New York State
Clean Heat Program
2021 Annual Report

Jointly Filed By:

Central Hudson Gas & Electric Corporation
Consolidated Edison Company of New York, Inc.
Niagara Mohawk Power Corporation d/b/a National Grid
New York State Electric & Gas Corporation
New York State Energy Research and Development Authority
Orange and Rockland Utilities, Inc.
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1. Introduction

Pursuant to the January 16, 2020 *Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios through 2025* ("2020 NE:NY Order"), the New York State Energy Research and Development Authority ("NYSERDA") and the NY Electric Utilities[1] (collectively, "Joint Efficiency Providers") hereby file this New York State Clean Heat Statewide Heat Pump Program ("NYS Clean Heat Program" or "Program") Annual Report for 2021 ("Annual Report").[2]

The NYS Clean Heat Program, which launched on April 1, 2020, provides customers, contractors, and other heat pump solution providers with a consistent experience and business environment throughout New York State. The NYS Clean Heat Program supports a consistent statewide heat pump program designed to achieve the State's ambitious heat pump goals and build the market infrastructure for a low-carbon future.

The NYS Clean Heat Program includes initiatives to advance the adoption of efficient electric heat pump systems for space and water heating applications throughout New York State. The NY Electric Utilities provide incentives to support customer adoption of eligible heat pump technologies, including cold climate air source heat pump ("ccASHP") systems, ground source heat pump ("GSHP") systems, and heat pump water heaters ("HPWHs"), as well as their promotion and pricing by contractors and other heat pump solution providers.[3] The Implementation Plan[4] and the Program Manual[5] provide detail about the Program, including incentive structures and levels, eligible technologies, program rules and processes, and information for participating contractors.[6] The Program is implemented in coordination with a portfolio of NYSERDA-led market development initiatives, which aim to build market capacity to deliver building electrification solutions. The market development efforts, which are described in Appendix 1 of the Implementation Plan, include support for training and qualification of contractors, processes to

[1] Central Hudson Gas & Electric Corporation ("Central Hudson"); Consolidated Edison Company of New York, Inc. ("Con Edison"); Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid"); New York State Electric & Gas Corporation ("NYSEG"); Orange and Rockland Utilities, Inc. ("Orange & Rockland"); and Rochester Gas and Electric Corporation ("RG&E") (collectively, "NY Electric Utilities")."

[2] Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative* ("NE:NY Proceeding"), Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025 (issued January 16, 2020) ("2020 NE:NY Order"), p. 93.

[3] NE:NY Proceeding, NYS Clean Heat: Statewide Heat Pump Program Implementation Plan ("Implementation Plan"), (initially filed on March 16, 2020 and most recently refiled July 1, 2021), Appendix 3: NYS Clean Heat Program Glossary of Terms, p. 54-57. This Glossary provides definitions of ccASHP, GSHP, HPWH, Participating Contractor, and other key terms used in this Annual Report.

[4] NE:NY Proceeding, Implementation Plan. The Joint Efficiency Providers' work in coordinating development of the NYS Clean Heat Program began in 2019, following the issuance of the Commission's NE:NY Order - NE:NY Proceeding, Order Authorizing Accelerated Energy Efficiency Targets (issued December 13, 2018) ("2018 NE:NY Order").

[5] NE:NY Proceeding, NYS Clean Heat: Statewide Heat Pump Program Manual ("Program Manual"), (initially filed on March 16, 2020 and most recently refiled July 1, 2021).

[6] Both the Implementation Plan and Program Manual are revisited, as necessary and with prior notice, on a separate schedule from this Annual Report.

assure quality installations, marketing and education initiatives to help customers understand and select among options and to operate systems optimally, and research and demonstration initiatives.

2. Executive Summary

In 2021, the NYS Clean Heat Program supported a total of 16,737 heat pump projects that were installed and provided incentives – a nearly threefold increase in projects relative to 2020. More than 70% of these projects were whole home/full load heating projects. Approximately 89% of the 2021 Clean Heat projects were ASHP technologies in residential (1-4 family) buildings and 4% were GSHP technologies in residential buildings. In addition, the Long Island Power Authority (LIPA) supported 4,855 heat pumps in 2021, for a total of more than 21,500 heat pump projects installed in 2021 across New York State.

In 2021, the NYS Clean Heat Program expended $139 million and achieved 994,000 MMBtu of savings. Based on the annual budgets and targets laid out in the 2020 NE:NY Order, Clean Heat delivered 234% of targeted savings at 231% of the targeted budget for 2021. Since the NYS Clean Heat Program launch on April 1, 2020, cumulative program spend has totaled almost $166 million and the Program has achieved 1,268,000 MMBtu of savings as of December 31, 2021.[7] As of the end of 2021, the Program has achieved 37% of the 6-year (2020-2025) NE:NY MMBtu savings target and spent 36% of the combined 6-year incentive program budget. The program is on track to achieve its cumulative 6-year target by 2025. Details on individual Utility performance can be found in Section 4 of this report.

Over 2,000 individuals across the heat pump supply chain were trained toward growing a quality-oriented skilled labor force. Recruitment efforts in 2021 continued to grow the pool of ASHP and GSHP contractors. As of April 1, 2021 the Joint Efficiency Providers had enrolled more than 300 NYS Clean Heat Participating Contractors.[8] One year later, at the time of this filing, there are more than 750 Participating Contractors in the program. Recruitment activities continue with the goal of continuously increasing the pool of ASHP and GSHP contractors.

Market development efforts included $21.5 million in spending across various initiatives. A summary is provided in Section 3, with specific program details provided in Section 5.

Key Program Milestones, Achievements, Updates and Planned Areas of Improvement

The Joint Efficiency Providers were engaged in a number of activities throughout 2021 in their efforts to develop, support, and continuously improve the NYS Clean Heat Program. Section 3 details the key milestones and activities completed in 2021 and planned areas of improvement for 2022. A summary table is provided below.

[7] The prior heat pump achievement in Q1 2020 – as acquired by NYSERDA – was incorporated into the respective NY Electric Utilities' individual 2020 budgets and targets, pursuant to the 2020 NE:NY Order.
[8] New York State Clean Heat Program 2020 Annual Report (filed April 1, 2021), p.4

Key Milestones

- Developed and filed the Joint Efficiency Providers' updated (July 2021) NYS Clean Heat: Statewide Heat Pump Program Implementation Plan
- Developed and adopted an updated NYS Clean Heat Program Manual, which provides detailed information on the Program including incentives, eligible technologies, Program rules and requirements, and information for Participating Contractors
- Continued to develop and support the NYS Clean Heat webpage, which contains information and resources for customers and Participating Contractors

