistence of substandard housing conditions for renters.	**NYS:** Require real estate LLCs to disclose the identity of members through a statewide rental registry program in order to increase transparency and accountability around housing quality. *[HPHC]* **WNY Hub:** Provide know your rights resources and legal services referrals, along with NYSERDA program information, to tenants living in substandard rental housing as a means of building trust with vulnerable households. *[HPLC]*
Housing and Energy Affordability	Housing maintenance/operating costs and rents across the region are increasingly unaffordable for residents of DACs, including for small mom-and-pop landlords.	**NYS:** Enact the NY HEAT Act (S2016B/A4592B) to codify a 6% energy affordability standard for low-to-moderate income households in NYS. *[HPHC]* **NYS:** Adopt new utility rate designs for low-to-moderate income households installing heat pump equipment to ensure all electric equipment is affordable to operate. *[HPHC]* **NYSERDA:** Develop and/or enforce program rules that prohibit landlords from raising rents on tenants in properties that receive state or federal clean energy incentives. *[HPHC]* **NYSERDA:** Capture, track, and publish information about actual post-retrofit

		energy cost savings and operating costs. *[LPLC]* **WNY Hub:** Develop targeted marketing materials for mom-and-pop landlords that raise awareness around energy and operating cost savings associated with energy efficiency improvements. *[HPLC]*
	Residents in the Southern Counties of WNY pay a premium for delivered fuels (wood, propane).	**WNY Hub:** Promote clean heating and cooling alternatives that leverage federal IRA incentives and clean heat program rebates. *[HPLC]*
Transportation	Public transportation options are insufficient and unreliable across the region, leaving residents of DACs physically and socially isolated from service providers and employment opportunities, including clean energy services and jobs.	**WNY Hub:** Explore online training options for job seekers (e.g., https://cahillresources.com/) and virtual workshop formats for residents. *[LPLC]* **WNY Hub:** Use Local Pilot and Project funding for transportation stipends, ride share fare, or carpooling fuel reimbursements for residents to attend job training or community workshops. *[HPLC]*
	A lack of public transportation options in rural DACs in the Southern Counties of WNY is compounded by a lack of affordable private transportation options and long travel distances.	
High-speed Internet Access and Computer Ownership	In urban DACs, high-speed internet access and computer ownership remains unaffordable for many residents, leaving them disconnected from clean energy service providers and digital program enrollment opportunities.	**WNY Hub:** Maximize time in diverse community settings tabling, conducting door-to-door outreach, and facilitating workshops. *[HPLC]* **WNY Hub:** Utilize ad-buys in community newspapers to promote program opportunities. *[HPLC]* **WNY Hub:** Mail paper applications and instructions to residents. *[HPLC]* **WNY Hub:** Host program information and enrollment sessions at public computer lab facilities (e.g., libraries, K-12 schools, community centers, or community colleges and universities). *[HPLC]*
	In rural DACs, high-speed internet service is either unavailable or network connectivity is unreliable, and computer ownership is unattainable, leaving residents disconnected from clean energy service providers and digital program enrollment opportunities.	
Language Access	Large and growing immigrant and refugee populations in urban DACs with limited English proficiency increases costs for service providers of language translation and interpretation services.	**NYSERDA:** Provide capacity building and financial support to immigrant- and refugee-owned contractors in WNY that enables their participation in NYSERDA programs. *[HPHC]*

		WNY Hub: Seek to partner with immigrant community leaders and refugee resettlement agencies that serve urban DACs to communicate information about program opportunities. *[HPHC]* **WNY Hub:** Translate materials in other languages. *[HPLC]* WNY Hub: Use Local Pilot and Project funds to recruit and provide stipends to immigrant and refugee community ambassadors to break down language and cultural barriers. *[HPHC]*
Low Wage Jobs and Underemployment	Lack of family sustaining full-time employment opportunities forces low-income residents and residents of DACs to cobble together low wage part-time jobs and work longer hours to make ends meet and leaves less time for residents to pursue clean energy program opportunities.	**WNY Hub:** Maintain flexible work schedules (evenings, weekends, holidays) to meet with households when they have windows of availability. *[LPLC]*

Table 5. Barriers and Opportunities - Financial and Knowledge Resources and Capacity

Barrier Subcategory	Barrier Identified	Recommendations and Opportunities to Address Barrier
Confidence and Trust in Financial Benefits	Lack of confidence in the ability of clean energy programs to deliver truly no cost or affordable services that provide meaningful financial benefits.	**WNY Hub:** Capture and broadcast testimonials from early adopters in DACs to validate program benefits. *[HPLC]*
Direct-to-Consumer Marketing	Predatory and misleading direct-to-consumer mail and telemarketing in rural DACs, and door-to-door marketing by ESCOs in urban DACs creates confusion and erodes trust in the financial benefits of clean energy services; renews faith in name brand entities like investor-owned utilities.	**NYS:** Prohibit deceptive direct-to-consumer marketing practices including door-to-door outreach in DACs. *[HPHC]* **NYSERDA:** Build NYSERDA's statewide brand in DACs as a trusted and reputable source for factual and transparent information about the benefits of clean energy through direct mail, advertising in community newspapers, neighborhood billboards, and by highlighting the unique role played by the WNY Hub. *[HPLC]*

Table 6. Barriers and Opportunities - Perspectives and Information

Barrier Subcategory	Barrier Identified	Recommendations and Opportunities to Address Barrier
Distrust of Government Programs	Due to persistence of structural racism and economic inequality in urban DACs, claims that government support will reach marginalized communities and make a direct, positive impact on people's lives and livelihoods is doubted or held in contempt as a form of top-down white saviorism.	**WNY Hub:** Ensure frontline Hub staff and subcontractors are representative of the communities they work in. **WNY Hub:** Forge additional partnerships with local community-based partners and compensate partners for time and effort spent directly supporting community engagement efforts. **WNY Hub:** Leverage relationships with local elected officials (e.g., city councilmembers) to directly engage constituents. *[HPLC]* **WNY Hub:** co-design and implement Community Campaigns and/or Local Pilots and Projects with local elected officials, faith leaders, etc. *[HPHC]*
	In rural DACs, perceptions that community-based program implementers operate with ulterior motives and agendas than what's publicly promoted.	**WNY Hub:** Build and leverage relationships with local elected officials, small businesses, faith leaders, school officials, etc., to reset perceptions. *[HPHC]* **WNY Hub:** Co-design and implement Community Campaigns and Local Pilots and Projects with local leaders out front. *[HPHC]*
Zero Sum Thinking	Rural communities hold a belief that a transition to a clean, renewable energy economy will destabilize agricultural economic activity, displace family farms, and industrialize the land.	**WNY Hub:** Develop targeted marketing materials for family farms that raise awareness around energy and operating cost savings associated with energy efficiency improvements. *[LPLC]*
	Belief held by landlords that programs will only deliver benefits to tenants.	**NYSERDA:** Provide enhanced financial incentives to landlords who agree to sign regulatory agreements tied to the useful life of the improvements that are designed to preserve rental unit affordability. *[HPHC]* **WNY Hub:** Develop a value proposition for landlords in the context of a Community Campaign that frames energy efficiency and clean energy upgrades as worthwhile

		investments to preserve the integrity and extend the useful life of their property while reducing tenant turnover by stabilizing energy costs. *[HPHC]*
Ideological and Political Worldview	In some rural communities, climate denialism blends with libertarianism and conspiratorial thinking to politicize the clean energy transition and keep residents polarized.	**WNY Hub:** Rely on trusted local messengers (teachers, faith leaders, business owners, nurses and doctors), and include testimonials from program participants, to promote Hub services with a focus on health and affordability benefits. *[LPHC]*
Energy Reliability	For urban DACs, particularly in the city of Buffalo, the December blizzard in 2022 confirmed beliefs that aging electrical infrastructure is unreliable, and the existing electrical grid cannot safely support a transition away from fossil fuels.	**WNY Hub:** Educate residents of urban DACs on the resiliency benefits ("passive survivability") of whole house energy efficiency improvements. *[HPLC]*
	For rural DACs, delivered fuel sources like wood and propane are believed to be inherently more reliable than electricity and in the case of wood, provide residents with a form of energy independence.	**WNY Hub:** Focus messaging on the health benefits and cost savings of switching to high efficiency electric heat pumps. *[HPLC]*

Table 7. Barriers and Opportunities - Program Design and Implementation

Barrier Subcategory	Barrier Identified	Recommendations and Opportunities to Address Barrier
Program eligibility	Clean energy programs are designed to prioritize the needs of homeowners and often leave tenants without meaningful access to clean energy benefits.	**WNY Hub:** Raise awareness of NYSERDA's EmPower+ program among renters through direct mail, outreach to housing providers, Buffalo Housing Court, municipal building inspectors, etc. *[HPLC]*
	Program eligibility thresholds are too restrictive and funding levels are too low to meet the needs of renters, including small businesses.	**NYSERDA:** Expand income eligibility thresholds to make grant-based assistance available to more households in DACs; increase total amount of funding available for clean energy projects in DACs; create programs that target small business owners in DACs. *[HPLC]*
Funding for Non-Energy Improvements	Funding for programs designed to address weatherization and electrification readiness, and substandard health and safety conditions, like Buffalo's Green and Healthy Homes Initiative, is	**NYSERDA:** Collaborate with other state agencies, like NYS Homes and Community Renewal, and local governments to create more comprehensive programs that are easy for program implementers and residents to administer and access. *[HPHC]*

	unsustainable and difficult to braid together; when programs ramp down, trust is broken with residents of DACs.	
Contractor Availability and Performance	Contractors avoid taking jobs in DACs, perform substandard work, or lack the cultural competence to engage respectfully with residents.	**NYSERDA:** Improve contractor oversight and quality assurance; create publicly available contractor scorecards. *[HPLC]* **NYSERDA:** Report on contractor participation rates in DACs vs. non-DACs to determine if contractors are failing to serve particular communities. *[HPLC]* **WNY Hub:** Offer community health worker training for contractors to build their cultural competency. *[HPLC]* **WNY Hub:** Design a Community Campaign that incorporates enhanced performance and participant satisfaction standards. *[LPLC]* **WNY Hub:** Leverage Community Campaign and Local Pilot and Project funding to build and demonstrate Hub-led energy assessment and project management capacity. *[HPHC]*
	In rural communities, there's a lack of trained and qualified clean energy contractors and workers which causes long delays for projects to be approved and scheduled for installation; in urban DACs there are a lack of Minority and Women-owned contractors serving those communities.	**NYS:** Provide funding, potentially through the Office of Just Energy Transition, to develop a network of small, neighborhood-based Sustainability Workforce Training Centers in DACs and encourage collaboration with community colleges, state universities, and building trades unions in those communities. *[HPHC]* **NYSERDA:** Promote and incentivize training and credentialing opportunities to new or existing MWBEs that will enable participation in NYSERDA programs. *[HPLC]* **WNY Hub:** Use budgeted MWBE capacity building support funds to buy down cost of training and credentialing for new contractors. *[HPLC]*

	Projects that require coordination with multiple contractors create scheduling and project completion challenges that have negative impacts for residents.	**NYSERDA:** Develop case studies and how-to toolkits documenting successful attempts across the Regional Hubs network to braid NYSERDA and non-NYSERDA programs. *[LPLC]* **NYSERDA:** Provide cross-training opportunities in building performance to non-NYSERDA contractors to better align general home repair and clean energy program objectives. *[LPHC]* **NYSERDA:** Provide project management training and support for Hubs implementing braided program models. *[LPLC]* **NYSERDA:** Pilot new HCR/NYSERDA braided program models. *[HPHC]*
	Contractors struggle with cash flow to initiate projects and programs are often late in reimbursing contractors for completed work.	**NYSERDA:** Change program rules to provide additional upfront financial support to contractors, with a focus on MWBEs, that commit to partnering with Regional Hubs and providing a high standard of service to DACs. *[HPHC]*
Outreach and Education	Travel costs and logistics for residents in rural communities deter participation in outreach events and workshops.	**NYSERDA:** Provide transportation funding to Hubs engaged in rural outreach to offer to residents to offset travel costs to workshops and incentivize participation. *[HPLC]*
	More extensive networks of community-based organizations are standing by to support outreach and education in DACs if resources are available.	**NYSERDA:** Increase overall funding levels for the Hubs initiative statewide to maximize opportunities for stakeholder and community engagement and participation. *[HPHC]* **WNY Hub:** Utilize resources available for Community Campaigns or Local Pilots and Projects to demonstrate the efficacy of an all-hands-on-deck approach. Direct funds to support time and effort or deliverables-based contributions from additional partners. *[HPLC]*

Next Steps

Develop and Assessment of Recommendations

The recommendations and opportunities outlined above were coded as follows:

Table 8. Assessment of Recommendations

High Priority, Low Complexity [HPLC] Recommendations with the greatest potential impact and ease of implementation. These recommendations will provide meaningful benefits to DACs and can be implemented by mobilizing existing Hub resources and partnerships or through modest programmatic changes.
High Priority, High Complexity [HPHC] Recommendations with the greatest potential impact and difficulty of implementation/outside the Hub scope of work. These recommendations will provide meaningful benefits to DACs and can be implemented through legislative reform, regulatory rulemaking, or significant programmatic changes.
Low Priority, Low Complexity [LPLC] Recommendations with the least potential impact and greatest ease of implementation. These recommendations will provide fewer benefits to DACs and can be implemented by mobilizing existing Hub resources and partnerships or through modest programmatic changes.
Low Priority, High Complexity [LPHC] Recommendations with the least potential impact and greatest difficulty of implementation/outside the Hub scope of work. These recommendations will provide fewer benefits to DACs and can be implemented through legislative reform, regulatory rulemaking, or significant programmatic changes.

Implementing Recommendations

Recommendations labeled HPLC will take precedence over implementation of the remaining recommendations because they stand a greater chance of delivering benefits to DACs at a timescale that aligns with the remaining term of the WNY Hub contract. Many of the HPLC recommendations can feature in Community Campaigns and/or Local Pilots and Projects. The WNY Hub has yet to draw down those supplemental funds and will work to closeout 2024 by developing a set of preliminary proposals for the design or co-design of various HPLC recommendations using the supplemental funding.

Appendix 1

Energy Generation Jobs, 2016-2022

County	2016	2022	Change	% Change
Allegany				
Solar	57	<10	-52	-91.2%
Wind	<10	<10	0	0.0%
Hydroelectric	67	40	-27	-40.3%
Natural Gas	<10	<10	0	0.0%
Coal	<10	76	71	1420.0%
Oil & Fossil Fuel	<10	<10	0	0.0%
Other	<10	<10	0	0.0%
Cattaraugus				
Solar	17	12	-5	-29.4%
Wind	<10	12	7	140.0%
Hydroelectric	<10	<10	0	0.0%
Natural Gas	<10	<10	0	0.0%
Coal	<10	12	7	140.0%
Oil & Fossil Fuel	<10	<10	0	0.0%
Other	24	<10	-19	-79.2%
Chautauqua				
Solar	<10	25	20	400.0%
Wind	<10	<10	0	0.0%
Hydroelectric	12	<10	-7	-58.3%
Natural Gas	32	<10	-27	-84.4%
Coal	94	<10	-89	-94.7%
Oil & Fossil Fuel	<10	17	12	240.0%
Other	74	<10	-69	-93.2%
Erie				
Solar	450	1,180	730	162.2%
Wind	113	134	21	18.6%
Hydroelectric	182	96	-86	-47.3%
Natural Gas	62	16	-46	-74.2%
Coal	152	113	-39	-25.7%
Oil & Fossil Fuel	<10	57	52	1040.0%
Other	674	<10	-669	-99.3%
Niagara				
Solar	68	47	-21	-30.9%
Wind	15	17	2	13.3%
Hydroelectric	36	404	368	1022.2%

Natural Gas	38	28	-10	-26.3%
Coal	113	90	-23	-20.4%
Oil & Fossil Fuel	<10	13	8	160.0%
Other	86	<10	-81	-94.2%

Transmission, Distribution, and Storage Jobs, 2016-2022

County	**2016**	**2022**	**Change**	**% Change**
Allegany				
Traditional	181	231	50	27.6%
Storage	<10	<10	0	0.0%
Smart Grid	<10	<10	0	0.0%
Micro Grid	<10	<10	0	0.0%
Other Grid Mod	n/a	<10	n/a	n/a
Cattaraugus				
Traditional	121	93	-28	-23.1%
Storage	<10	<10	0	0.0%
Smart Grid	<10	<10	0	0.0%
Micro Grid	<10	<10	0	0.0%
Other Grid Mod	n/a	<10	n/a	n/a
Chautauqua				
Traditional	305	296	-9	-3.0%
Storage	<10	<10	0	0.0%
Smart Grid	<10	<10	0	0.0%
Micro Grid	14	<10	-9	-64.3%
Other Grid Mod	n/a	<10	n/a	n/a
Erie				
Traditional	1,916	1,632	-284	-14.8%
Storage	45	987	942	2093.3%
Smart Grid	<10	<10	0	0.0%
Micro Grid	150	38	-112	-74.7%
Other Grid Mod	n/a	26	n/a	n/a
Niagara				
Traditional	291	251	-40	-13.7%
Storage	15	13	-2	-13.3%
Smart Grid	<10	<10	0	0.0%
Micro Grid	56	11	-45	-80.4%
Other Grid Mod	n/a	<10	n/a	n/a