Key Program Achievements and Updates

- Installed nearly 17,000 heat pump projects throughout New York State, with more than 70% sized to serve full heating load.
- Trained over 3,000 individuals to support the heat pump industry
- Enrolled more than 400 additional Participating Contractors
- Made updates to Technical Resource Manual ("TRM")
- Outlined a regular cadence for future program changes to provide greater certainty to the market with respect to the timing of future program changes
- Developed new manufacturer-led ccASHP Design and Sizing training for Participating Contractors
- Developed a new custom savings calculator to assist contractors with calculating incentives up front for large and custom Clean Heat projects
- Made QA/QC process improvements including revising ASHP and GSHP checklists in coordination with stakeholders and promoting 48 Clean Heat contractors to Full Status
- Established monthly Working Group Series for Participating Contractors and Industry Partners to foster Program transparency, coordination and communication, prioritization of issues and updates, and solution development
- Executed a range of Market Development activities including a statewide marketing campaign in 2021
- Updated Program data exchange practices and intake tools to make the application process more efficient and promote future heat pump development
- Con Edison and Orange & Rockland introduced a new adder incentive for residential ccASHP installations that offer full load heating with integrated controls
- Central Hudson, Con Edison, and Orange & Rockland introduced a new adder incentive for residential ccASHP installations that offer full load heating with decommissioning of the existing fossil fueled heating system
- Added Energy Recover Ventilators ("ERVs"), Heat Recover Ventilators ("HRVs"), and Envelope incentives for custom heat pump projects

Planned Areas of Improvement

The Joint Efficiency Providers will continue to coordinate with Participating Contractors and industry partners to address the following planned areas of improvement in 2022:

- Reduce application process cycle time from application submission through issuance of incentive payment
- Reduce the frequency of application errors and the duration of time to resolve errors
- Continue to improve program data exchange between contractors and utilities
- Consider new technologies to be included in the program

2022 Lookahead

In 2022, the Joint Efficiency Providers look forward to supporting New York State's accelerated electrification goals. The Joint Efficiency Providers will also work with Department of Public Service to support both the New Efficiency: New York Interim Review and the statewide heat pump technical study.

3. NYS Clean Heat – Statewide Heat Pump Incentive Program

This 2021 Annual Report describes the milestones, activities, results, and findings for 2021 and planned areas of improvement for the NYS Clean Heat Program for 2022. Table 1 shows 2021 program achievement as compared to the budgets and targets from the 2020 NE:NY Order.[9]

Statewide Program Performance

Table 1. NYS Clean Heat Statewide Program Spend and Achievement 2021

Category	Spend ($)	Savings (MMBtu)*
2021 Actual	$139,478,406	994,241
2021 NE:NY Budget/Target	$60,431,605	424,447
Difference Between 2021 Actual and NE:NY Budget/Target	$79,046,801	569,794

Table 2. NYS Clean Heat Statewide Program Spend and Achievement 2020-2021[10]

Category	Spend ($)	Savings (MMBtu)*
Cumulative 2020-2021 Spend/Achievement	$165,964,884	1,268,152
Cumulative NE:NY 2020-2025 Budget/Target	$454,318,221	3,567,590
Share of NE:NY Budget/Target Realized Through 2021 (33% through 6-year program)	37%	36%

** Equivalent Annual MMBtu, net of all energy savings and associated usage*

[9] NE:NY Proceeding, 2020 NE:NY Order, Appendix C; NE:NY Proceeding, Implementation Plan, p. 4-5. Similar tables are shown for each utility in Section 4.

[10] The prior heat pump achievement in Q1 2020 – as acquired by NYSERDA – was incorporated into the respective NY Electric Utilities' individual 2020 budgets and targets, pursuant to the 2020 NE:NY Order.

Table 3 shows the number of heat pump projects that were installed and provided incentives in 2021 by program category.

Table 3. Projects Installed and Provided Incentives in 2021 by Electric Utility and Category

Category	Description	Central Hudson	Con Edison	National Grid	NYSEG	RG&E	ORU	Total by Category
1	*ccASHP: Partial Load Heating*	507	3,155	311	312	107	21	4,413
2	*ccASHP: Full Load Heating*	2,235	6,120	689	927	111	219	10,301
2a	*w/ Integrated Controls*	-	120	-	-	-	1	121
2b	*w/ Decommissioning*	-	128	-	-	-	-	128
3	*GSHP: Full Load Heating*	36	35	70	136	27	9	313
4	*Custom Space Heating Applications*	5	27	3	10	4	6	55
4a	*Heat Pump + Envelope*	-	-	-	-	-	-	-
5	*HPWH (up to 120 gal)*	548	125	105	213	82	16	1,089
6	*Custom Hot Water Heating Applications*	-	-	-	-	-	-	-
7	*GSHP Desuperheater*	85	44	57	57	21	18	282
8	*Dedicated DHW WWHP*	7	1	9	16	2	-	35
9	*Simultaneous Install of Space & Water Heating*	121	32	67	135	33	2	390
Total Project Count[11]		3,423	9,755	1,244	1,671	354	290	16,737

[11] Total Project Count is the total number of customer heat pump projects installed and provided incentives in 2021. Since some projects include more than one category of eligible heat pump equipment (e.g. combination space heating and water heating projects), the sum of projects by category may exceed the Total Project Count.

Each NY Electric Utility's individual performance is presented in more detail under its respective "Utility-Specific Progress" section.

3.1 Summary of NYS Clean Heat Program in 2021

3.1.1 Key Milestones

As part of the effort in developing, initiating, and implementing the NYS Clean Heat Program, the Joint Efficiency Providers achieved the following key milestones in 2021:

- Development, filing, and approval of the Joint Efficiency Providers' updated (July 2021) Implementation Plan.
- Development and adoption of an updated NYS Clean Heat Program Manual, which provides detailed information on the Program including incentives, eligible technologies, Program rules and requirements, and information for Participating Contractors.[12] The latest version (V6) of the Program Manual dated March 1, 2022 and the current versions of other important program documents are maintained on the NYS Clean Heat website.[13]
- Continued development and support of the NYS Clean Heat webpage, which connects users with utility-specific incentive pages, a network of Participating Contractors, and information on heat pump technology, as well as information about financing options tied to On-Bill Recovery and other programs. Additional content provides guidance on the Participating Contractor Application and features key program documents and supplementary background resources to answer common questions.[14]

3.1.2 Additional Activities, Accomplishments, Findings and Next Steps

In addition to the Program milestones described above, the Joint Efficiency Providers have addressed and advanced numerous specific goals, topics, requirements, and Program work scopes.

3.1.2.1 Key Program Achievements and Updates

- **Updates to TRM**
    - The Joint Efficiency Providers coordinated with the New York TRM Management Committee and related working groups to support the continuation of updates to the TRM to reflect the NYS Clean Heat Program, including the establishment of robust calculations for savings impacts of heat pump technologies. These efforts, based on program implementation experience, led to revisions of the residential/multifamily and small commercial HPWH measure, as well as the addition of a centrally pumped GSHP measure in the commercial and industrial space. The process of providing feedback on existing measures, as well as coordinating on new TRM measures, is ongoing.
- **Effective Program Data Exchange**

[12] *See,* NE:NY Proceeding, NYS Clean Heat: Program Manual

[13] https://saveenergy.ny.gov/NYScleanheat/

[14] ibid

- The Joint Efficiency Providers reviewed and updated reporting practices and intake fields – such as utility-specific online intake tools ("OITs") – to gather the necessary program information for Program administration and to inform the promotion of future heat pump development. The Joint Efficiency Providers have made numerous updates to their online intake tools in 2021 to incorporate efficiency improvements requested by Participating Contractors and market partners.

- **Market Development**

  NYSERDA Market Development activities were funded through the Clean Energy Fund ("CEF")

  - Additional details on the achievements below are included in Section 5:
    - The NYS Clean Heat statewide marketing framework, which is a comprehensive consumer awareness campaign with the Joint Utilities and NYSERDA, was launched in Q2 2021
    - The first Community Heat Pump Systems solicitation (PON 4614) was released in 2021, with additional solicitation rounds offered through 2022 due to strong market interest. Additional funds for the program were secured from the Regional Greenhouse Gas Initiative ("RGGI"), which allows for participation from customers that do not pay into the Systems Benefit Charge ("SBC").
    - Transformative partnerships between NYSERDA and state and local affordable housing agencies were created, which integrated technical assistance, envelope efficiency, and electrification incentive funding directly into affordable housing finance applications submitted to NYS Homes and Community Renewal ("HCR") and NYC Housing Preservation and Development. These agencies are now positioned to require efficient all-electric design for affordable housing new construction and preservation projects ahead of anticipated mandates and regulatory requirements, enabling them to deliver the benefits of comfort, improved indoor air quality, and cost savings to low- and moderate-income residents.
    - The Clean Heat for All Challenge was launched by NYSERDA, New York City Housing Authority ("NYCHA"), and New York Power Authority ("NYPA") to spur heating and cooling equipment manufacturers to develop a packaged, window-mounted cold climate heat pump that can be easy installed and maintained, providing efficient, reliable heating and cooling to NYCHA residents. The partnership draws on RGGI funding and leverages NYSERDA's technical assistance, NYCHA's portfolio size and commitment to electrification, and NYPA's procurement vehicle and project management.
    - The Heat Pump Demonstration Study was released, providing $10 million for electrification measures as part of comprehensive energy upgrades in low- and moderate-income homes and affordable multifamily buildings. The study will assess real-world barriers and solutions for making heat pumps more accessible and affordable for low- and moderate-income households.
    - The first round of partners in the Empire Building Challenge demonstration program was selected and analysis was completed to map out electrification retrofit strategies for high-rise buildings.

        - Analysis in support of the Building Electrification Roadmap was incorporated into the Climate Action Council and Building Advisory Panel deliberations. The Building Electrification Roadmap will be issued in Q2 2022 for stakeholder input.

- **Working Group Series for Participating Contractors and Industry Partners**
    - In 2021, the Joint Efficiency Providers established a series of monthly working meetings between Participating Contractors, industry partners and other stakeholders with the NYS Clean Heat Program Administrators to foster transparency, coordination and communication, prioritization of issues and updates, and solution development. The working group held eight meetings in 2021 with an average attendance of more than 70 attendees per session.
- **QA/QC Process Improvements**
    - The Joint Efficiency Providers collaborated with industry partners to release two amended versions of the Standards and Quality Assurance Ground Source Heat Pump Checklist – one in February 2021 and one in December 2021 – to create a more streamlined set of criteria for assessing residential GSHP installations. Additionally, the Air Source Heat Pump Checklist was also modified in December 2021 to include items pertaining to integrated controls and decommissioning installations. Through the QA/QC process, 48 registered statewide Clean Heat contractors achieved Full status in 2021.
- **Regular Cadence for Future Program Changes**
    - The Joint Efficiency Providers adopted a regular cadence for announcing and implementing future program updates and incentive changes, in order to provide greater certainty to the market with respect to the timing of program updates. The Joint Efficiency Providers have agreed to limit program changes to no more than twice per year with set implementation dates of March 1st and September 1st. Announcements of program and incentive changes will be provided no later than December 1st and June 1st of each year, at least three months in advance of the set implementation dates.
- **Development of ccASHP Design and Sizing Training**
    - NYSERDA developed a course curriculum guide and training presentation content and coordinated with ASHP manufacturers to offer manufacturer-led ccASHP design and sizing training to Participating Contractors. This training is now required for new ASHP installers to become certified as New York State Clean Heat Participating Contractors in 2022.
- **Development of Custom Savings and Incentive Calculator for Contractors**
    - The Joint Efficiency Providers developed a statewide custom savings calculator to calculate custom energy savings and incentives in advance for projects involving installation of ccASHP or mini-split units in new construction or existing multifamily buildings, and custom projects involving installation of a combination of heat pump technologies. This calculator and its user guide were developed to give contractors greater clarity around incentive amounts when planning large and custom projects.
- **Adder Incentives for Integrated Controls and Decommissioning**

- Con Edison and Orange & Rockland introduced two new adder incentives in 2021: Category 2 ccASHP full load heating installed in residential (1-4 family) buildings with integrated controls (Category 2a) and decommissioning of an existing fossil fuel heating system (Category 2b). The new adders are offered to encourage the use of installed heat pumps specifically for heating. On December 1, 2021, Central Hudson also announced the addition of a Category 2b decommissioning adder effective March 1, 2022. Con Edison, Orange & Rockland, and Central Hudson developed a decommissioning guidance checklist as part of the application package, which establishes a common set of decommissioning standards for Category 2b projects.

- **Added ERVs, HRVs, and Envelope Incentives for Custom Heat Pump Projects**
  - The Joint Efficiency Providers added eligible equipment (ERV/HRV) to Custom Space Heating Applications, as well as a new Category 4A for Heat Pump plus Envelope measures that provides incentives on the combined savings.

3.1.2.2 Planned Areas of Improvement

The Joint Efficiency Providers have announced several planned areas of improvement in 2022. Each of these are areas that the Joint Efficiency Providers worked on throughout 2021, with additional steps to be undertaken in 2022. The Joint Efficiency Providers will continue to coordinate with and collect feedback from Participating Contractors, industry partners, and other stakeholders as progress is made in these areas of improvement.

- **Reduce Application Process Cycle Time**
  - The Joint Efficiency Providers are working to reduce the application process cycle time for prescriptive applications, from the point of application submission through the issuance of incentive payment. Ongoing efforts to reduce the overall cycle time include improvements to the efficiency of application processing, improvements to communication with contractors, enhanced contractor training, and more timely resolution of application errors.
- **Reduce the Frequency of Application Errors and the Duration of Time to Resolve Errors**
  - The Joint Efficiency Providers are working to reduce both the number of applications submitted with errors or incomplete information, and the amount of time required to resolve application errors. Planned efforts to mitigate these issues include training contractors on common application errors and their solutions and improving communication about application requirements. Planned efforts to reduce the time required to resolve application errors include improvements to the efficiency of application processing, improvements to communication with contractors, and a new deadline for contractors to submit missing and/or corrected information.[15]
- **Continue to Improve Program Data Exchange**

[15]The electric utility will notify the Participating Contractor if an application contains missing or inaccurate information. Beginning March 1, 2022, Participating Contractors will be given 45 days from the date that the electric utility contacts the Participating Contractor with a missing information request to complete their application. See NYS Clean Heat: Statewide Program Manual, Version 6, March 1, 2022, p.71

    - In response to feedback received from Participating Contractors and other industry partners, the Joint Efficiency Providers will continue to improve the efficiency of data exchange through the Joint Efficiency Providers' OIT platforms. This includes an effort to migrate to a common statewide OIT framework.
- **Consideration of New Technologies**
    - The Joint Efficiency Providers will continue to collaborate with technical experts, manufacturers, and other industry partners to explore and integrate new heat pump technologies into the Program.
- **Enhance Review of Manual J Submissions**
    - The Joint Efficiency Providers have found that some Manual J submissions with project applications require further review and vetting. The Joint Efficiency Providers will monitor this trend in their respective service territories and work with the Implementation Contractor to enhance the Manual J review process as needed.
- **Coordination with Statewide Low- and Moderate-Income ("LMI") Portfolio and LMI JMC**
    - The Joint Efficiency Providers will continue to work closely with the LMI JMC to help LMI customers participate in the clean energy transition. On November 3, 2021, the Program Administrators launched the affordable multifamily energy efficiency program (AMEEP). The Joint Efficiency Providers began coordinating NYS Clean Heat with AMEEP in 2021.