Fuels Jobs, 2016-2022

County	**2016**	**2022**	**Change**	**% Change**

Allegany				
Coal	<10	<10	0	0.0%
Petroleum	<10	27	22	440.0%
Natural Gas	<10	<10	0	0.0%
Woody Biomass	34	31	-3	-8.8%
Corn Ethanol	12	<10	-7	-58.3%
Other Clean Fuel	19	12	-7	-36.8%
Other	n/a	<10	n/a	n/a
Cattaraugus				
Coal	<10	<10	0	0.0%
Petroleum	26	110	84	323.1%
Natural Gas	22	45	23	104.5%
Woody Biomass	41	38	-3	-7.3%
Corn Ethanol	<10	<10	0	0.0%
Other Clean Fuel	40	<10	-35	-87.5%
Other	n/a	10	n/a	n/a
Chautauqua				
Coal	<10	<10	0	0.0%
Petroleum	22	84	62	281.8%
Natural Gas	15	87	72	480.0%
Woody Biomass	25	23	-2	-8.0%
Corn Ethanol	16	<10	-11	-68.8%
Other Clean Fuel	90	17	-73	-81.1%
Other	n/a	<10	n/a	n/a
Erie				
Coal	<10	21	16	320.0%
Petroleum	708	1,045	337	47.6%
Natural Gas	600	1,120	520	86.7%
Woody Biomass	11	10	-1	-9.1%
Corn Ethanol	52	13	-39	-75.0%
Other Clean Fuel	337	53	-284	-84.3%
Other	n/a	119	n/a	n/a
Niagara				
Coal	<10	<10	0	0.0%
Petroleum	<10	25	20	400.0%
Natural Gas	<10	<10	0	0.0%
Woody Biomass	0	<10	5	
Corn Ethanol	24	<10	-19	-79.2%
Other Clean Fuel	29	26	-3	-10.3%
Other	n/a	<10	n/a	n/a

Energy Efficiency Jobs, 2016-2022

County	2016	2022	Change	% Change
Allegany	26	27	1	3.8%
Energy Star/Lighting	14	15	1	7.1%
Traditional HVAC	80	86	6	7.5%
High Efficiency HVAC & Renewable H&C	<10	<10	0	0.0%
Advanced Materials & Insulation	<10	<10	0	0.0%
Other	26	27	1	3.8%
Cattaraugus				
Energy Star/Lighting	44	44	0	0.0%
Traditional HVAC	34	39	5	14.7%
High Efficiency HVAC & Renewable H&C	53	56	3	5.7%
Advanced Materials & Insulation	<10	11	6	120.0%
Other	23	26	3	13.0%
Chautauqua				
Energy Star/Lighting	136	135	-1	-0.7%
Traditional HVAC	114	132	18	15.8%
High Efficiency HVAC & Renewable H&C	159	173	14	8.8%
Advanced Materials & Insulation	32	52	20	62.5%
Other	56	65	9	16.1%
Erie				
Energy Star/Lighting	1,372	1,406	34	2.5%
Traditional HVAC	1,174	1,446	272	23.2%
High Efficiency HVAC & Renewable H&C	1,509	1,730	221	14.6%
Advanced Materials & Insulation	308	374	66	21.4%
Other	360	445	85	23.6%
Niagara				
Energy Star/Lighting	224	226	2	0.9%
Traditional HVAC	194	221	27	13.9%
High Efficiency HVAC & Renewable H&C	250	266	16	6.4%
Advanced Materials & Insulation	50	60	10	20.0%
Other	58	65	7	12.1%

Appendix 2

Potential Regional Partners and Assets

Organization	County	Sector	Services
Buffalo Federation of Neighborhood Centers	Erie	Social Services	Care Management; Residential Services; Senior Services; BFNC Hope Center; Youth Services
Buffalo Urban League	Erie	Social Services	Housing and Community Development; Workforce Development; Youth Empowerment
SUNY Buffalo State University	Erie	Higher Education	Education and Training
Community Foundation for Great Buffalo	Erie	Philanthropy	Grant Making
Division of Citizens Services, Buffalo	Erie	Government	311 Call and Resolution Center
Lincoln Memorial United Methodist Church	Erie	Church	Community Development
Erie County Department of Health	Erie	Government	Public Health
Native American Community Services, Inc.	Erie and Niagara	Social Services	Community and Cultural Services, Information and Referral, Economic Development
Hispanics United of Buffalo	Erie	Social Services	Housing, Social Services, Health Services, Nutrition
Neighbor Works Community Partners	Erie and Niagara	Housing	Home Buyer Orientation and Education, Home Energy Audit
Partnership for the Public Good	Erie	Research	Policy and Social Issues Research for Buffalo
Habitat for Humanity - Buffalo	Erie	Housing	Homeownership
WNY Veteran Housing Coalition	Erie	Housing	Housing for homeless veterans
Westminster Economic Development Initiative (WEDI)	Erie	Business	Economic Development
Community Health Center of Buffalo	Erie & Niagara	Health	Community Healthcare services
SNAPCAP (Safety Net Healthcare)	WNY	Health	Community Healthcare services
Hearts and Hands	Niagara	Social Services	Transportation and In-Home Care Services
Niagara Falls Memorial Primary Care Center	Niagara	Health	Family Health

Horizon Health Services	Niagara	Health	Family Health
Parent Network WNY	Niagara	Health	Family Health
Lockport CareNet	Niagara	Health	Family Health
Pinnacle Services	Niagara	Social Services	Domestic Violence Prevention, Parenting and Youth Services
United Way of Greater Niagara	Niagara	Non-profit	Grant Making
YWCA of the Niagara Frontier	Niagara	Social Services	Housing, Youth and Community Services
Lockport Housing Authority	Niagara, Lockport	Housing	Housing Assistance
Emmanuel United Methodist Church	Niagara, Lockport	Church	Religious and Community Services
Grace Chapel	Niagara, Lockport	Church	Religion
New Directions Youth and Family Services	Eire & Niagara	Social Services	Youth and Family Care Services
University at Buffalo	Erie	University	Academic Services
Niagara County Government	Niagara	Government	County Government
Allegany County Government	Allegany	Government	County Government
Chautauquan County Government	Chautauqua	Government	County Government
Cattaraugus County Government	Cattaraugus	Government	County Government
Southern Tier West Regional Planning and Development Board	Allegany, Cattaraugus, and Chautauqua	Government	Regional Planning, Community Development, Economic Development
Salvation Army	Chautauqua	Social Services	Homelessness Prevention
United Way of Cattaraugus County	Cattaraugus	Non-profit	Grant Making
Connecting Communities in Action	Cattaraugus	Social Services	Utility Shutoff and Eviction Prevention, Weatherization Assistance, Housing Services
Jericho Road Community Health Center	Erie	Health	Immigrant and Refugee Services, Primary Healthcare
YMCA Lockport	Niagara	Social Services	Youth and Adult Services
First Presbyterian Church of Lockport	Niagara	Religious	Youth and Family Services
Veterans One-Stop Center	WNY	Social Services	Supportive Services for Veterans

Appendix 3

NYSERDA spending in Western New York

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Findings

Assisted

Assisted Home Performance is a ratepayer-funded, residential energy efficiency program run by NYSERDA. It targerts moderate income households, defined as households with annual incomes between 60% and 80% of their area's median income.

There are approximately 69,000 of these households across the five counties of Western New York.

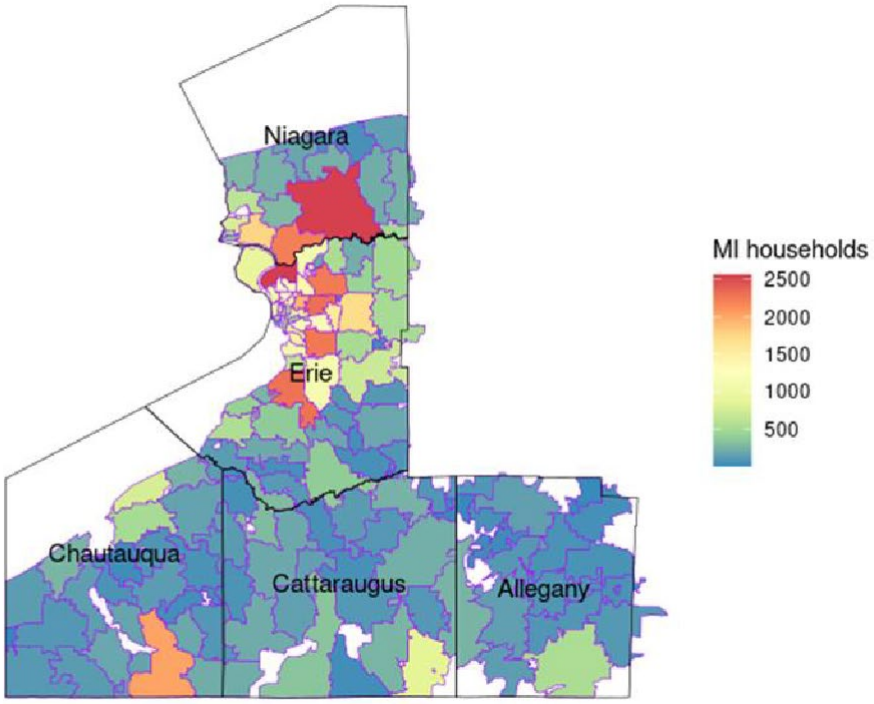

Figure 1: Number of moderate income households, by zip code

They are highly concentrated in Erie and Niagara counties.

Big picture

- Between 2010 and 2022, NYSERDA disbursed $18,081,182 on 8,401 energy efficiency projects across Western New York.
- These incentives catalyzed a further $41,853,095 in out-of-pocket spending by program beneficiaries.
- We estimate that 12.1% of eligible households across Western New York benefited from the program between 2010 and 2022. [1]
- These projects produced an estimated $3.1M in bill savings and 2.9M kWh in energy savings in their first year.

Projects over time

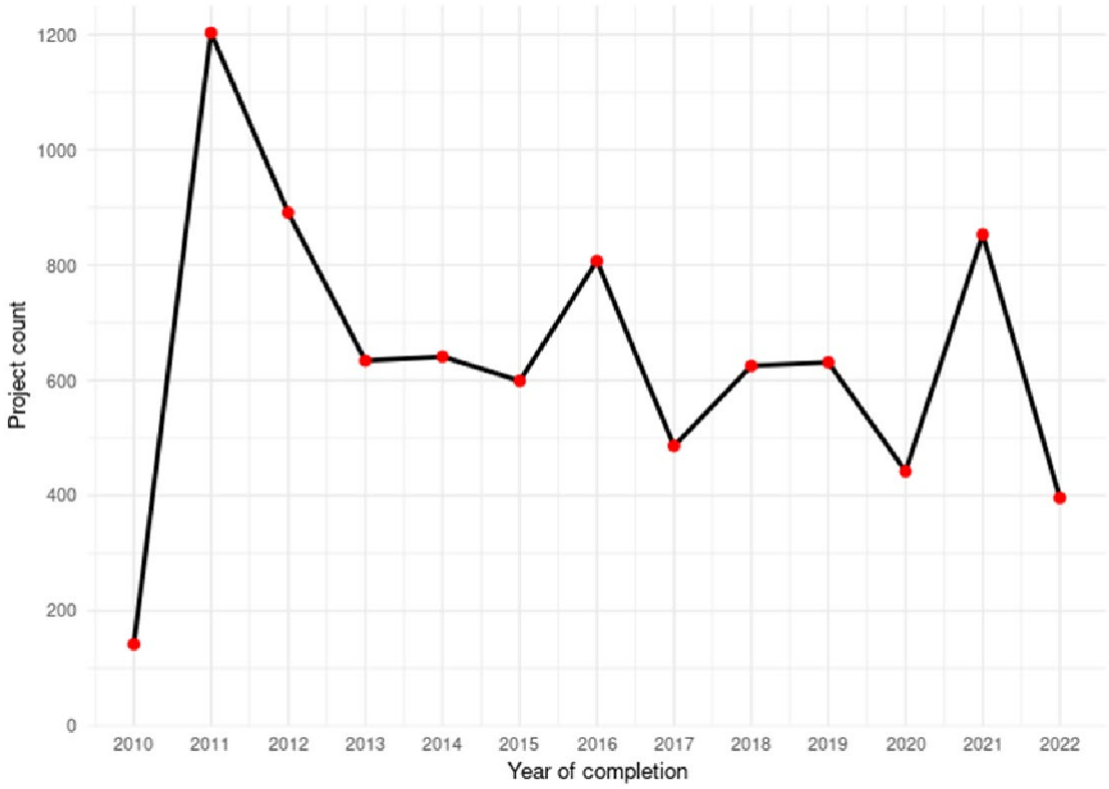

Figure 2: Number of completed Assisted projects by year

In 2011, contractors completed 1,203 projects across Western New York, the highest in any single year during our study period.

Projects appear to be on a downward trajectory since 2021, averaging around 700 projects a year and reaching a low of 396 in 2022. It's not clear why program activity declined, at from examining the data.

Spending by county

How did NYSERDA distribute this $18M across the 5 counties?

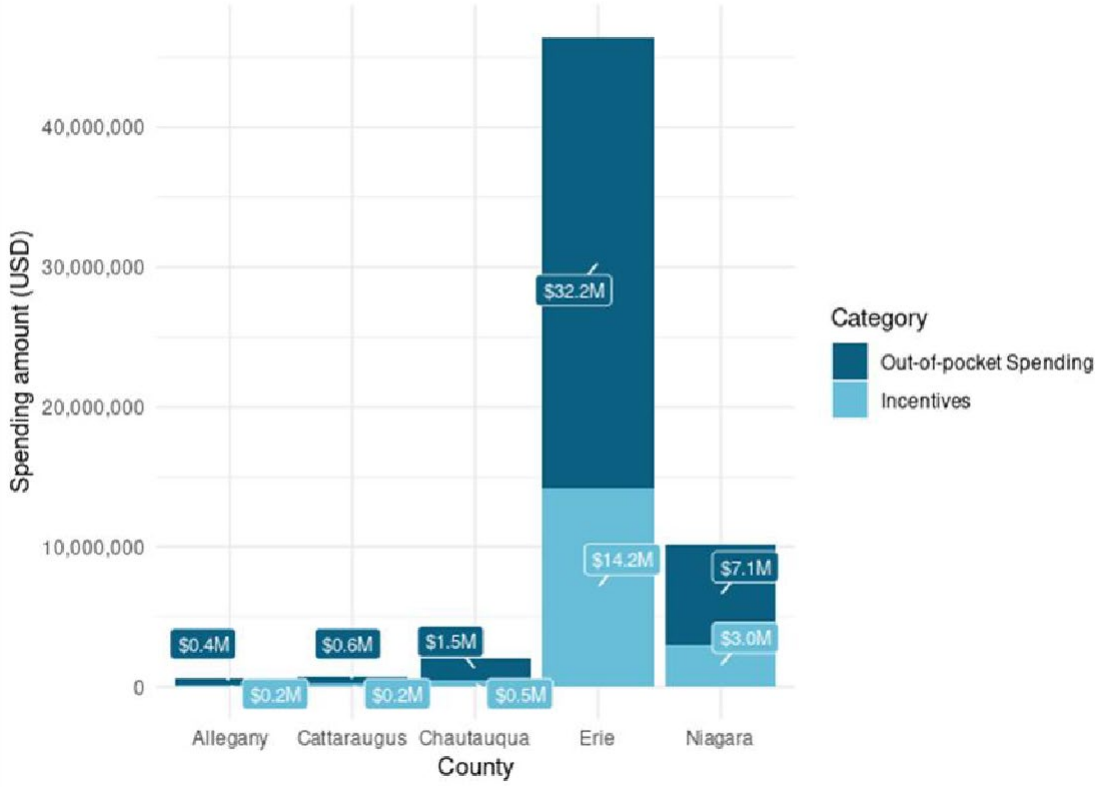

Figure 3: Assisted Incentives and Out-of-pocket Spending by County

95% of the incentive spending went to Erie and Niagara counties, with 4 out of 5 of those dollars going to Erie county.

What accounts for concentration of spending in the north of the region? Does it simply reflect where moderate income households live?

Let's take a look:

- Erie county, which has 67.2% of the eligible population, received 78.6% of the incentive spending.
- Niagara county, with 15.6% of the eligible population, received 16.8% of the incentive spending.
- Chautauqua, Allegany, and Cattaraugus, with 17.2% of the eligible population, received 4.6% of the spending.

County	Projects count	Total project spending	Total incentives	Total out-of-pocket spending	Total bill savings	Total energy savings (kW)
Erie	6,534	$46,435,577	$14,212,326	$32,223,251	$2,304,157	2,036,992
Niagara	1,487	$10,124,268	$3,035,614	$7,088,654	$625,764	561,205
Cattaraugus	82	$751,134	$181,951	$569,183	$67,431	60,817

Chautauqua	236	$2,024,400	$485,055	$1,539,345	$122,442	244,897
Allegany	62	$598,898	$166,236	$432,662	$29,062	50,503

Table 1: Assisted program statistics by county

While the majority of moderate income residents of Western New York do in fact live in Erie and Niagara counties—82% of households, to be precise—this does not fully explain the spending concentration.

It appears that the three rural counties in southern portion of New York State received a less-than-proportional share of the incentive spending between 2010 and 2022.

To understand why, let's look at program penetration, the percent of eligible households that benefited from the program:

County	MIHHs count	Beneficiary household percentage
Erie	46,535	14%
Niagara	10,819	14%
Cattaraugus	3,626	2%
Chautauqua	6,160	4%
Allegany	2,154	3%

Table 2: Assisted program subsidy recipients

While we estimate that 14% of eligible moderate income households in Erie and Niagara counties participated in the Assisted program during the study period, program penetration was much lower in Cattaraugus, Chautauqua, and Allegany.

In other words, the program is reaching a smaller percentage of moderate income households in the southern counties, despite the fact that the households make up a greater share of the population of many zip codes:

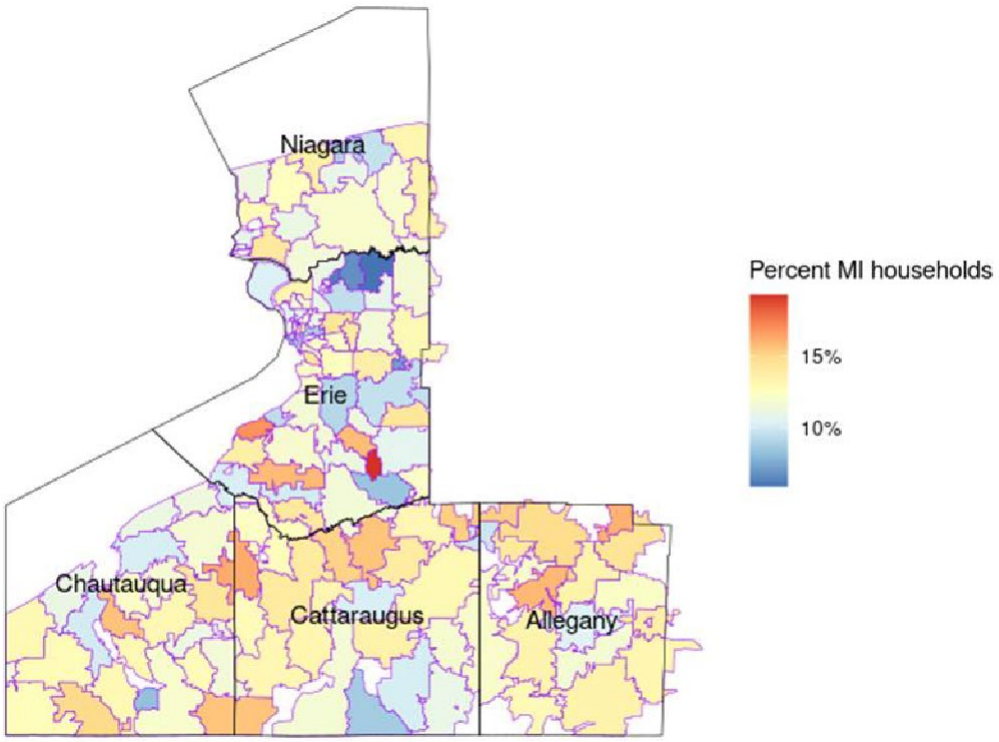

Figure 4: Percent of eligible households for Assisted program

Benefits by county

Despite the lower program penetration, the households that Assisted did reach in the southern counties enjoyed more than double the energy savings in the first year after the energy efficiency work was performed, on average:

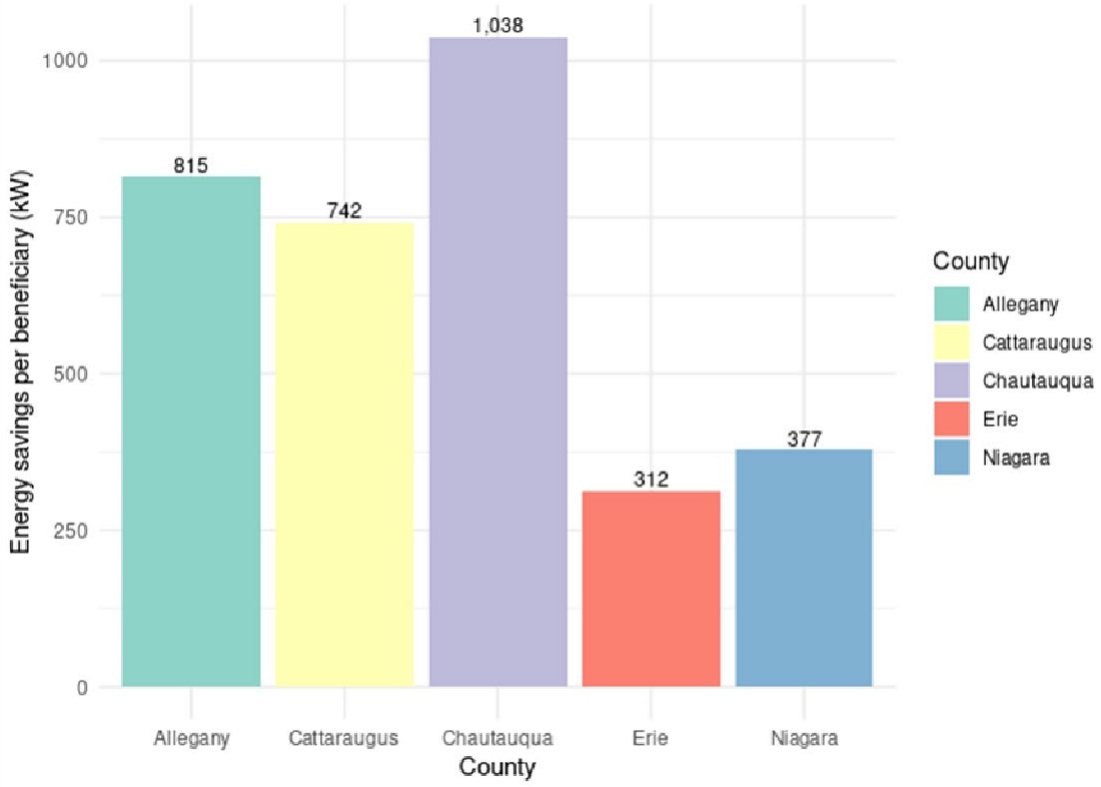

Figure 5: Energy savings per beneficiary by county for Assisted program

Why did that happen? Rural homes often consume more energy than urban ones, and so may be benefit more from energy efficiency measures. But another part of the story may be that households in these areas spent more on their projects:

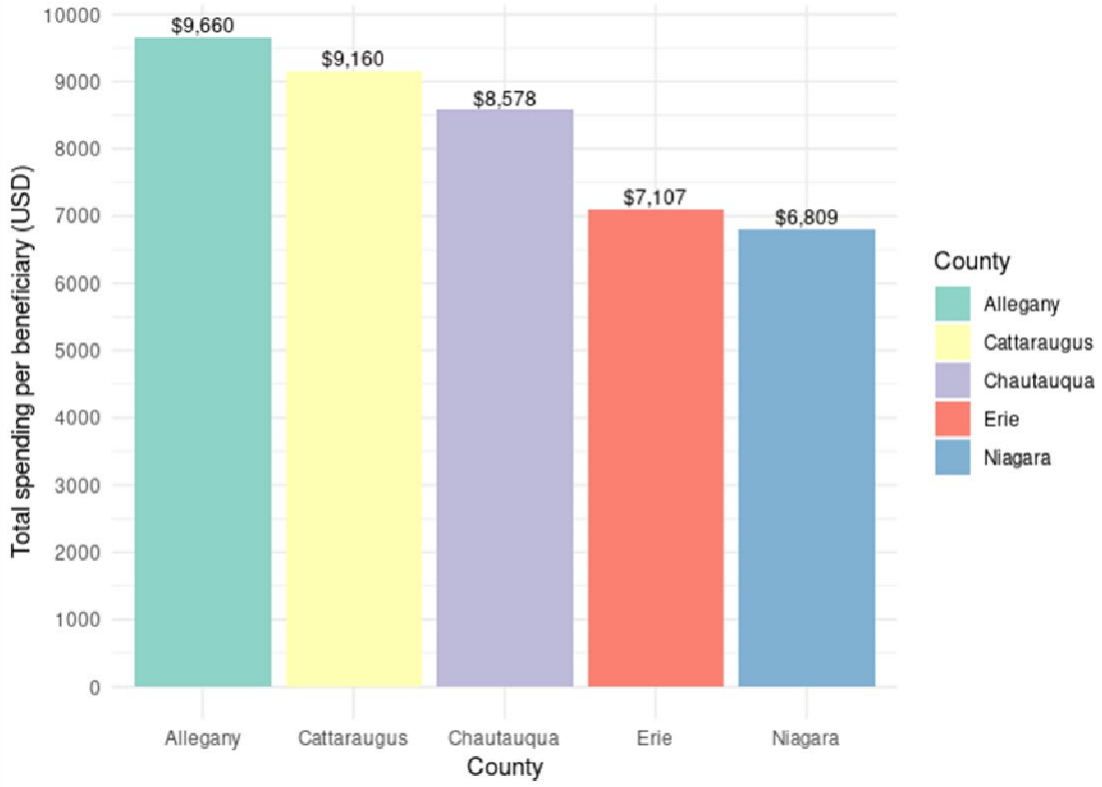

Figure 6: Total project spending per beneficiary by county for Assisted program

The average total project cost in Erie and Niagara—including both NYSERDA's incentives and household out-of-pocket costs—stands at $7K. In the southern counties, the average total project cost ranged between $8.5K and $9.5K.

County	Total spending	Incentives	Out-of-pocket spending
Erie	$7,107	$2,175	$4,932
Niagara	$6,809	$2,041	$4,767
Cattaraugus	$9,160	$2,219	$6,941
Chautauqua	$8,578	$2,055	$6,523
Allegany	$9,660	$2,681	$6,978

Table 3: Assisted program measures per beneficiary household by county

This is not primarily due to higher average incentive payments, however, but to high out-of-pocket costs. Projects in the southern counties spent 3 dollars out-of-pocket for every 1 dollar NYSERDA chipped in incentives. In Erie and Niagara, the ratio is close to 2-to-1.

Interestingly, however, the 2x better energy savings didn't translate into 2x more bill savings:

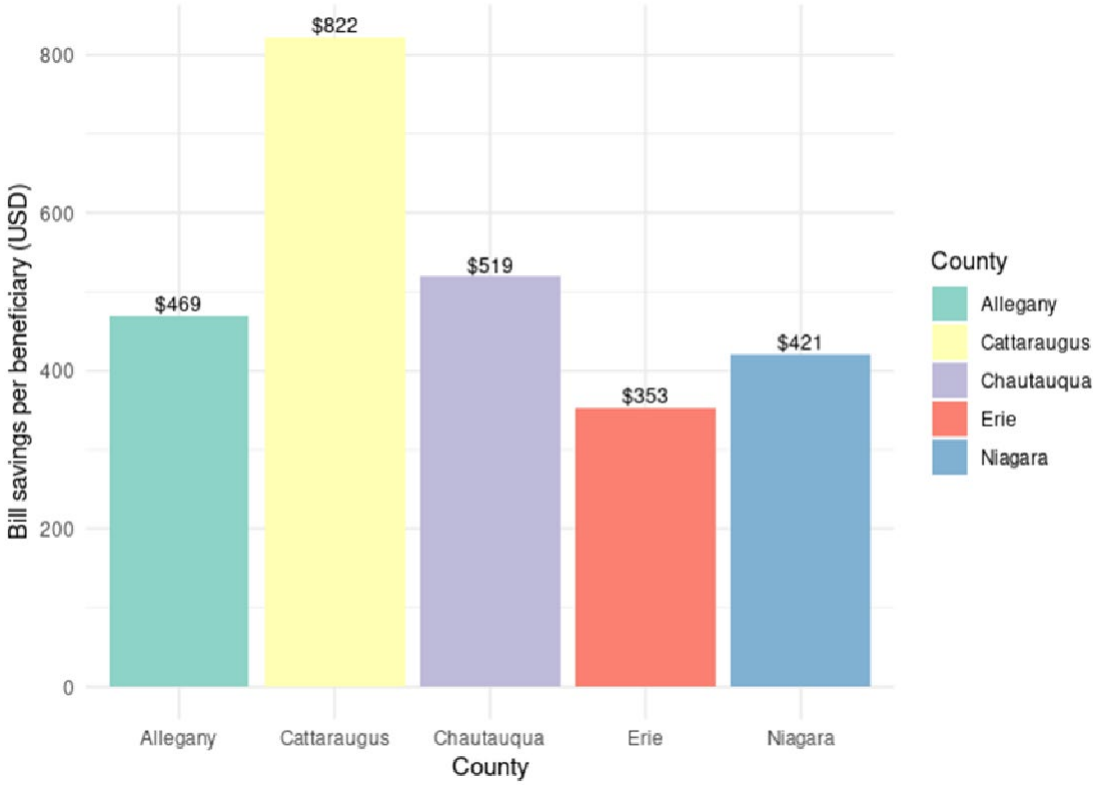

Figure 7: Bill savings per beneficiary by county for Assisted program

It's not immediately clear why this is the case.

Spending by race

How did NYSERDA distribute this $18M in demographic terms?

Let's start by examining the racial makeup of moderate income households across Western New York:

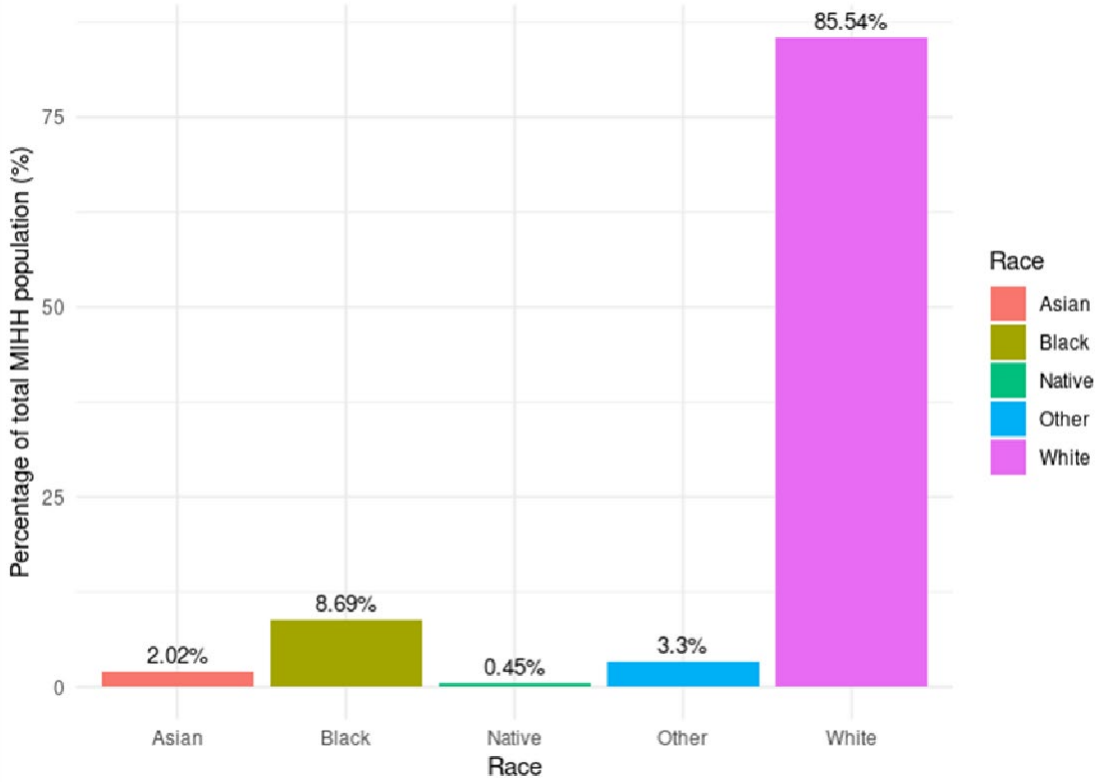

Figure 8: Racial makeup of middle income households in WNY

If the racial makeup of *program beneficiaries* looks similar, we can conclude that the money was spent equitably—if we assume that the energy efficiency need is roughly equal across racial groups.