2022 Lookahead

- In the 2022 State of the State address, Governor Hochul directed[16] NYSERDA, Department of Public Service ("DPS"), Homes and Community Renewal ("HCR"), and Department of State ("DOS") to achieve 2 million climate-friendly homes by 2030. The interagency team is tasked with developing a joint approach to achieve, fund, and deliver at least one million efficient and electrified homes and one million electrification-ready homes by 2030. The target also calls for 800,000 of the two million electrified and electrification-ready homes to be for LMI households. Market research and internal and external collaborative insights will be leveraged in the development of the joint approach. NYSERDA will coordinate with its utility partners to ensure that actionable proposals in this plan are incorporated into the NYS Clean Heat program in subsequent years, where applicable.
- The 2020 NE:NY Order mandates that the Interim Review commence in 2022,[17] with expected Commission action in 2023 to assess the NYSCH program and make adjustments as necessary. The Interim Review will assess program design and administration, innovative technologies and practices, governance and oversight mechanisms, and targets and budgets required to support the Climate Leadership and Community Protection Act ("CLCPA") and other State goals. The Joint Efficiency Providers will work closely with DPS Staff and key stakeholders to support the Review and implement directives following a Commission Order.

[16] https://www.governor.ny.gov/news/governor-hochul-announces-plan-achieve-2-million-climate-friendly-homes-2030

[17] NE:NY Proceeding, 2020 NE:NY Order, p. 59-60.

- The Joint Efficiency Providers will continue to support DPS in the statewide heat pump technical study, which started in Q3 2021. Insights from the study, which will be ongoing in 2022, will inform the Interim Review and will be shared once complete.

4. Utility-Specific Progress

4.1 Central Hudson

Table 4. 2021 Clean Heat Program Spend and Achievement

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$22,670,811	201,032
2021 NE:NY Budget/Target	$5,559,173	30,183
Difference Between 2021 Actual and NE:NY Budget/Target	$17,111,638	170,849

Table 5. Clean Heat Program Spend and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$28,551,744	262,444
Cumulative NE:NY 2020-2025 Budget/Target	$43,221,312	255,292
Share of NE:NY Budget/Target Realized Through 2021	66%	103%

4.1.1 2021 Program Performance

Central Hudson overachieved and overspent on its 2021 savings targets and budget respectively. Central Hudson saw consistent high levels of activity throughout 2021 for installations under the Clean Heat program, with over two-thirds of projects involving heat pump adoption for the full heating and cooling needs of homes and businesses. As a result, an incentive reduction took effect on July 1, 2021, reducing partial load and full load rebates by nearly 40% and 20% respectively. In addition to this high volume for air source heat pump installations, Central Hudson saw growth in the GSHP and HPWH categories.

Central Hudson has adjusted the total Category 1 Partial Load project rebates to $200 per outdoor condenser unit, and adjusted Category 2 Full Load heating rebates to $500 per 10,000 Btu/h of maximum heating capacity at 5 degrees Fahrenheit as documented on the Northeast Energy Efficiency Partnership ("NEEP") ccASHP Product and Specification List.[18]

[18] See, NE:NY Proceeding, Program Manual, p. 7. The current specification and listed eligible units are available at: https://neep.org/heating-electrification/ccashp-specification-product-list.

Central Hudson is also introducing Category 2b decommissioning for full load air source heat pump projects that fully decommission legacy fossil fuel systems. The rebate for Category 2b will be $1,000 per 10,000 Btu/h of maximum heating capacity at 5 degrees Fahrenheit as documented on the NEEP ccASHP Product and Specification List. This new addition will focus on full legacy fossil fuel displacement in accordance with the goals set forth in the Clean Heat program.

4.2 Con Edison and Orange & Rockland

4.2.1 Con Edison 2021 Program Performance

Table 6. Con Edison 2021 Clean Heat Program Spend and Achievement

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$96,771,588	598,721
2021 NE:NY Budget/Target	$29,128,534	119,716
Difference Between 2021 Actual and NE:NY Budget/Target	$67,643,054	479,005

Table 7. Con Edison Clean Heat Program Spend and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$112,709,708	731,091
Cumulative NE:NY 2020-2025 Budget/Target	$227,315,834	1,000,000
Share of NE:NY Budget/Target Realized Through 2021	50%	73%

The Clean Heat program saw rapid growth in the Con Edison service territory in 2021, particularly residential ccASHP installations. Con Edison incentive expenditures in 2021 significantly exceeded the 2021 NE:NY budget and reached 50% of the cumulative budget for the six-year program term. Con Edison exceeded its annual savings target in 2021 by 479,005 MMBtu and reached 73% of the cumulative program savings target.

In 2021, the majority of Program savings were from residential (1-4 family) customers who accounted for 92% of savings. However, the non-residential segment exhibited growth as its share of savings increased from under 1% in 2020 to roughly 8% in 2021.

Novel Categories and Incentive Level Changes

On July 1st, 2021, Con Edison introduced a 30% kicker incentive for all heat pumps (except Categories 1 and 9) installed within gas-constrained areas of Westchester County.

On August 1st, 2021, Con Edison introduced two new adder incentives for Category 2 ccASHP full load heating in residential (1-4 family) buildings with integrated controls (Category 2a) or decommissioning of an existing fossil fuel heating system (Category 2b). Con Edison introduced the adders to encourage the use of installed heat pumps for heating. Adoption of the adders grew significantly in the fourth quarter after Con Edison reduced the incentive level for the base Category 2 ccASHP full load heating on September 1, 2021.

On December 1, 2021, Con Edison announced incentive level adjustments for residential (1-4 family) ASHP projects (Categories 1, 2, 2a and 2b), effective on March 1, 2022, to manage its remaining authorized Clean Heat program budget.

4.2.2 Orange & Rockland 2021 Program Performance

Table 8. Orange & Rockland 2021 Clean Heat Program Spend and Achievement

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$2,915,865	20,829
2021 NE:NY Budget/Target	$1.973,311	10,421
Difference Between 2021 Actual and NE:NY Budget/Target	$942,554	10,408

Table 9. Orange & Rockland Clean Heat Program Spend and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$3,458,608	25,264
Cumulative NE:NY 2020-2025 Budget/Target	$15,003,888	86,657
Share of NE:NY Budget/Target Realized Through 2021	23%	29%

Orange & Rockland's program participation grew significantly in 2021 with an increase of 205 completed projects. This resulted in overachievement and overspending for the year and cumulatively since program inception. ASHP installations were completed in over 85% of all 2021 projects while GSHP installations accounted for 9% of projects. Fossil fuel heating systems were displaced by heat pumps in 81% of all projects. Full load displacements accounted for 74% of all projects, while partial load displacements accounted for 7% of all projects. Residential projects accounted for 96% of all projects.