This is a big assumption, and unfortunately we lack the data to verify if it is true. (If that assumption doesn't hold, in other words, then the chart doesn't provide a basis for judging the equity of how the money was spent.)

And we need to make a second assumption before we can crunch the numbers: NYSERDA doesn't tell us the race of the household behind each Assisted project, only the zip code that household lived in. This allow us to calculated how many spending went to each zip code. We assume that households in a given zip code are all equally likely to receive funds from Assisted, regardless of race. In other words, we must assume that within a given zip code, a moderate income white household is just as likely to have done an Assisted project as a moderate income black household.

With those two caveats in mind, let's look at the estimated racial makeup of program beneficiaries in Western New York:

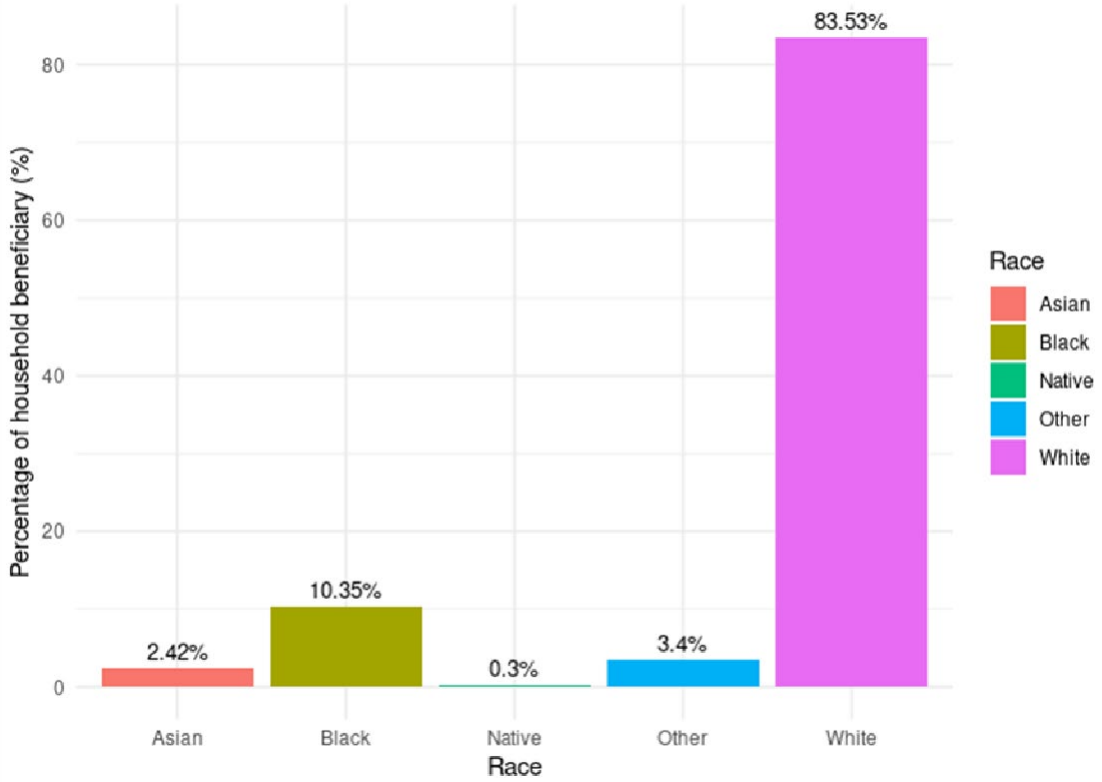

Figure 9: Racial makeup of moderate income households in WNY

White households made up 85.5% of the moderate income population, and we estimate they made up 84% of households that did Assisted programs. The percentages are similar across racial groups: Black households made up 8.7% of the eligible population and 10% of program beneficiaries, asian households made up 2% and 2%, and so on.

While not definitive, this finding suggests that Assisted incentives were spent in a broadly equitable way in Western New York.

Empower

NYSERDA's Empower program subsidizes energy efficiency interventions for low-income New Yorkers, defined as households whose annual income is under 60% AMI.

There are approximately 253,000 of these households across Western New York.

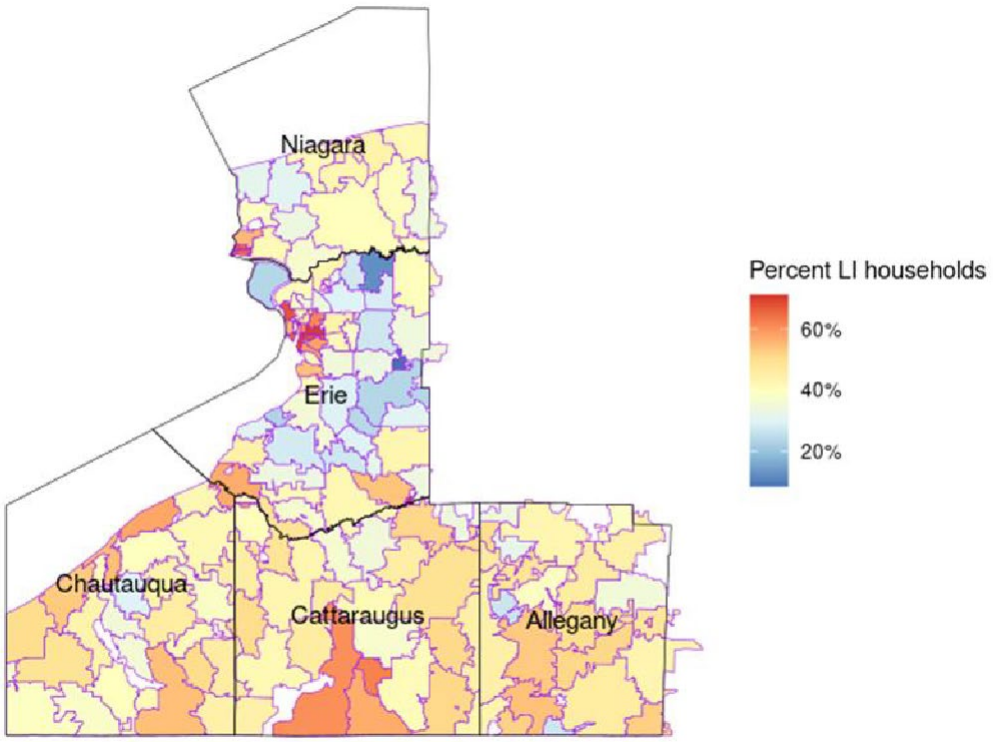

Figure 10: Percent Empower eligible households (WNY)

They are most concentrated in Buffalo, where low income households often make up 60% of a zip code, and the southern counties, where they make up 40-50% of the population, on average.

Unlike Assisted, Empower covers a project's total cost,[2] providing free energy retrofits to eligible households. In other words, incentives equal the total project cost, and there is no out-of-pocket spending.

Big picture

- Between 2018[3] and 2023, NYSERDA disbursed $53,653,748 for the completion of 8,793 residential energy efficiency projects in Western New York.
- We estimate that 3.47% of eligible households in the region benefited from the program between 2018 and 2023. [4]
- These projects produced an estimated $3.3M in first-year bill savings, and 3,8M kW in first-year energy savings across Western New York.

Projects over time

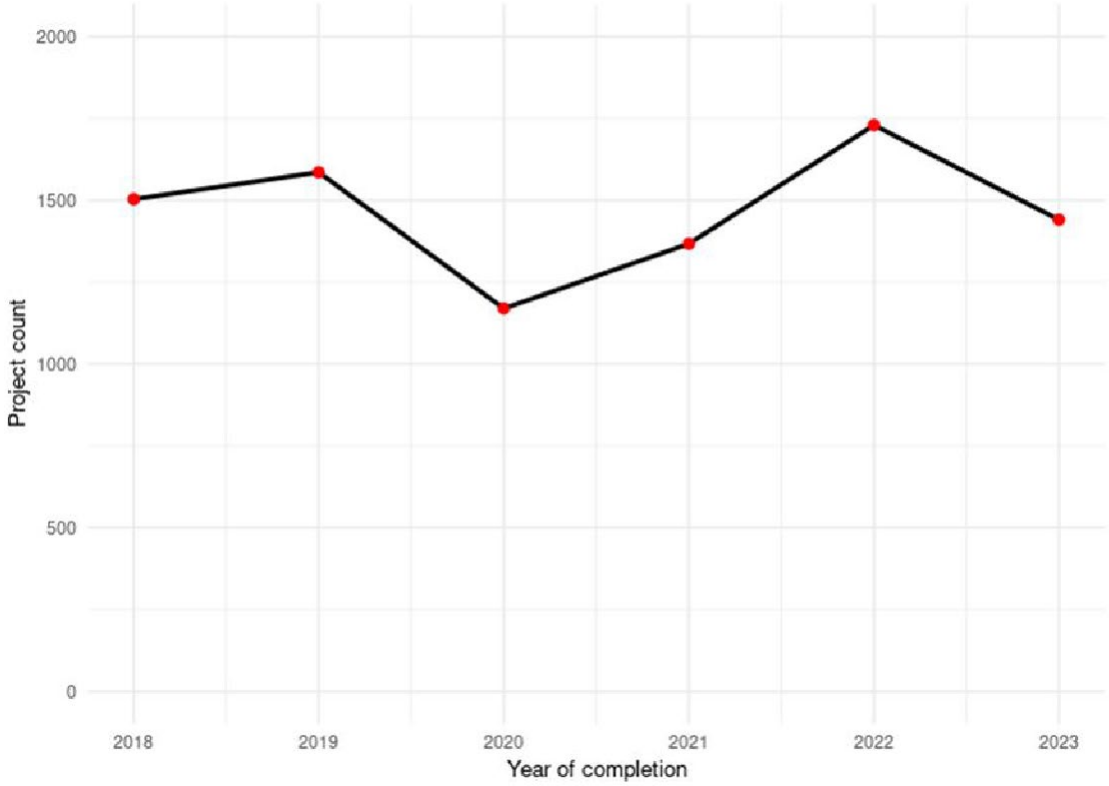

Figure 11: Number of completed Empower projects by year

The annual number of completed projects per year was fairly consistent in our study period, averaging around 1,500 projects a year. The dip to a low of 1,169 projects completed in 2020 was likely caused by the Covid pandemic.

It's also worth noting the difference in scale between Empower, with an average of 1,465 projects a year, and Assisted, with an average of 642 projects.

This difference could be due to Empower's more generous subsidies, which may encourage household participation and reduce the resistance of landlords to out-of-pocket expenses.

Spending by county

How did NYSERDA distribute Empower funds across the 5 counties?

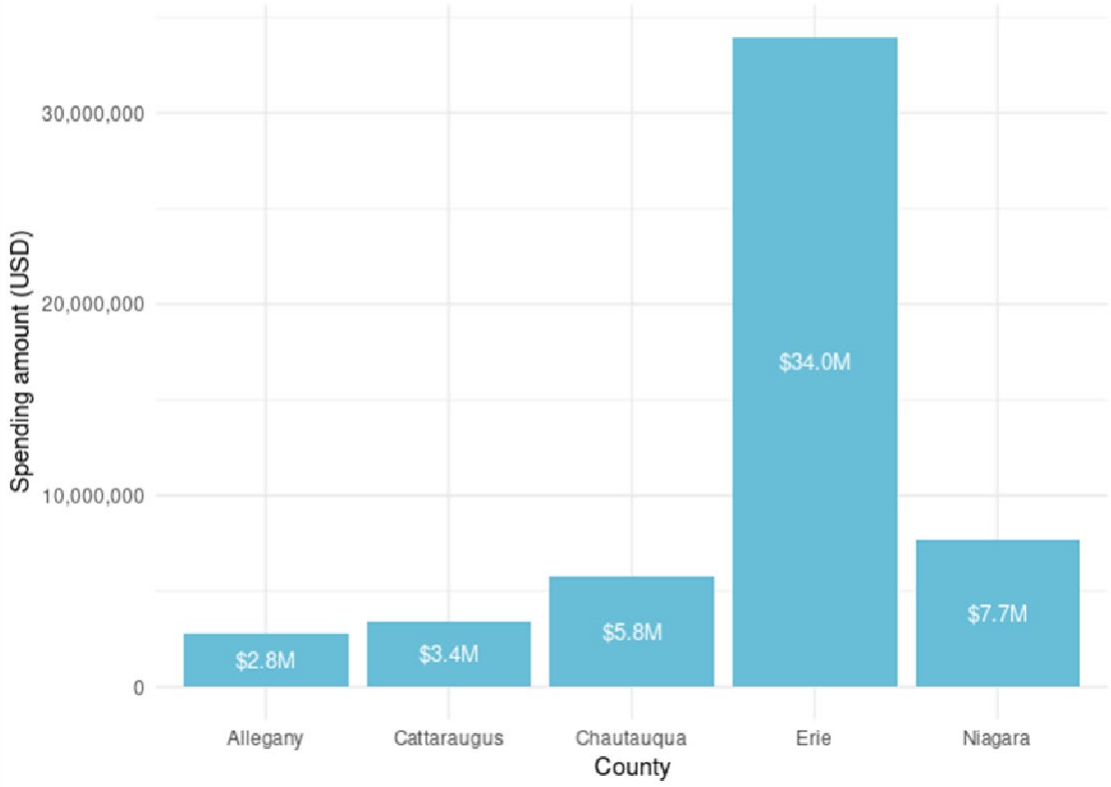

Figure 12: Incentives Spending by County

- Erie county, which has 66.5% of the eligible population, received 63.3% of the incentive spending.
- Niagara county, with 15.1% of the eligible population, received 14.3% of the incentive spending.
- Chautauqua, Allegany, and Cattaraugus, with 18.4% of the eligible population, received 22.4% of the spending.

The pattern here is the opposite of Assisted: the southern counties received a slightly larger-than-proportional share of the incentive spending, while Erie and Niagara, where the majority of low-income households live, received a slightly less-than-proportional share.

Program penetration sheds a light on this finding:

County	Potential beneficiaries count	Subsidy recipients percentage
Erie	168,561	3.43%
Niagara	38,170	3.15%
Cattaraugus	14,072	3.75%
Chautauqua	25,249	3.51%
Allegany	7,436	5.43%

Table 4: Empower program beneficiary percentage

Compared to Assisted, which had much higher program penetration in Erie and Niagara counties, Empower's rates are much more similar across counties. The one exception is Allegany county, where an estimated 5.43% of eligible households have participated.

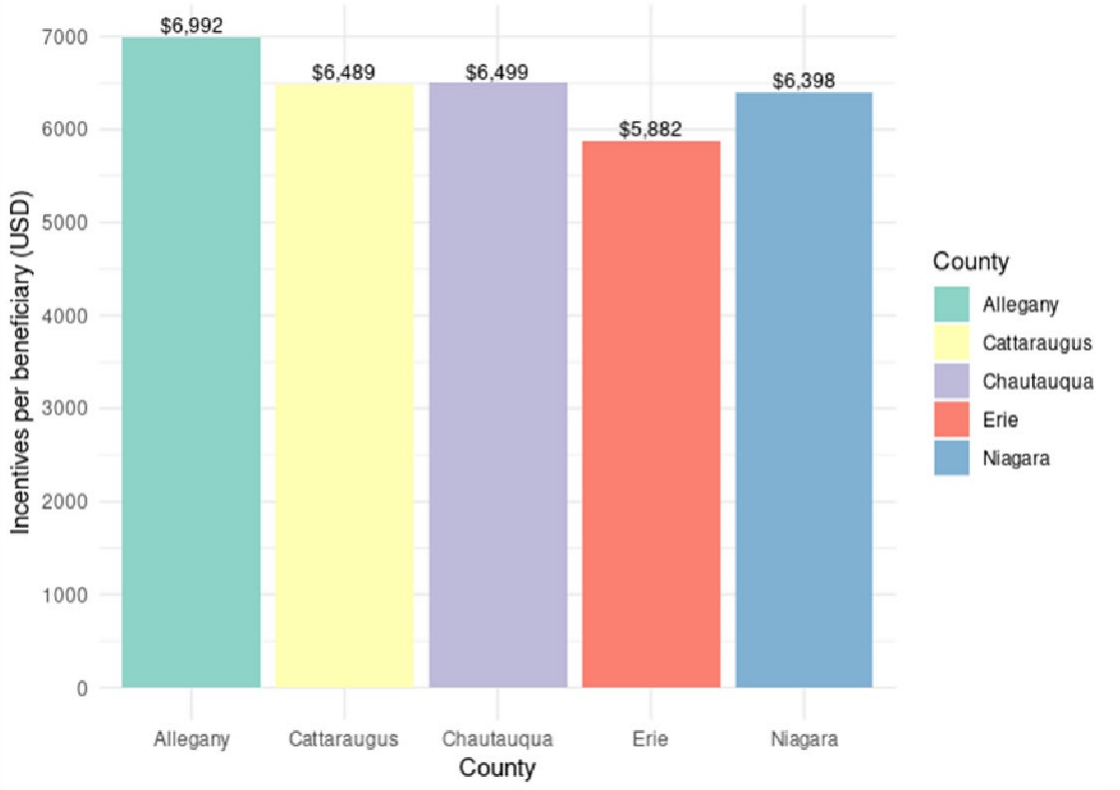

Figure 13: Total incentives per beneficiary by county for Empower program

On top of that, program participants in southern counties received $600-1,100 more than in Erie county, on average, which helps explain why these these counties received a slightly larger-than-proportional share of the funding. Given that Empower covers 100% of eligible energy efficiency measures, this per capita funding difference may reflect the higher expensive in energy efficiency retrofits in rural areas.

Benefits by county

As in the case of Assisted, participating households in Southern counties received greater first-year energy savings than those in Niagara and Erie, though the difference is not as stark.

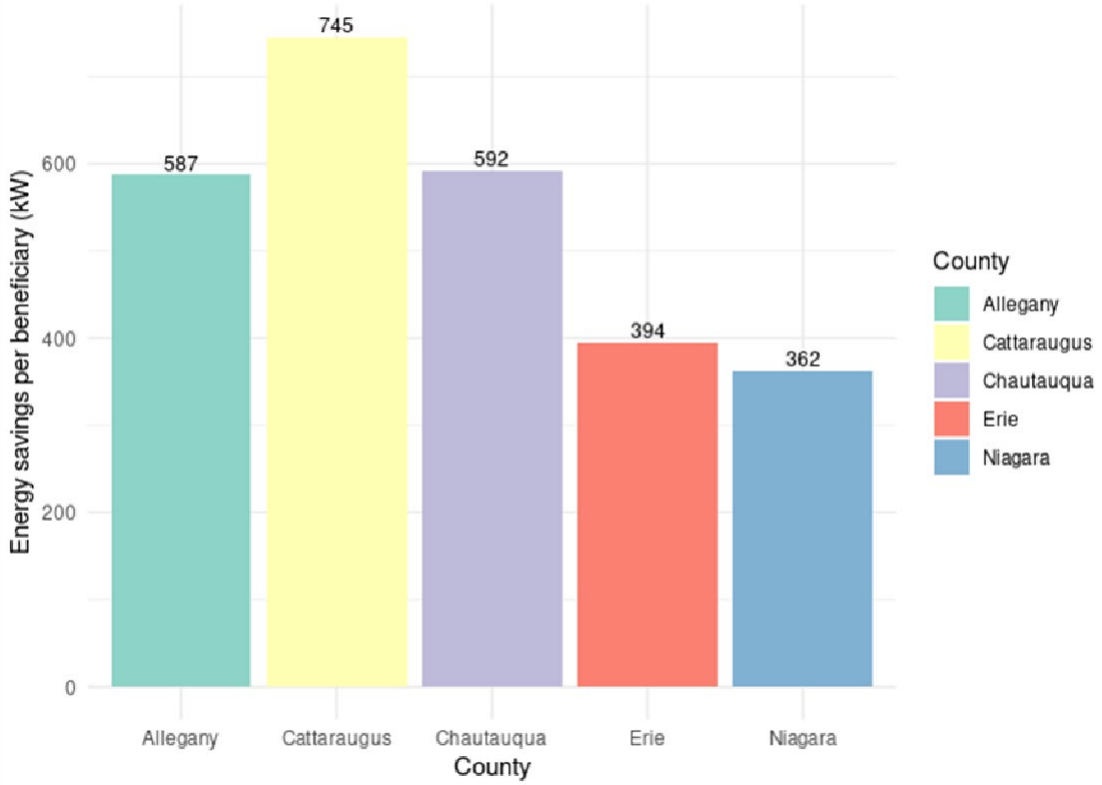

Figure 14: Energy savings per beneficiary by county for Empower program

This different in energy savings, could be partly due to the higher per-capital project costs in these counties, though the savings gap was larger than the cost gap.

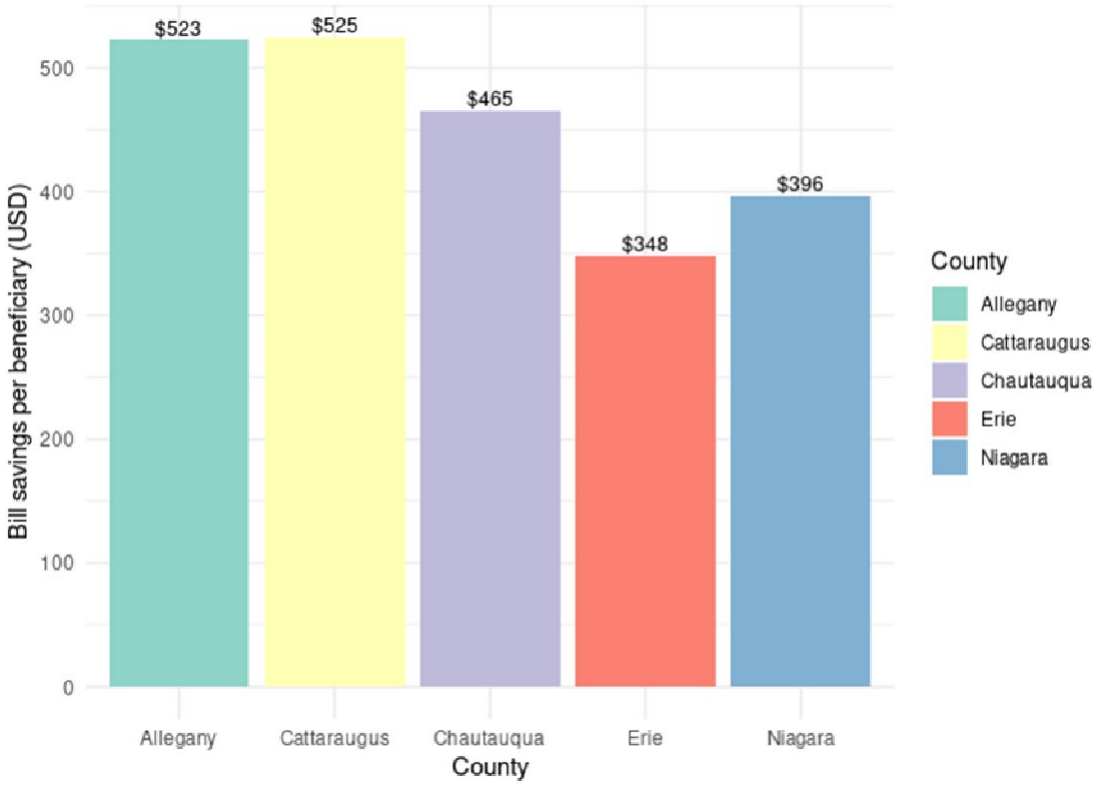

Figure 15: Bill savings per beneficiary by county for Empower program

The disparity in energy savings also translated to a disparity in bill savings, with Southern counties saving more than Northern ones. However, as with Assisted, the bill savings gap was smaller than the energy savings gap.

Interestingly, bill savings didn't line up perfectly with energy savings. Allegany had virtually the same first-year bill savings as Cattaraugus, but lower energy savings. In the other direction, Erie had slightly higher first-year energy savings than Niagara, but lower bill savings.[5]

Spending by race

Next, we examine how NYSERDA distributed Empower's $53.6M in demographic terms, first by looking at the racial composition of low income households in Western New York:

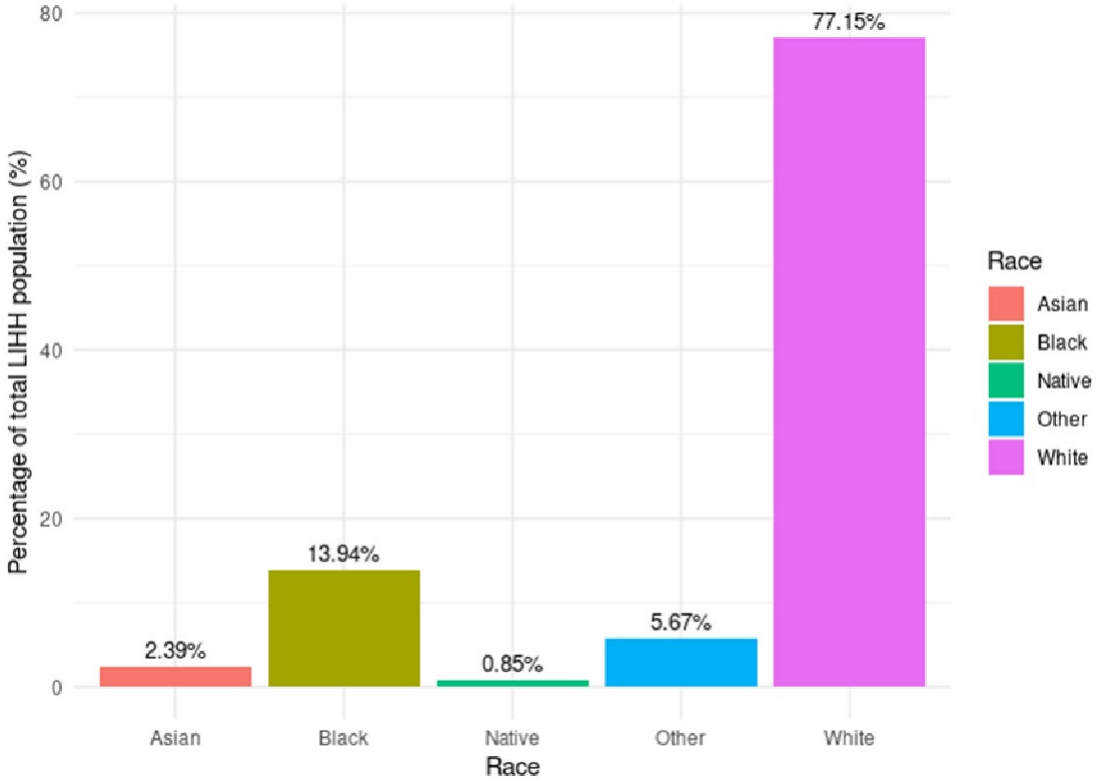

Figure 16: Racial makeup of low income households in WNY

Once again, if the racial makeup of *program beneficiaries* looks similar, we can conclude that the money was spent equitably—if we assume that the energy efficiency need is roughly equal across racial groups.

As with Assisted, NYSERDA doesn't provide us with the race of program participants, only the financial details of each project, and the zip code where the project took place.

If we make the same assumption that we did for Assisted—namely, that within a given zip code, a low-income white household is as likely to participate in Empower as a low-income household of any other race—we can estimate the racial makeup of the program's beneficiaries in Western New York:

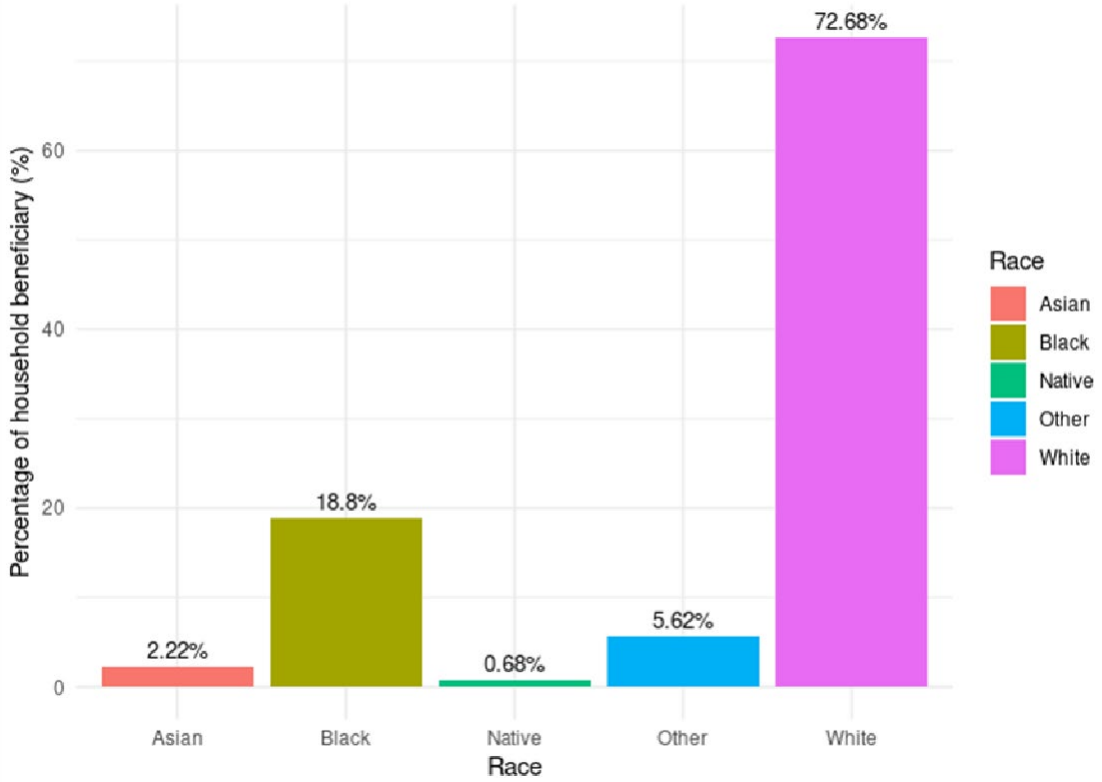

Figure 17: Racial makeup of Empower program's beneficiary households in WNY

- White households make up 77.2% of low-income population, and 72.7% of Empower households.
- Black households make up 13.9% of low income population, and 18.8% of Empower households.
- The percentages of other races were nearly identical.

Despite our assumptions, the positive 4 point difference between Black household eligibily and participation provides strong evidence that program funds were disbursed equitably.

NY-Sun: Residential

NY-Sun is NYSERDA's up-front incentive for distributed solar, including rooftop and community installations. [6]

This part of the analysis focuses on residential rooftop solar in Western New York. Any household that installs rooftop solar with a qualified contractor is eligible.

Big picture

- Between 2008 and 2023, NYSERDA disbursed $20,360,432 on 4,491 solar panel installation projects across Western New York.
- These incentives catalyzed a further $110,362,193 in out-of-pocket spending by program beneficiaries.
- We estimate that 0.79% of all eligible households across Western New York benefited from the program between 2008 and 2023.

- Taken together, these panels added 36 MW of solar capacity to the region.

Projects over time

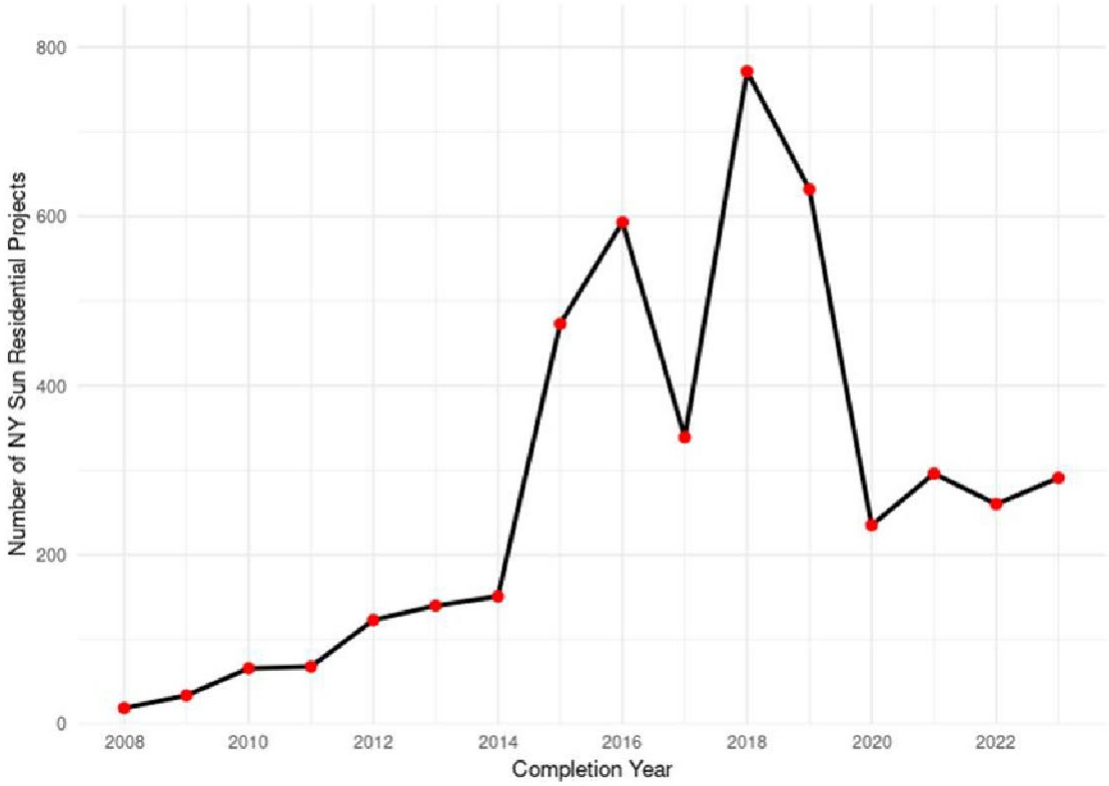

Figure 18: Number of completed NY Sun Residential projects by year

In contrast with Assisted and Empower, NY-Sun residential installations have increased over time.