Incentive Level Changes

Beginning on August 1st, 2021, Orange & Rockland introduced two new adder incentives for Category 2 ccASHP full load heating installed in residential (1-4 family) buildings with integrated controls (Category 2a) or decommissioning of an existing fossil fuel heating system (Category 2b). Orange & Rockland introduced the adders to encourage the use of installed heat pumps for heating.

On December 1, 2021, Orange & Rockland announced incentive level adjustments for residential (1-4) family air source heat pump projects (Categories 1, 2, 2a and 2b), effective on March 1, 2022, to manage its remaining authorized Clean Heat program budget.

4.3 National Grid

Table 10. National Grid (Niagara Mohawk) Clean Heat Program Spending and Achievement 2021

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$6,883,685	63,163
2021 NE:NY Budget/Target	$11,891,672	132,010
Difference Between 2021 Actual and NE:NY Budget/Target	$(5,007,987)	(68,847)

Table 11. National Grid (Niagara Mohawk) Clean Heat Program Spending and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$9,612,645	102,156
Cumulative NE:NY 2020-2025 Budget/Target	$84,398,834	1,113,681
Share of NE:NY Budget/Target Realized Through 2021	11%	9%

4.3.1 2021 Program Performance

During the 2021 program year, National Grid underspent and underachieved its allocated 2021 budget and target due to a combination of COVID-related economic impacts, supply chain constraints, and a workforce shortage throughout the year. Additionally, in an effort to create consistency throughout the market, National Grid transitioned to utilizing the same implementation vendor as the other Clean Heat Utilities mid-way through the year. This change created challenges as new processes were set up for applications to be submitted through a newly introduced online portal and as the market adjusted to working with the new vendor. The online application portal provides consistency with the other Clean Heat Utilities and will improve incentive processing and savings calculations for the 2022 program year and beyond.

In comparison to 2020, National Grid did see an overall increase in program participation, resulting in a 62% increase in MMBtu savings in 2021. Savings achievement in 2021 was primarily from residential customers, totaling 96.5% of the MMBtu savings.

4.4 NYSEG and RG&E

Table 12. NYSEG Clean Heat Program Spend and Achievement 2021

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$8,580,000	91,001
2021 NE:NY Budget/Target	$10,600,000	117,911
Difference Between 2021 Actual and NE:NY Budget/Target	($2,020,000)	(26,910)

Table 14. RG&E Clean Heat Program Spend and Achievement 2021

Category	Spend ($)	Savings (MMBtu)
2021 Actual	$1,656,457	19,495
2021 NE:NY Budget/Target	$1,278,915	14,206
Difference Between 2021 Actual and NE:NY Budget/Target	$377,542	5,289

Table 13. NYSEG Clean Heat Program Spend and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$9,589,394	120,163
Cumulative NE:NY 2020-2025 Budget/Target	$75,130,577	992,737
Share of NE:NY Budget/Target Realized Through 2021	13%	12%

Table 15. RG&E Clean Heat RG&E Program Spend and Achievement 2020-2021

Category	Spend ($)	Savings (MMBtu)
Cumulative 2020-2021 Spend/Achievement	$2,042,785	27,034
Cumulative NE:NY 2020-2025 Budget/Target	$9,247,776	119,223
Share of NE:NY Budget/Target Realized Through 2021	22%	23%

4.4.1 2021 Program Performance

RG&E Clean Heat program achieved its 2021 annual MMBtu savings goal while maintaining budget spend. NYSEG Clean Heat program was under goal in 2021 for both annual MMBtu and budget. This can be attributed to COVID-19 economic impacts and the need to fully develop the contractor and implementation partner network. Both NYSEG and RG&E saw substantial growth in ASHP installations, which constituted 75% of savings. Overall, in 2021 the Companies saw an increase in heat pump adoption, resulting in a 74% increase in MMBtu savings.

5. Market Development Plan

5.1 Overview

Starting in Q2 2020, the NY Electric Utilities launched the NYS Clean Heat Statewide Heat Pump incentive program. To achieve the statewide heat pump goals and build the market infrastructure for a low-carbon future, the incentive program has been paired with a portfolio of market development initiatives implemented by NYSERDA.

NYSERDA is investing more than $250 million in market-enabling initiatives funded through CEF to support the NYS Clean Heat Market Development Plan, which aims to build market capacity to deliver building electrification solutions.

The NYS Clean Heat Market Development Plan is designed to address critical barriers and market needs through the initiatives listed in the table below. These initiatives have been approved through various NYSERDA CEF Investment Plans.

While NYSERDA does report benefits such as energy savings and leveraged funding from various investments outlined in the following table in routine CEF reporting (from investment plans unrelated to

utility investments), NYSERDA's NYS Clean Heat performance is quantitatively assessed in the following manner:

1. Progress against the "central goals" described in the next section of this report;
2. Funding commitments made in comparison to the Implementation Plan; and
3. Progress against near-term output metrics and longer-term outcome metrics which are summarized in Appendix B of this report.

5.2 NYS Clean Heat Central Goals

Across its component initiatives, the NYS Clean Heat Market Development Plan aims to build market capacity to deliver building electrification solutions, including ASHPs, GSHPs, and HPWHs, to advance the adoption of heat pump systems that are designed and used for heating and cooling, to meet the central goals identified in Table 16, below, which also shows 2021 performance related to each goal.

Table 16. NYS Clean Heat Market Development Central Goals and 2021 Performance

NYS Clean Heat Central Goal	2021 Performance
Help achieve the state's energy savings targets and green energy economy goals from the installation of over 130,000 heat pumps, including advancing heat pump solutions	Over 16,000 heat pump installations received direct incentives through NYS Clean Heat
Increase the pool of skilled labor needed to grow a quality-oriented industry, training 14,000 workers across the heat pump supply chain, including 4,200 workers to sell, design, and install systems	3,165 individuals were trained cumulatively through the end of 2021 (2,113 in 2021); • 2,387 of those trained are in sales, installation, and design (1,607 in 2021) • 778 are in other fields such as government, real estate, and utilities (506 in 2021)
Reduce the cost of heat pump installations by at least 25%	The 2019 EE Soft Costs study, which assessed cost components for residential heat pump projects, was updated in 2021 (see details below in 2021 Performance, Cost Reduction Strategies). It was found that the heat pump market remains nascent and, now with a broader set of market pressures from COVID-19 and supply chain shortages, difficult to isolate for soft cost impacts. This study will be updated in 2023.
Increase stocking of heat pumps by 50% above 2019 industry shipments and increase penetration of high-performance cold climate heat pumps to 90% of all heat pumps shipped for space conditioning in New York	Despite declining HVAC sales for the past two years, ASHP sales have continued to grow. NYS HVAC sales overall declined 19% from 2019-2021, while ASHP sales grew from 93,000 in 2019 to 137,000 in 2021 – an increase of 47% above 2019. In terms of market share, ASHP share has grown from 18% in 2019 to 32% in 2021 for a net increase of 78% over 2019.[19] Future assessments of this data will differentiate ccASHP unit sales as a percentage of estimated total annual sales in New York.

NYSERDA expects that the market can deliver or exceed these overarching goals given the supportive policy framework initiated in 2020 to accelerate the scale of heat pump adoption, to support workforce training and consumer education, and to drive innovation in the supply chain and technology solutions.

5.3 NY Clean Heat Market Development Plan Funding Commitments

The table below summarizes NYSERDA 2021 progress of funding commitments per each Critical Market Need identified in the Market Development Plan; these metrics are also documented in quarterly/annual CEF reporting related to each NYSERDA investment plan supporting the Market Development Plan.

[19] Based on 2021 Heating, Air conditioning & Refrigeration Distributors International (HARDI) data on HVAC sales in New York State.

Table 17. NYSERDA 2021 Progress per Critical Market Need

Critical Market Need	Initiative	Expended Thru 2020	Expended in 2021	Planned 2021 Expenditures	Difference Actual v Projected 2021	NYSCH Goal (all years)	Total Expended as % of NYSCH Goal
Train and develop the needed clean heating and building electrification workforce	Workforce Development	$0.0M	$2.2M	$2.2M	$0.0M	$38.2M	6%
Build consumer demand and market confidence and reduce customer acquisition costs	Marketing	$0.2M	$6.6M	$4.6M	$2.0M	$19.2M	35%
	Community Campaigns	$0.0M	$0.2M	$0.2M	$0.0M	$10.0M	2%
	Critical Tools	$0.0M	$0.1M	$0.4M	-$0.3M	$4.0M	3%
	Technical Assistance & Audits	$0.3M	$2.5M	$2.7M	-$0.2M	$28.4M	10%
Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations	Clean Thermal District Systems	$0.0M	$1.0M	$0.6M	$0.3M	$15.0M	6%
	HVAC Technology Challenges	$3.6M	$2.2M	$2.4M	-$0.2M	$25.3M	23%
	Empire Building Challenge	$0.0M	$0.6M	$0.3M	$0.4M	$15.0M	4%
	Multifamily Building Demonstrations	$0.0M	$0.2M	$1.1M	-$0.9M	$18.3M	1%
	Exploratory Cost Reduction Strategies	$0.0M	$0.0M	$0.3M	-$0.3M	$10.0M	0%
Make electrification solutions available for LMI consumers	LMI	$0.0M	$3.8M	$6.2M	-$2.3M	$30.0M	13%
Make products available when and where consumers need them by building the clean heat supply chain	Clean Heat Supply Chain	$0.2M	$0.5M	$1.3M	-$0.8M	$13.0M	5%
Minimize winter electrical peak by investing in demand reducing "heat-pump ready" solutions	Comfort Home	$0.8M	$1.2M	$1.6M	-$0.5M	$26.5M	7%
Develop a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings	Building Electrification Roadmap	$0.2M	$0.4M	$0.5M	-$0.2M	$1.0M	59%
Totals		**$5.2M**	**$21.5M**	**$24.3M**	**-$2.9M**	**$253.8M**	**11%**

5.4 2021 Updates: Critical Market Needs and Market-Enabling Initiatives

1. TRAIN AND DEVELOP THE NEEDED CLEAN HEATING AND BUILDING ELECTRIFICATION WORKFORCE

2021 Performance

Several training initiatives are underway, with building electrification prioritized under multiple program opportunity notices ("PONs"):

- 2,113 individuals trained during 2021 (3,165 cumulative to date), including 16 interns (39 cumulative to date) through the Internship Program and 153 new hires (264 cumulative to date) through the On-the-Job Training Program working on heat pumps and/or building electrification activities
- 1,607 of those trained are in the sales, installation, and design category (2,387 cumulative to date)
- 506 of those trained are in the "other" categories such as government, real estate, and utilities (778 cumulative to date)
- Held two due date rounds for solicitation (PON 4463, total of $8.5 million in funding) for Career Pathways Training Partnerships for High Efficiency HVAC and Heat pumps, with four training projects totaling $2.3 million in NYSERDA funding contracted in 2021
- Published introductory level and technical ccASHP curriculum on sizing and design
- Recruited 14 manufacturer and distributor members and began development on a series of educational resources and technical tools for the initial launch of Clean Heat Connect – NYSERDA's "Upstream Partners" network that will be used as a distribution channel to get educational and business development resources to contractors through their established networks
- Offered higher incentives for workers hired through On the Job Training ("OJT") that work on heat pumps
- Work continued on the development of the HVAC/Heat Pump Career Map to raise awareness of and build interest in career opportunities in the field
- Provided support to ASHRAE to develop and host a series of 17 webinars to engage and educate all stakeholders involved in community heat pump system design and implementation
- Introduced heat pumps training in collaboration with Grid for Good, a National Grid initiative to provide a positive impact on disadvantaged communities ("DACs")
- The live online building electrification training series on heat pump design and installation considerations continued in 2021 and prepared for a 2022 transition to an on-demand format

<u>Key Findings:</u>

- Training programs for new workers need to include a range of technical proficiencies beyond specific heat pump installation to prepare individuals for successful employment and career options

- Some scheduled trainings were postponed due to supply chain delays that slowed the arrival of training equipment as well as pandemic-related concerns over resuming in-person training

2022 Lookahead

- Identifying new opportunities to develop channel partnerships, focusing on career pathway HVAC and heat pump training with community-based organizations and training organizations that work with priority populations in disadvantaged communities
- PON 4463 Career Pathways Training Partnerships for High Efficiency HVAC and Heat Pumps will be reissued in Q2 2022
- Online building electrification training content will be transitioned to a Learning Management System to allow for flexible/on-demand participation
- Trainings to provide introductory heat pump concepts to youth in disadvantaged communities will continue in partnership with National Grid's Grid for Good program

2. BUILD CONSUMER DEMAND AND MARKET CONFIDENCE AND REDUCE CUSTOMER ACQUISITION COSTS

2021 Performance

Marketing

A 5-year NYS Clean Heat Consumer Awareness and Education marketing campaign to increase adoption of cold-climate heat pumps statewide launched in April 2021 – as a coordinated effort between NYSERDA and each of the State's investor-owned utilities. In 2021, the campaign directly targeted those most likely to benefit from installing heat pumps in the near-term, while building broader awareness in geographies with higher potential and adequate coverage of contractor support. A statewide tracking study measuring current levels of awareness, familiarity, and intent among homeowners targeted by the campaign and homeowners not targeted by the campaign was compared to the 2020 baseline study. Initial results are promising – with significant gains across key metrics – however, the results highlight the need for expanded targeting (e.g., natural gas households), based on significant differences in key metrics between households currently targeted through marketing and all other households not targeted. The tracking study will be fielded annually throughout the campaign lifetime.

Marketing messages drive prospects to a single landing environment co-branded to represent the NY Electric Utilities. On the site, visitors can determine options available to them based on their home address and then reach out to NYS Clean Heat contractors.[20] Metrics tracking will be coordinated with the NY Electric Utilities based on property address.