Since 2020, just under 300 projects have been completed per year. This follows an explosion of projects during a 5-year period between 2015 and 2019, which saw roughly double as many installations. Before this period, installations climbed from a dozen region-wide in 2008 to approximately 150 in 2014.

It's not clear what caused this spike, though it may have to do with the drying up for NY-Sun funds post-2020.

For comparison, Assisted has average 600 projects a year in recent years, while Empower has averaged 1400.

Spending by county

How did NYSERDA distribute this $20M across Western New York?

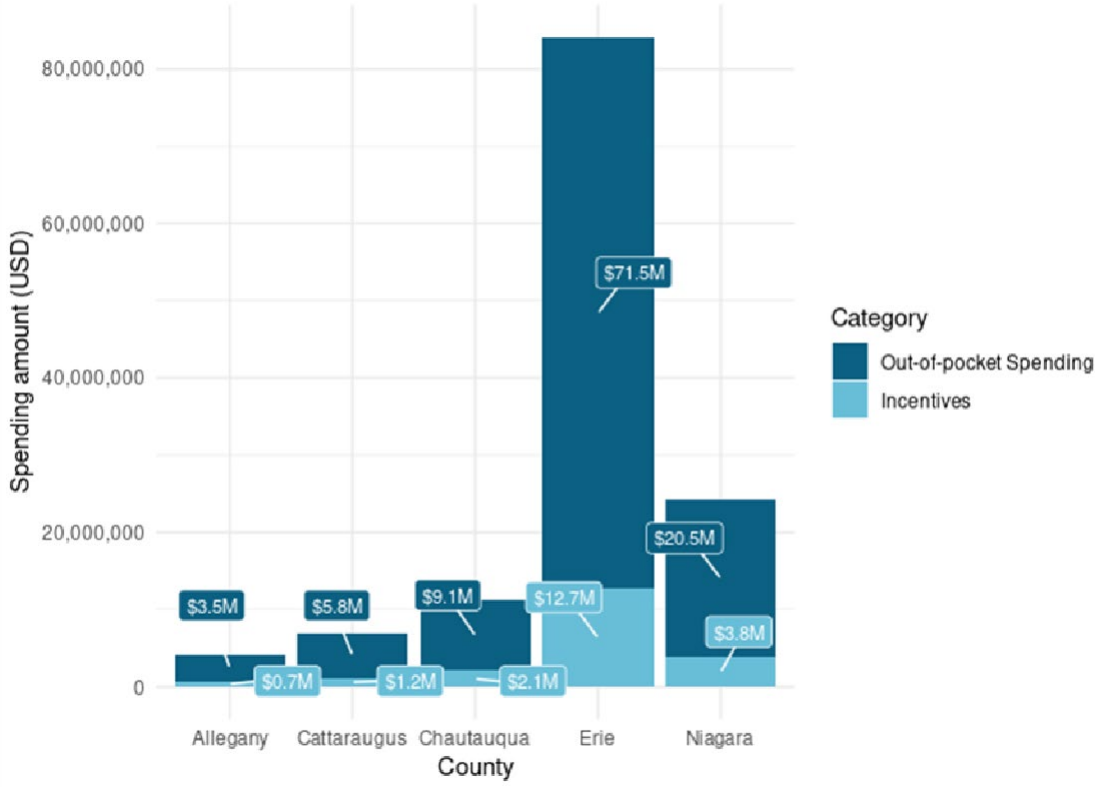

Figure 19: NY-Sun Residential Incentives and Out-of-pocket Spending by County

As we might expect, projects and funds are allocated in rough proportion to population: 62% of incentive spending went to Erie county, 19% to Niagara, and 19% went to the Southern counties.

County	Recipients percentage	Incentives per beneficiary
Allegany	0.76%	$5,546
Erie	0.75%	$4,165
Niagara	0.84%	$5,007
Cattaraugus	0.71%	$5,614
Chautauqua	0.70%	$5,671

Table 5: NY-Sun Residential by beneficiary by county

Program coverage is decently consistent across Western New York, ranging from 0.72% to 0.87% of total households in each county.

Benefits by county

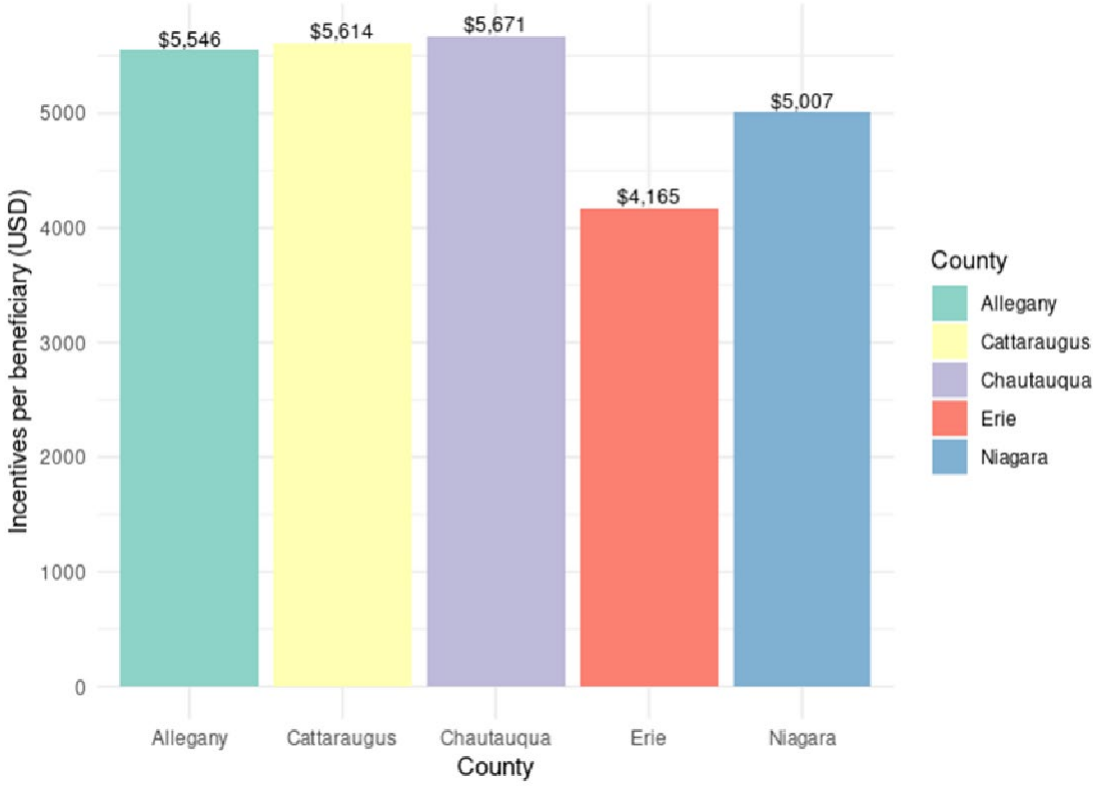

Figure 20: Total incentives per beneficiary by county for NY-Sun Residential program

Average incentives per project are considerably higher in the southern counties, averaging $5,500, 33% higher than the average in Erie, and 12% higher than Niagara.

While Erie County received the greatest aggregate subsidies due to its population size, the county's beneficiaries tend to get the least grant amount per household.

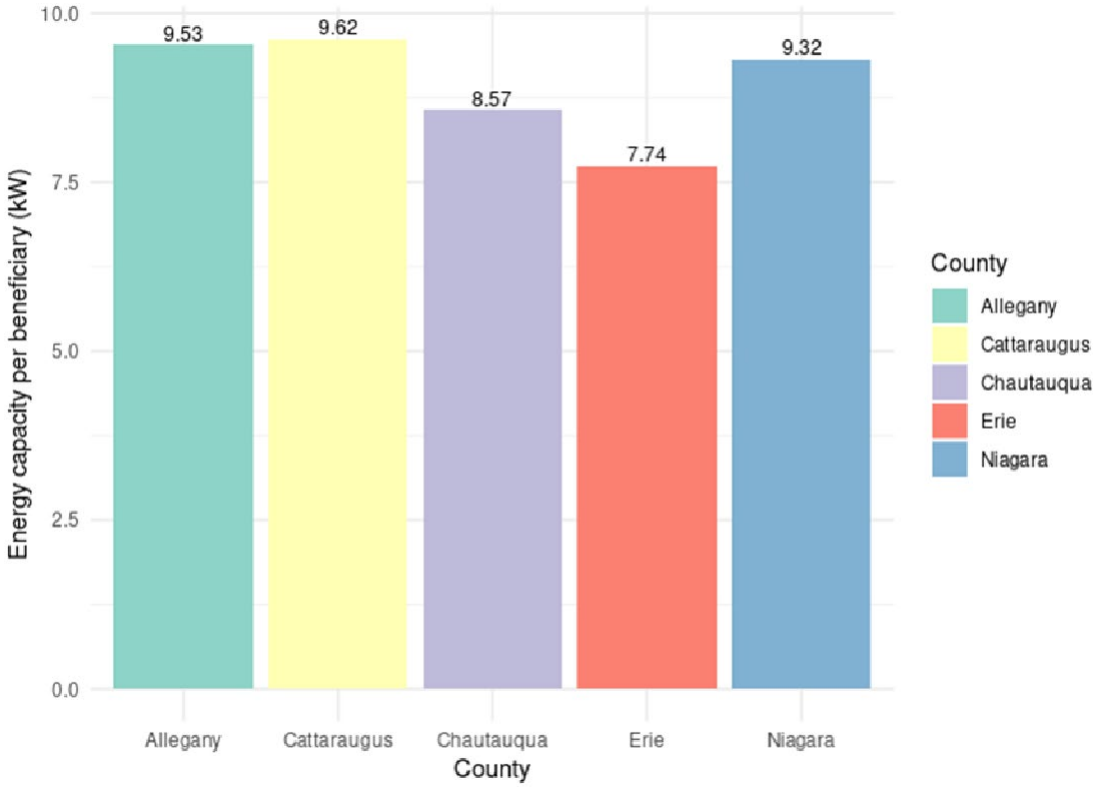

Figure 21: Energy capacity per installed system by county for NY-Sun Residential program

This is at least partly due to the larger size of residential solar installation in the, which in turn likely correlates with more available roof space in rural areas.

Spending by race

To assess the racial equity of NY-Sun spending in Western New York, let's start by examining the racial makeup of all households—not just LMI households—in the region:

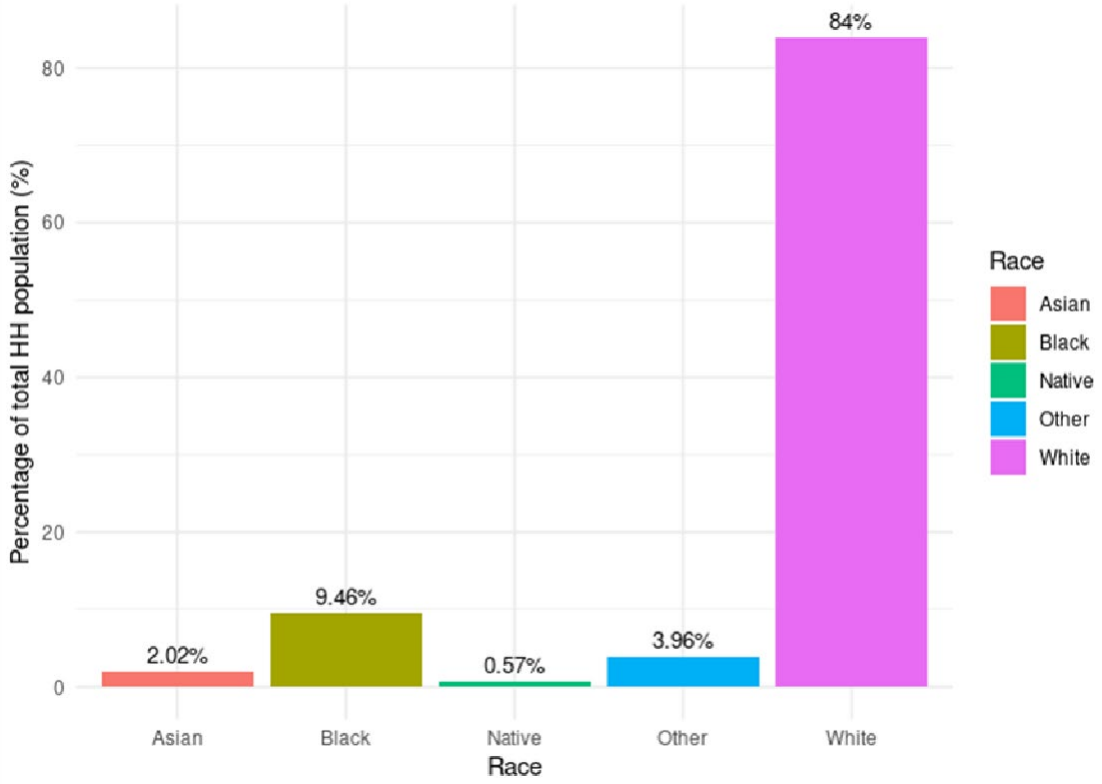

Figure 22: Racial makeup of all households in WNY

Once again, NYSERDA doesn't disclose the race of program beneficiaries, only the the technical and economic details of each installations, along with its zipc code.

Let's make our usual assumption—that a White household is equally likely to receive a NY-Sun incentive as a household of any other race—noting that the assumption is less likely to hold in this case, given that the likelihood of installing solar correlates with income, and income correlates with the race.[7]

Nevertheless, our imperfect estimate of the racial makeup of the NY-Sun residential program beneficiaries reveals a clear racial disparity in outcomes:

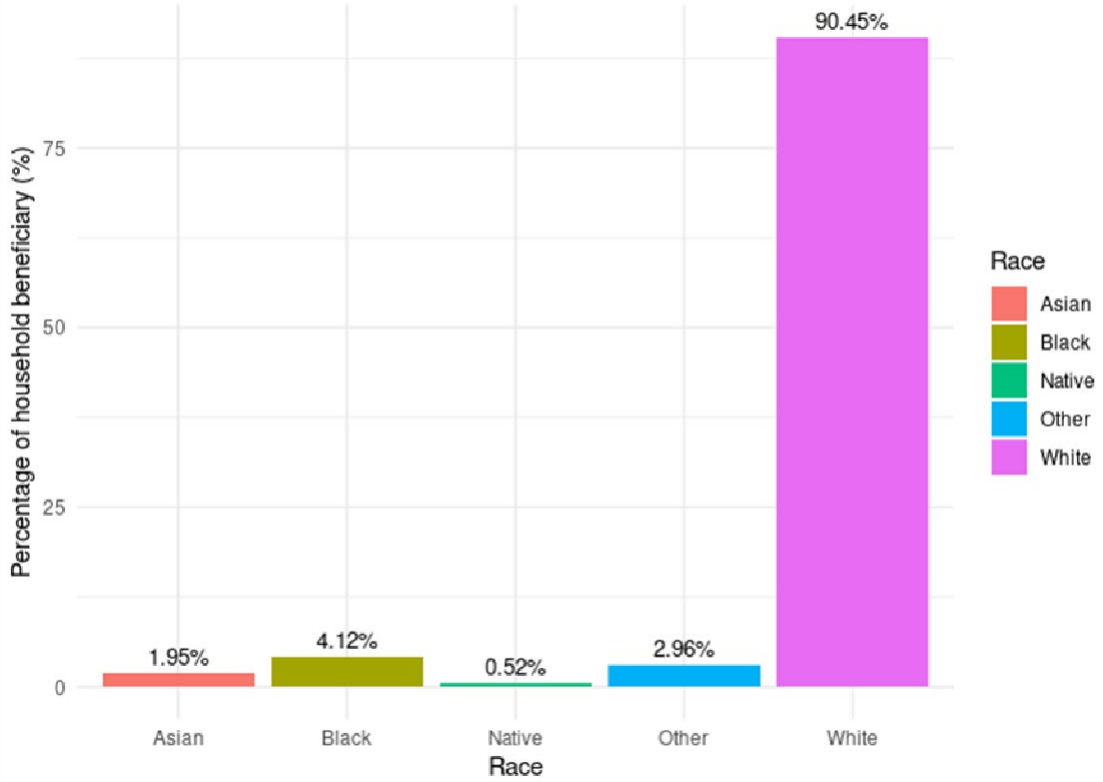

Figure 23: Racial makeup of NY-Sun Residential program's beneficiary households in WNY

While Black households represent 9.5% of the regional population, we estimate that only 4% of residential solar projects have install by Black households. While white households represent 82% of the population, we estimate they have received 90.5% of projects. Our estimates show less disparity for the other racial groups, although these figures are less likely to be accurate do the small size of these populations.