[20] Note PSEG-LI is funding this campaign in their own territory.

Community Campaigns

Starting in 2018, NYSERDA has supported over 20 Clean Heating and Cooling community campaigns in New York, including 6 new campaigns launched in 2020 and early 2021. Phase 2 funding for Clean Heating and Cooling campaigns will start in 2022. Phase 2 campaigns will be based on the learnings from Phase 1 work and include an increased focus on DACs. Phase 2 campaigns will be executed by the Clean Energy Hubs and the funding moved to the LMI Joint Implementation Plan[21].

Critical Tools

New guidelines and templates focused on cold climate ASHP system sizing and design, to be delivered through manufacturer trainings, have been developed to support future contractor requirements for participation in the NYS Clean Heat program.

NYSERDA supported a NEEP effort to develop cold climate specifications for PTHPs, in recognition of this emerging technology, and anticipates adding this as an eligible technology for NYS incentives.

NYSERDA initiated additional areas of research identified in the "Heat Pump Supplemental Heat Analysis" project conducted for NYSERDA by VEIC, to better identify when, where, and under what conditions supplemental heat is or is not needed. NYSERDA hosted two expert meetings in 2021 to explore 1) performance testing methods and metrics for ccASHPs, and 2) the use of hybrid and dual fuel solutions (vs. full load heat pump design) to minimize or eliminate the need for supplemental heat. As a result of this work, a white paper is being developed summarizing findings related to test methods and performance metrics to provide guidance to program administrators to optimize the selection of eligible ccASHP equipment for incentive programs. This paper will be presented at ACEEE's 2022 Summer Study on Energy Efficiency in Buildings.

NYSERDA's ongoing stakeholder engagement and collaboration with regional and national industry partners continues to inform its understanding of the complexity of the performance capabilities of ccASHP equipment. NYSERDA is co-funding projects in coordination with regional partners, NEEP, and NEEA to analyze performance capabilities and conduct field validation of lab-based test methods. Additionally, NYSERDA is working with NEEP to develop a ccAHSP equipment selection tool that is based on a graphical visualization of the selected equipment's performance data compared against the load profile for a specific home. This tool, when released, will serve as an educational resource to create greater awareness of performance trade-offs to be considered when selecting ccASHP equipment and to help build market confidence in ccASHP technology for cold climate applications. The initial release of this tool is expected in Q2 2022.

NYSERDA has also developed a Heat Pump Planner for consumers. This is a helpful tool to show several common configurations of heat pump installations in a consumer's home. A PDF version is available and has been integrated into the Consumer landing page[22] (as part of the Consumer Awareness campaign) to provide tools and resources to help consumers plan and become more informed

[21] https://www.nyserda.ny.gov/All-Programs/Low-to-moderate-Income-Programs/LMI-Stakeholder-Resources-New-Efficiency-New-York
[22] https://cleanheat.ny.gov/

decisionmakers. In response to positive feedback from stakeholders, NYSERDA has expanded development of this tool to include additional use cases for GSHPs and created an interactive web-based version populated with richer content across various media including photos and videos. The web-based version of the planner is expected to go live in Q2 2022.

Technical Assistance

The Technical Assistance program received 380 study applications in 2021 that focused on electrification or had an electrification component. Most of these studies are from commercial real estate, colleges & universities, and multifamily facilities. To date, 45 Clean Heating and Cooling screenings have been completed. Due to the wide range of savings and costs presented in these screenings as well as increased customer interest in more comprehensive electrification studies, NYSERDA will be ending Clean Heating and Cooling screenings in 2022. NYSERDA will continue to direct customers interested in an electrification evaluation to the appropriate technical assistance offering.

2022 Lookahead

Marketing

Based on 2021 learnings, the NYS Clean Heat Consumer Awareness and Education marketing campaign will expand targeting to include gas households that meet the current income threshold (household income >$90,000) or exhibit sustainable purchasing preferences based on online purchases. The retargeting strategy (re-engaging first-time website visitors) will shift to encourage consumers to revisit the website by promoting specific opportunities to learn or take action. Campaign messages will expand beyond functional benefits and begin to highlight more emotional benefits of switching to cold-climate heat pumps such as ease and convenience, health, and sustainability.

Lead delivery, tracking, and follow-up will continue to be evaluated for effectiveness and opportunities for improvement will be identified and implemented. The campaign performance will be monitored over time, and based on findings, multiple components will be optimized to maximize outcomes.

Community Campaigns

There is a critical need and opportunity to continue to synergize community campaign work both across technologies and with the work of NYSERDA's Communities and Local Government Teams, such as the Clean Energy Communities and Community Energy Engagement programs. Phase 2 Clean Heating and Cooling campaigns will be executed by the Clean Energy Hubs and funding moved to the LMI Joint Implementation Plan[23].

Critical Tools

[23] https://www.nyserda.ny.gov/All-Programs/Low-to-moderate-Income-Programs/LMI-Stakeholder-Resources-New-Efficiency-New-York

NYSERDA has hosted several webinars, providing a platform for heat pump manufacturers to present current, pending, and future equipment. NYSERDA intends to identify a process to evaluate and qualify these new products for potential eligibility for NYS incentives.

NYSERDA will support the development of a peer reviewed white paper on ccASHP performance test methods and metrics (to be published and presented at ACEEE's 2022 Summer Study on Energy Efficiency in Buildings) to assist program administrators and other stakeholders in the use of meaningful eligibility criteria when selecting ccASHP equipment at a program and project level.

In partnership with NEEP, in Q2 2022 NYSERDA will release version 1.0 of its ccASHP equipment selection visualization tool, to be initially made available through the Clean Heat Connect network and NYS Clean Heat participating contractors. Additional investments will be made to further enhance the tool to be applicable to a broader set of use cases, to be released in late 2022.

NYSERDA will evolve the Heat Pump Planner from the current PDF version to a fully digital and interactive tool for consumers and installers, due to go live in Q2 2022.

Technical Assistance

NYSERDA will be launching a program focused on supporting P-12 schools with decarbonizing their building portfolio in 2022. NYSERDA is also conducting an analysis of electrification studies to identify commonalities and lessons learned, with results expected in late 2022.

3. DRIVE PERFORMANCE IMPROVEMENTS, REDUCE COST, AND DELIVER NEW ECONOMIC SOLUTIONS THROUGH TECHNOLOGY INNOVATION AND DEMONSTRATIONS

2021 Performance

Clean Thermal District Systems

The PON 4614 Community Heat Pump Systems solicitation for the development of community thermal energy networks was released in early 2021, with additional rounds of funding to be released through 2022. PON 4614 funds 4 project categories: site-specific scoping studies, site-specific detailed design studies, construction, and best practices guidebooks.

Round 1 proposals included sites located upstate and downstate, addressing retrofits of existing facilities as well as new construction. This round of accepted proposals initiated two dozen feasibility studies to be conducted by a dozen solution providers – affecting more than 40 million square feet of buildings spanning sectors such as educational, medical, multifamily residential, and mixed-use campuses; multi-block downtown communities; and a cluster of single-family homes bundled with a nearby commercial building.