NY-Sun: Small Commercial

NY-Sun also contains a program focused on small commercial buildings.

Big picture

- Between 2008 and 2023, NYSERDA disbursed $37,923,056 on small commercial solar installations, almost double the amount spent on residential projects.
- As a result, 559 were completed, about a tenth as many as the 4,491 residential projects that were completed in the same timeframe.
- These projects added 38 MW of capacity to Western New York, compared with the 36 MW from the residential program.
- Each project received an average of $67K, compared with $4.5K for residential solar.
- This makes sense to an extent, as these were much larger projects, with an average capacity of 68.6 kW, compared with 8.2 kW for residential solar.

- However, small commercial projects received an average of $1000 per kW, whereas residential projects received an average of $550 per kW.
- And while these incentives catalyzed a further $81M in out-of-pocket spending by program beneficiaries, every $1 NYSERDA put into small commercial solar yielded $2.2 in private investment, compared to $5.5 for residential projects.
- The discrepancy is due to the higher $/kW subsidy rate that small commercial received. It's worth noting that the residential program achieved nearly the small solar deployment across the region—36 MW vs 38 MW—for nearly half the cost.

Projects over time

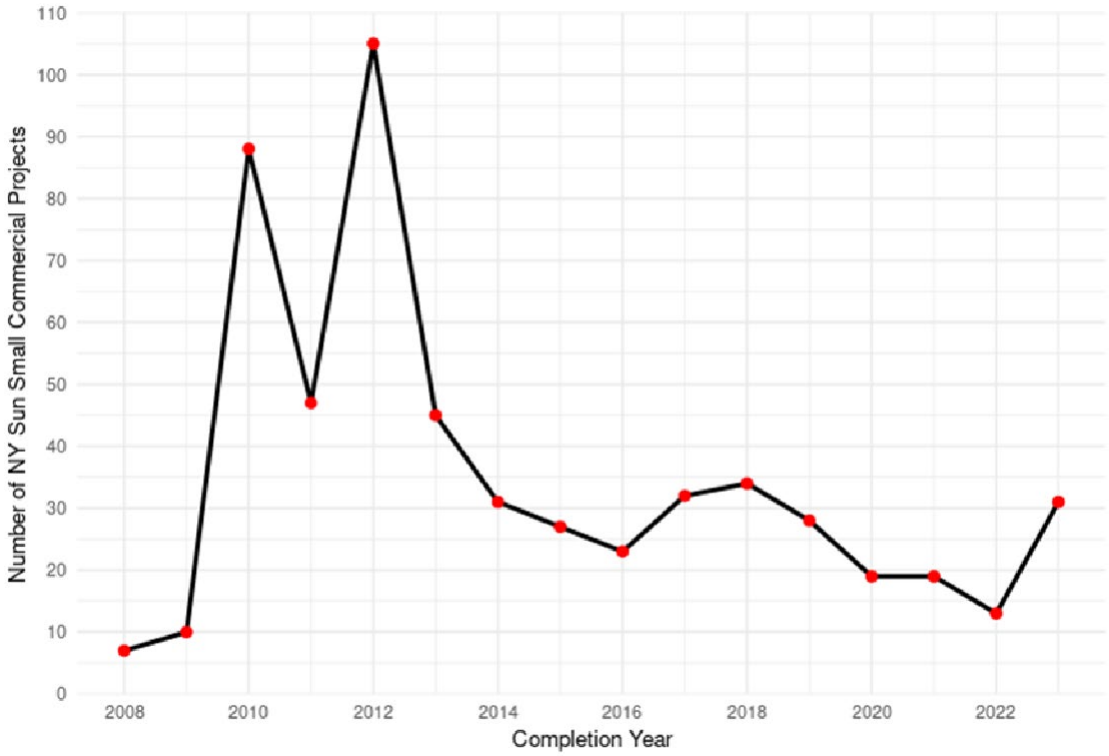

Figure 24: Completed NY Sun small commercial projects by year

In recent years, 20-35 small commercial installations have been completed annually, approximately 10x fewer than residential projects. In terms of capacity, each of these projects is approximately 10x bigger than the average residential project.

Installations spiked between 2010 and 2013. The number of project completed annually during this period was roughly 3x higher than the 2014-2023 period.

Interestingly, this spike occurred right before a similar explosion in residential projects, which occurred between 2014 and 2020.

Spending by county

How did NYSERDA distribute this $37M across Western New York?

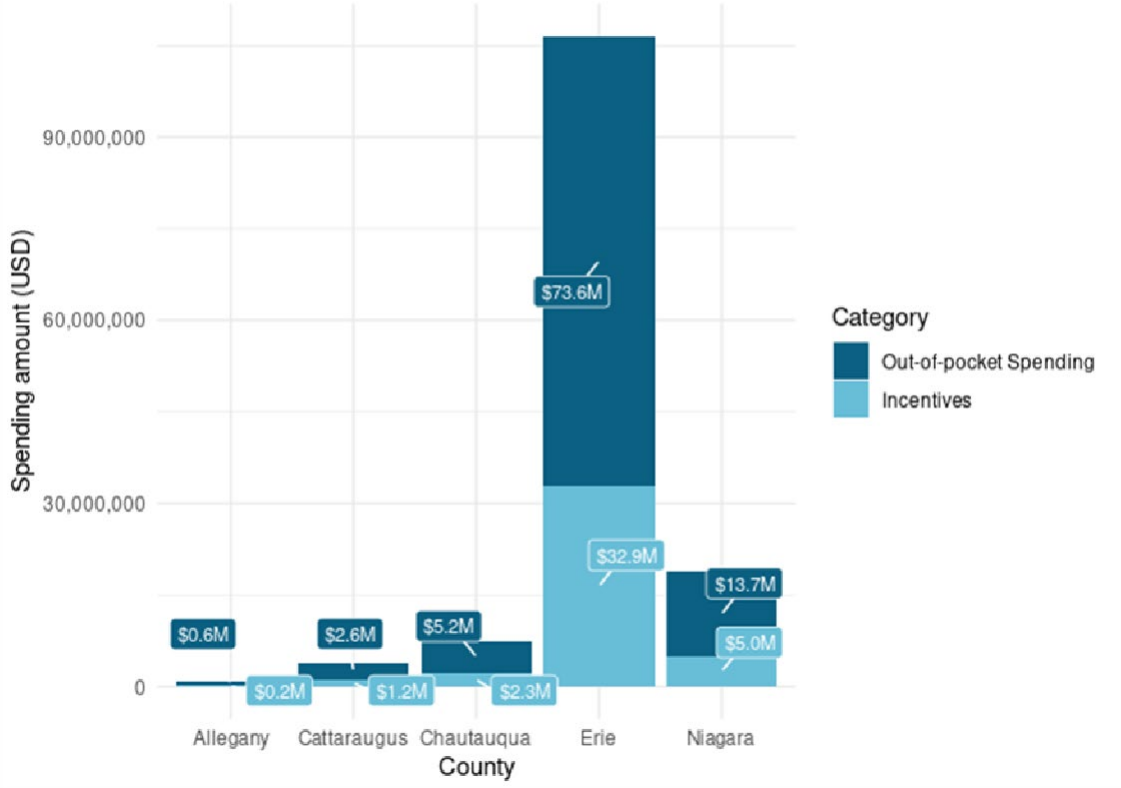

Figure 25: NY-Sun Small Commercial Incentives and Out-of-pocket Spending by County

Compared to NY-Sun residential, spending was more concentrated in Erie County, which received 78.9% of incentive spending (versus 62% in the residential program). Niagara received 12% (versus 19% in residential), and the Southern counties received 8.9% (vs 19%).

Benefits by county

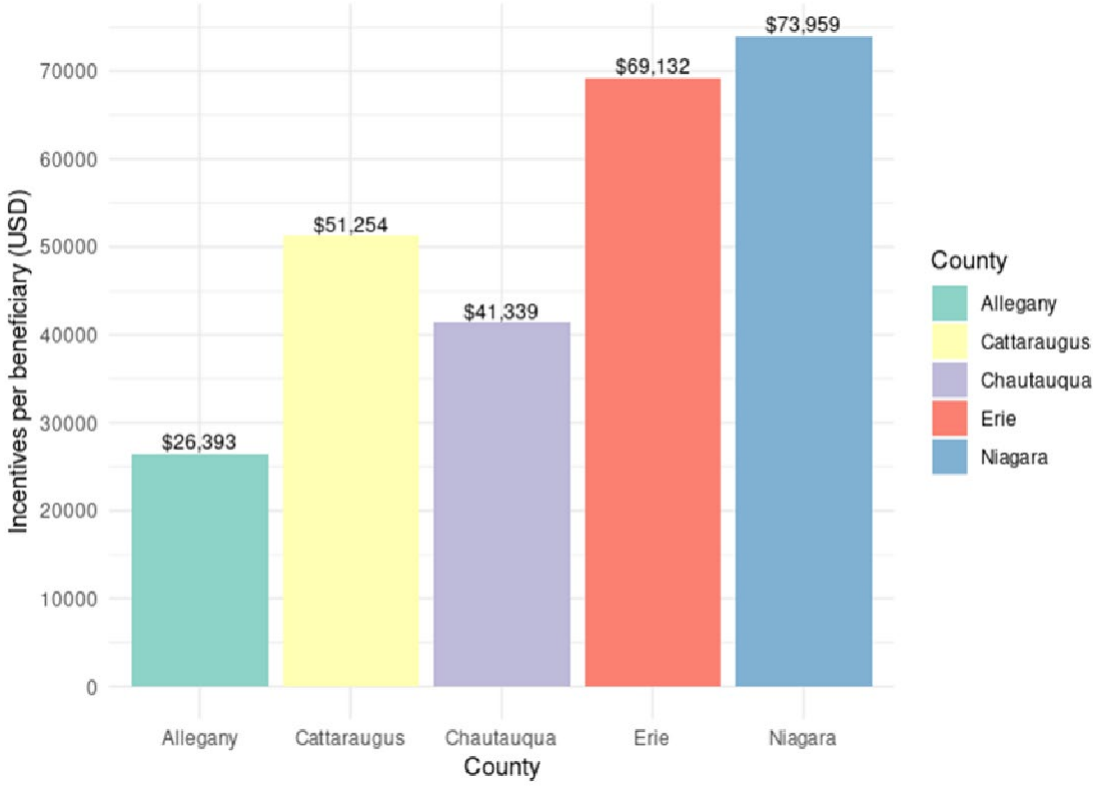

Figure 26: Total incentives per beneficiary by county for NY-Sun Small Commercial program

In the residential program, the Southern counties received $1-1.5K more incentives per project.

For small commercial, Erie and Chautauqua have much larger average incentives sizes. This is perhaps due to the presence of larger commercial rooftop spaces in these counties.

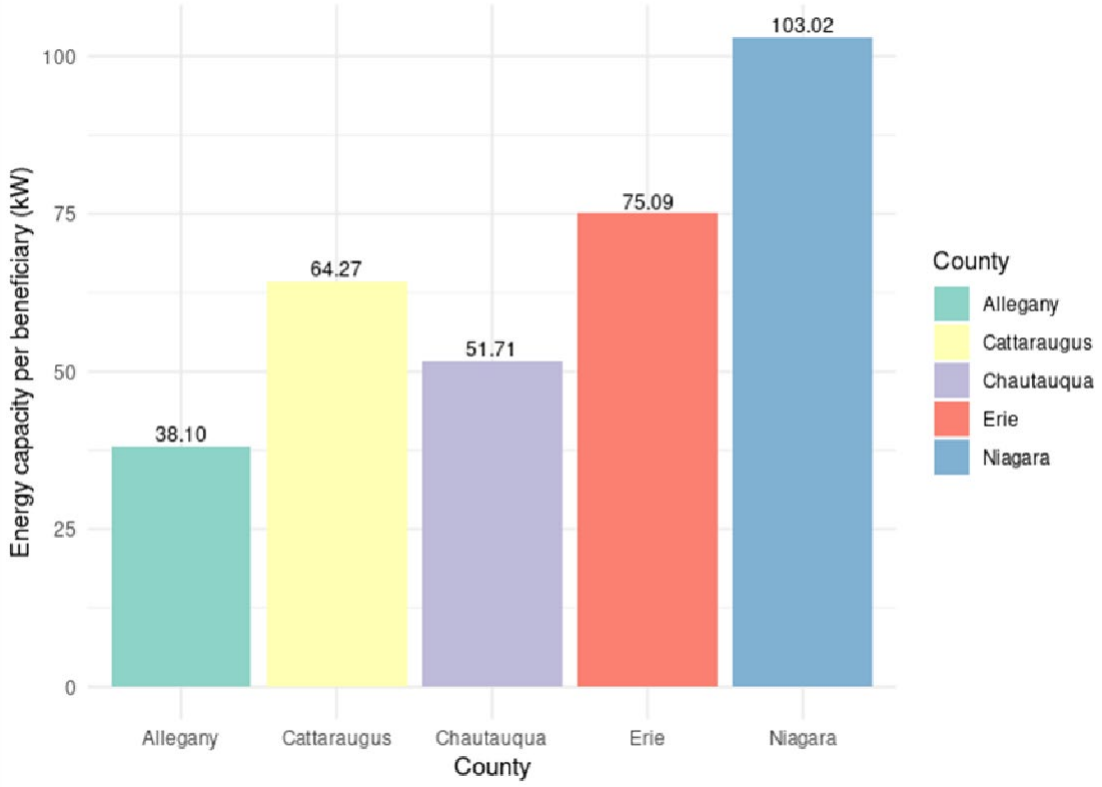

Figure 27: Energy capacity per installed system by county for NY-Sun Small Commercial program

The average capacity per project mirrors the average project incentive chart closely, with one exception: while Erie's average incentive is close to Niagara's, at around $70K, the average project capacity is 27% smaller.

NY-Sun: Large Commercial

NY-Sun also contains a program focused on large commercial projects, many of are community solar projects built in fields.

Big picture

- Between 2008 and 2023, NYSERDA disbursed $65,802,249 on large commercial solar installations, almost 2x the amount spent on small commercial projects, and 4x residential.
- As a result, 64 projects were completed, about a tenth of the 559 small commercial projects completed during this same timeframe, and a hundredth of the 4,491 residential projects.
- These projects added 240 MW of capacity to Western New York, 8.5x more than the small commercial or residential programs, respectively.
- Each project received an average of $1.028M, compared with $67K per small commercial and $4.5K per residential solar project.
- The larger subsidy makes sense, as these were much larger projects, with an average capacity of 3760 kW (3.7 MW) each, compared with 68.6 kW per small commercial and 8.2 kW per residential project.

- However, large commercial projects received an average of $273 per kW, half as much as residential solar ($550 per kW) and a quarter as much as small commercial ($1000 kW). Large commercial projects were by far the most cost effective.
- These incentives catalyzed a further $283M in out-of-pocket spending by program beneficiaries.
- Every $1 NYSERDA put into large commercial yielded $4.3 in private investment, compared to $2.2 for small commercial and $5.5 for residential.

Projects over time

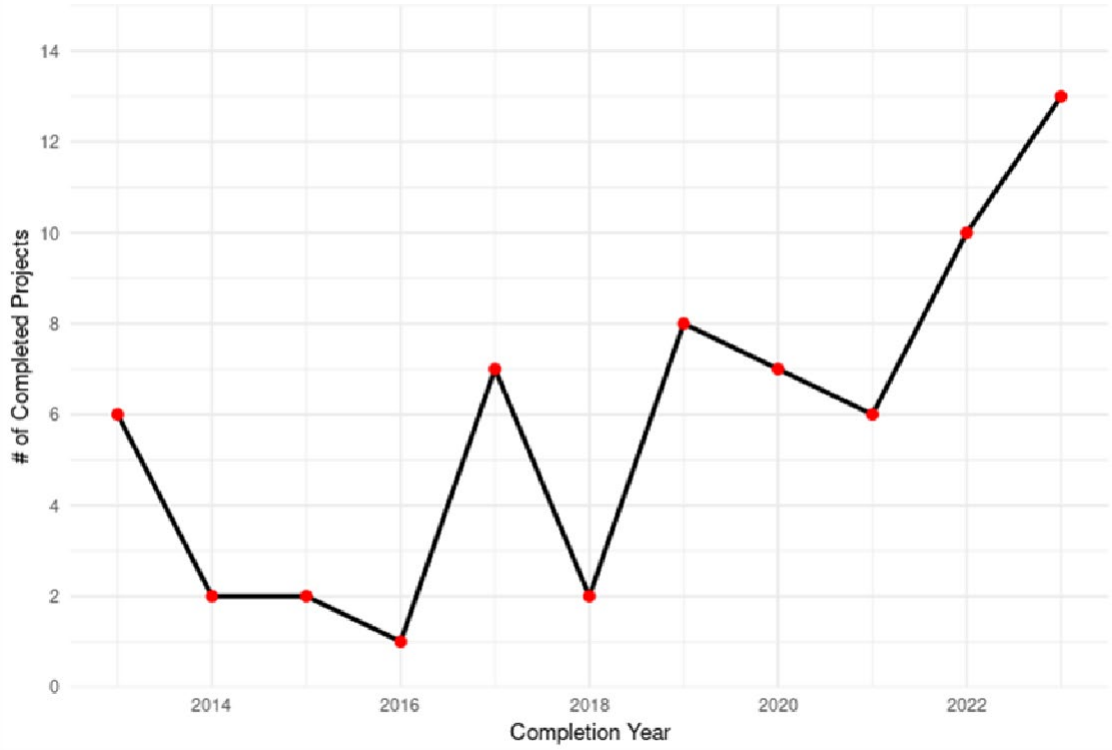

Figure 28: Completed NY Sun small commercial projects by year

Due to the size of the projects, less than 10 are typically completed annually. However, the pace has been steadily picking up since 2016.

Spending by county

How did NYSERDA distribute this $65M across Western New York?

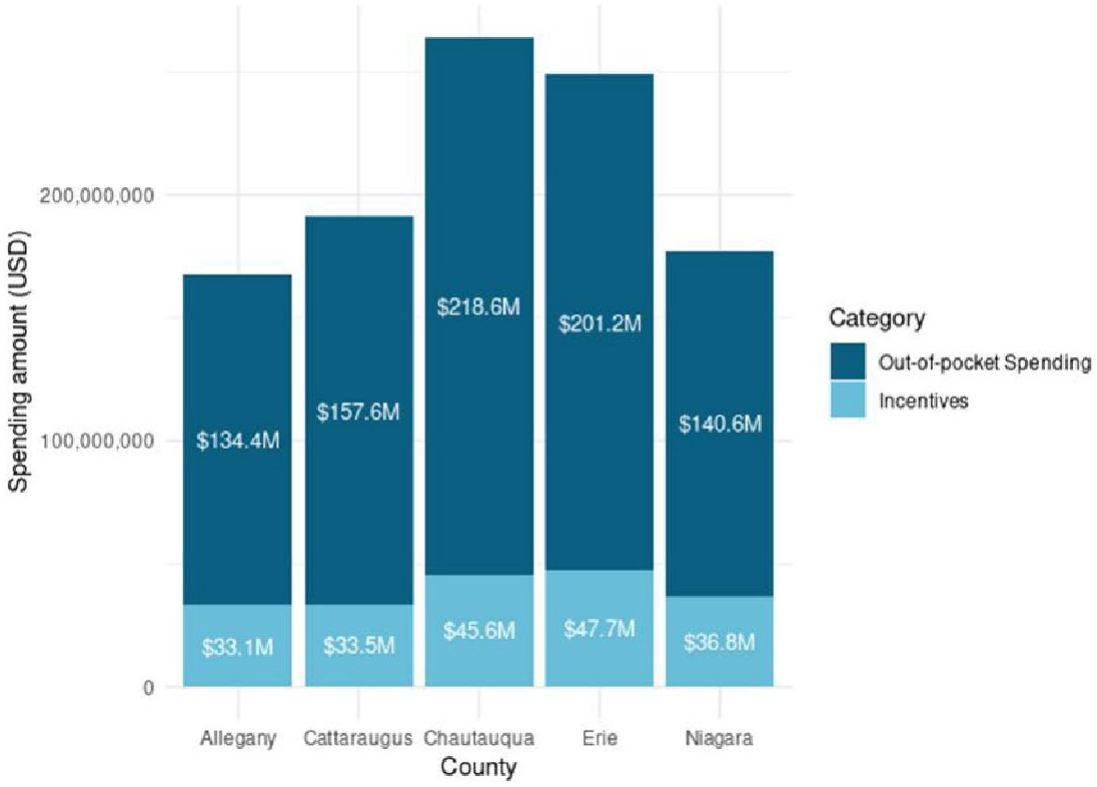

Figure 29: NY-Sun Large Commercial Incentives and Out-of-pocket Spending by County

Spending is much more equal across counties, compared to the small commercial and residential programs.

This is largely due to the fact that the other two programs focus on rooftop solar, and are thus concentrated in urban counties, where most of buildings are located. Large commercial projects are mostly sited in fields, and there's plenty of empty space in more rural counties.

In fact, for the first time, a county other than Erie got the most spending.

Benefits by county

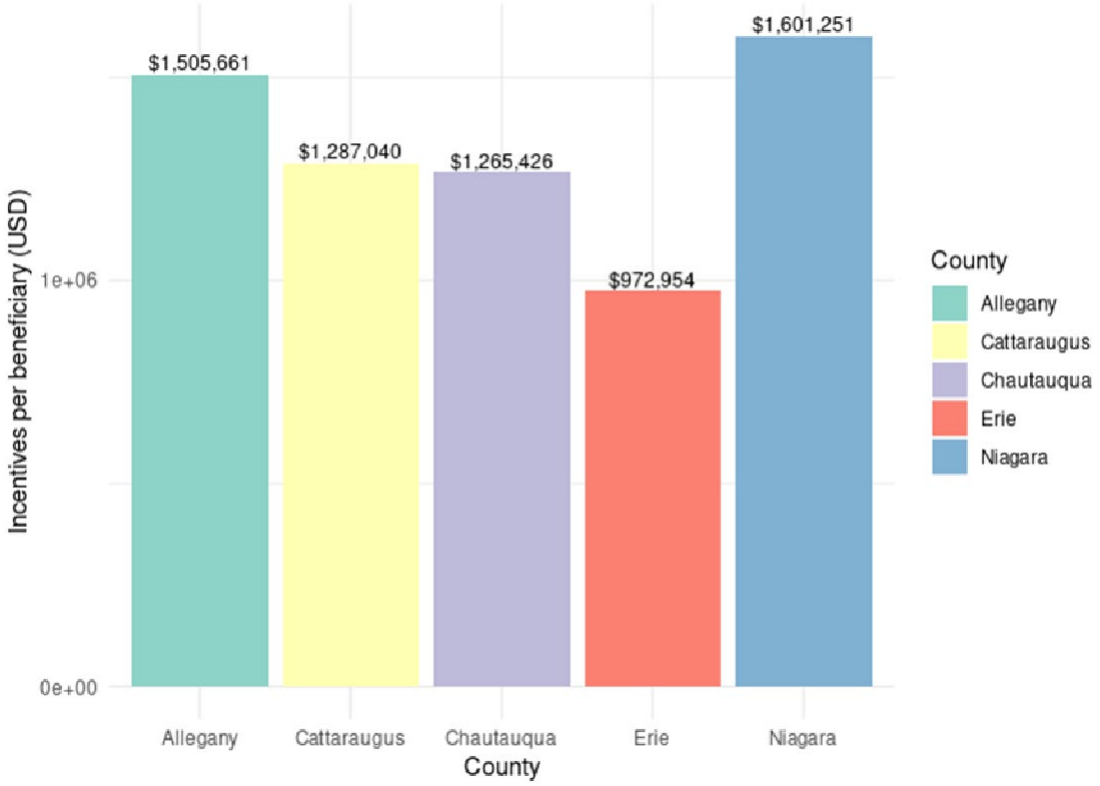

Figure 30: Total incentives per beneficiary by county for NY-Sun Large Commercial program

While Chautauqua and Erie ranked first and second in spending, they rank last in terms of average incentive per project.

Niagara and Allegany, which had the least overall investment, got the highest average incentives per project.

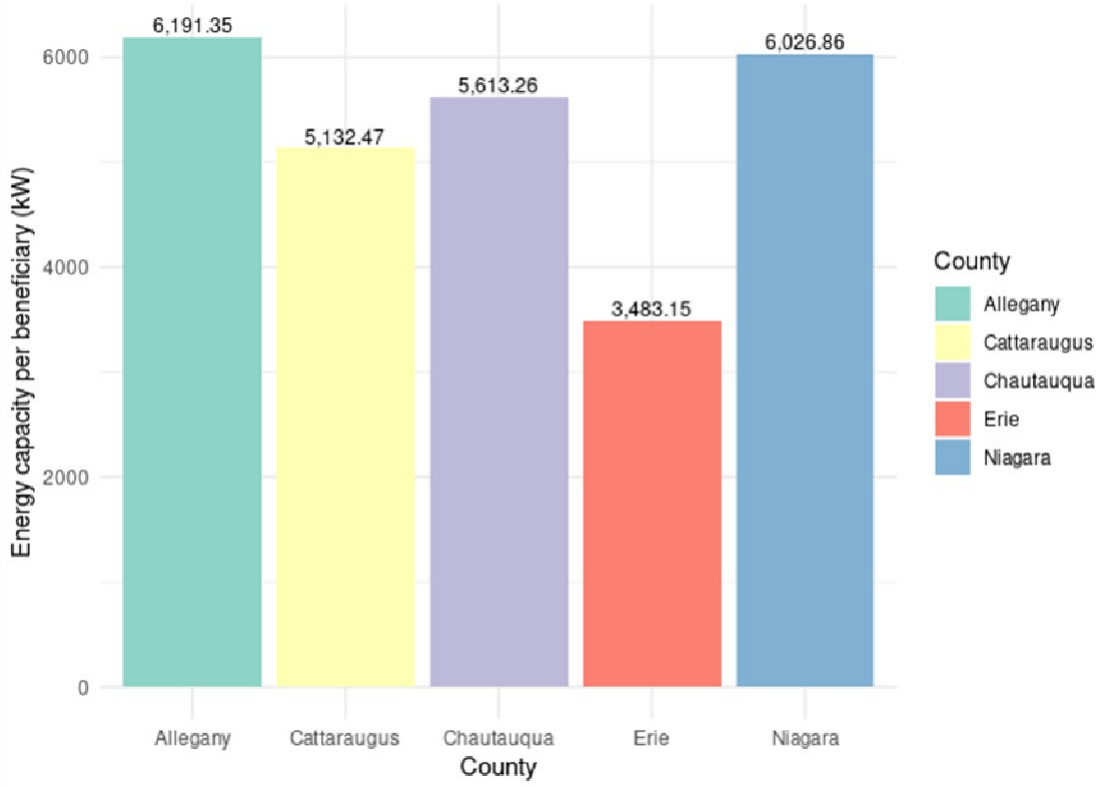

Figure 31: Energy capacity per installed system by county for NY-Sun Large Commercial program

As with small commercial, the average project capacity tracks closely with the average incentive, as we'd expect.

Appendix A

Assumptions

- For residential programs:
  - One project is equivalent to one household. The caveat of this assumption is that we might undercount actual beneficiary households, as one project might also entail multi-family buildings, in which case we will have indirect beneficiaries such as tenants and other occupants of the premise.
  - The racial distribution of the program's beneficiary is assumed to mirror the racial makeup of the population, with imputation done at ZCTA-level. What this means is that if White households account for 20% of a ZCTA population, we assume that 20% of fundings allocated to that ZCTA would go to White households.

Data & Methods

The following datasets were utilized in the analysis:

1. **Western New York Counties and ZIP Codes**: A list of counties and ZIP codes in Western New York, including Erie, Niagara, Chautauqua, Cattaraugus, and Allegany counties.
2. **HUD LMI Income Cutoffs**: County-level income thresholds provided by the U.S. Department of Housing and Urban Development (HUD) to define Low and Moderate Income households based on household size.
3. **ZCTA to County Crosswalk**: A mapping of ZCTAs to counties, accounting for the fact that ZCTAs can cross county boundaries.
4. **ZCTA to PUMA Crosswalk**: A mapping of ZCTAs to Public Use Microdata Areas (PUMAs), recognizing that ZCTAs and PUMAs have a many-to-many relationship.
5. **American Community Survey (ACS) Data**: ZCTA-level demographic data from the 2021 ACS 5-year estimates, including household income distributions and race.
6. **Public Use Microdata Sample (PUMS)**: Household-level data from the 2021 ACS 5-year PUMS, providing detailed information on household size, income, and race.
7. **Energy Efficiency Program Data**: Records from NYSERDA's Empower, Assisted, and NY-Sun programs, detailing project costs, incentives, energy savings, and project locations.

Source	Program/Details	Link
HUD	FY 2021 Income Limits	FY 2021 Income Limits
US Census	American Community Survey (ACS) 2021	ACS 2021
NYSERDA	Empower	Empower
NYSERDA	Assisted Home Program	Assisted Home Program
NYSERDA	New York Sun	New York Sun

Data Preparation

Mapping ZCTAs to Counties and PUMAs

- **Assigning ZCTAs to Counties**: Each ZCTA was assigned to the county containing the majority of its population. This simplifies the analysis by creating a one-to-one relationship between ZCTAs and counties.
- **Assigning ZCTAs to PUMAs**: Similarly, ZCTAs were linked to the PUMA where the largest share of their population resides.

HUD LMI Income Thresholds

- HUD income cutoffs for LMI households were compiled for each county and household size (up to 10 members). These thresholds define the maximum income a household can earn to be considered Low Income (up to 60% of Area Median Income) or Moderate Income (up to 80% of Area Median Income).

ACS Data Processing

- **Household Income Data**: The total number of households in each income bracket was obtained for all ZCTAs in New York State.
- **Race and Income Data**: The number of households in each income bracket was further broken down by race categories: White, Black, Asian, Native (including American Indian and Pacific Islander), and Other.

PUMS Data Processing

- **Household Size Distribution**: The distribution of household sizes within each PUMA was calculated using PUMS data. This information is critical because LMI thresholds vary with household size.
- **Race Categorization**: Household race was determined based on the race of the householder, aligning with the race categories used in the ACS data.

Estimating LMI Households

Challenges

- **Lack of ZCTA-Level Household Size Data**: The ACS does not provide a breakdown of households by size and income at the ZCTA level.

Approach

- **Applying PUMA Household Size Distributions to ZCTAs**: It was assumed that the distribution of household sizes in a ZCTA mirrors that of its corresponding PUMA.
- **Calculating LMI Percentages**:
    1. **Estimating Households by Size and Income**: The number of households in each ZCTA was estimated for each combination of income bracket and household size.
    2. **Determining LMI Status**: For each household size, the proportion of households in each income bracket that fall below the LMI thresholds was calculated using the HUD income cutoffs.
    3. **Aggregating Results**: The estimated numbers of Low Income, Moderate Income, and total LMI households were summed for each ZCTA and race group.

Program Data Analysis

Data Cleaning

- **Removing Invalid ZIP Codes**: ZIP codes corresponding to P.O. boxes or those not present in the ACS data were excluded to ensure consistency.

Aggregating Program Metrics

- **Project Counts and Financials**: For each program (Empower, Assisted, NY-Sun Residential, Small Commercial, and Large Commercial), the total number of projects, total incentives provided, and energy savings were calculated at both the ZIP code and county levels.
- **Focusing on Western New York**: The analysis was narrowed to include only the counties and ZIP codes within Western New York, aligning with the study's regional focus.

Analysis and Validation

Sanity Checks

- **Data Consistency**: Multiple checks were performed to ensure that the aggregated household counts and demographic distributions matched across datasets (e.g., comparing total households from different sources).
- **Method Validation**: Alternate methods were used to estimate LMI households to validate the primary approach, yielding consistent results.

Endnotes

[1] This may be an underestimate of the program's penetration, because we are assuming that each project benefits a single household. However, a project could benefit small residential buildings with up to 4 households.

[2] Empower doesn't cover all energy efficiency measures, however. Spray foam, for example, is not typically covered.

[3] NYSERDA did not provide any data for Empower before 2018, possibly because the program had not launched yet.

[4] This is likely underestimate, given our assumption that each project benefits a single household. In reality, Empower projects can be done in buildings with one to four units.

[5] These shaky relationships could be due to differences in electricity and gas prices across counties, or impefections in NYSERDA's energy and bill savings estimation methodology.

[6] Note that NY-Sun is not the most significant subsidy available for rooftop solar, there are also federal and state tax credits. See Switchbox's recent report.

[7] Making this assumption will likely cause us to understimate the percentage of minority-race housholds with solar, because we may, for instance, misattribute a solar project to a Black household that actually went to White household in that zip code.