Cost Reduction Strategies

NYSERDA, working with Rocky Mountain Institute ("RMI"), developed a framework to inform potential areas for increased activities and market support, based on an inventory of existing NYSERDA cost reduction strategies.

Internal and external (national and international) interviews were conducted with market stakeholders, which surfaced key market opportunities and focus areas for cost compression that were prioritized for further ideation. A cross-team workshop with NYS and DPS Staff was then convened to review key insights and hypotheses and to develop potential strategies in priority areas, including:

- Streamlining the customer experience to accelerate heat pump adoption and heat pumps combined with envelope upgrades
- Increasing the pool of HVAC contractors
- Considerations for phased electrification of large buildings
- Supporting commercialization and demonstration of late-stage emerging technologies that will improve the value proposition for electrification (reducing cost and improving feasibility and performance)

International interviews also highlighted the prominent role of policy signals in scaling up the uptake of heat pumps such that cost reduction initiatives can be successful.

HVAC Technology Challenges

Through NYSERDA's NextGen HVAC Innovation Challenge (PON 3519), targeted and specific challenges are issued to the industry and innovation community to develop and commercialize innovative solutions addressing barriers to broader heat pump adoption. Efforts under the challenge have resulted in five commercialized products that are seeing utilization and increasing adoption in the State.

14 projects were initiated in 2021 to accelerate the development and commercialization of innovative products and solutions to enable broader heat pump adoption. The 14 projects comprise an investment of $5 million. Projects focus on cold climate performance, cost compression, refrigerant usage, peak load reduction, building envelope improvements, and heat pump solution needs unique to New York's stock of buildings. For example, a cold climate packaged terminal heat pump ("PTHP") as a replacement for inefficient packaged terminal air conditioners ("PTACs"), coupled with a central heating system, was found to be a viable strategy for many multifamily buildings in New York. Two projects focused on the development and commercialization of a 120V cold climate window mounted heat pump. A heat pump of this type would offer a practical and economic solution for the deployment of heat pumps in multi-family buildings.

Empire Building Challenge

The Empire Building Challenge is a $50 million initiative to form public-private partnerships with leading real estate portfolio owners, engineers, and technology providers to demonstrate commercially viable low carbon retrofit approaches that can decarbonize New York's existing stock of high-rise buildings.

There is significant interest from the real estate industry in clean heat technology innovations and demonstration projects. NYSERDA has begun to publish results and processes from deep technical analysis and strategic capital planning conducted by ten leading real estate portfolio owners and their Mechanical, Electrical, and Plumbing ("MEP") engineers in partnership with the Empire Building Challenge. Synthesis of this work creates a pathway for significant energy and carbon reductions in existing buildings at commercially acceptable returns.

The Empire Building Challenge completed its first funding round for implementation of replicable low carbon retrofit approaches to decarbonize space heating and domestic hot water loads in existing high-rise buildings. The first four awarded projects were announced in the Governor's 2021 State of the State speech and will begin implementation in 2022.

Multifamily Building Demonstrations

The Low Carbon Pathways for Multifamily Buildings Program is a $7.8 million initiative that provides funding for low carbon retrofit packages in existing multifamily buildings to enable a whole building retrofit over time. The program targets real estate portfolio owners as well as buildings engaged in real estate organizations to allow for project replication within a portfolio and through peer-to-peer knowledge sharing.

This initiative launched in Q3 2021 and drew significant market interest. The initial four projects encompassed 438 units across 18 buildings and spanned a wide range of geographies, building typologies, ownership structures, and affordability statuses.

2022 Lookahead

Clean Thermal District Systems

Additional solicitation rounds will be offered through 2022 due to strong market interest. Additional funds for the program were secured from the RGGI, which allows for participation from customers that do not pay into the SBC.

A forum will be held in Q2 2022 to connect interested property owners with solution providers. Additional webinars will also be held throughout the year to share best practices, insights, and lessons learned from select projects with the industry.

Cost Reduction Strategies

There is currently a cost premium for building electrification solutions, particularly relative to gas systems. In the near-term, market actors also report that they expect broader supply chain disruptions and cost pressures associated with the COVID-19 pandemic to persist through the end of 2023. There is a need for ongoing creative thinking, including input from international experts, about strategies to drive down costs of heat pump installations (in addition to the reduction in cost that is expected to come with market scale).

HVAC Technology Challenges

The NYSERDA team will continue to identify and assess technical gaps with stakeholders and explore where innovative technology solutions can accelerate broader adoption of heat pumps. The team will issue a set of priority innovation challenges in 2022. Challenge areas will be expanded to include innovative solutions for increasing building participation in Clean Thermal District Systems. A separate solicitation will also be issued that is focused on making clean heating products currently only commercially available outside the United States available in New York. NYSERDA's work in this area has provided the basis for a collaborative between NYCHA and NYPA, who will be procuring small packaged heat pumps for NYCHA properties in 2022.

Empire Building Challenge

In Q2 2022, the Empire Building Challenge will create a second cohort of real estate owners and MEP engineers seeking to partner with NYSERDA to decarbonize existing high-rise buildings. In Q4, NYSERDA anticipates issuing a second funding round for implementation of high impact retrofit strategies.

Multifamily Building Demonstrations

The Low Carbon Pathways for Multifamily Buildings Program launched in Q3 2021. Activities planned for 2022 include the launch of tenant/resident surveys to measure the non-energy benefits associated with the low carbon retrofits in the Low Carbon Pathways program both pre- and post-retrofit (e.g., improved thermal comfort, reduced noise, improved controls in in-unit spaces, etc.). NYSERDA will publish relevant insights from initial project experiences and any learnings from these tenant surveys with the market. Additional opportunities for program updates will be assessed based on market response to the Low Carbon Pathways program and informed by progress under the related Empire Building Challenge.

4. MAKE ELECTRIFICATION SOLUTIONS AVAILABLE FOR LMI CONSUMERS

2021 Performance

In 2021, NYSERDA developed transformative partnerships with affordable housing agencies to advance electrification and bring the benefits of comfort and improved indoor air quality to low- and moderate-income residents. This included the Clean Energy Initiative, a pilot with NYS HCR to integrate technical assistance and electrification funding directly into HCR's affordable housing finance applications, beginning with affordable new construction and adaptive reuse projects. NYSERDA also partnered with NYC Housing Preservation and Development ("HPD") to create the Retrofit Electrification Pilot, which incorporated incentives for space heating and cooling and/or domestic hot water electrification for existing multifamily building rehabilitation projects into HPD's preservation programs. Lastly, NYSERDA joined forces with NYCHA – the largest public housing authority in the country and the largest landlord

in New York City[24] – and NYPA to create the Clean Heat for All Challenge, a heating and cooling industry competition to create a packaged, cold climate heat pump that can be mounted in a window opening and provide comfortable, efficient heating and cooling to NYCHA residents on a room-by-room basis, with NYCHA committing $250 million in a proven solution.

The LMI Heat Pump Demonstration Pilot allocated $10 million in supplemental incentives for heat pump installations as part of comprehensive efficiency upgrades in low- and moderate-income homes and affordable multifamily buildings offered through NYSERDA's EmPower, Assisted Home Performance, and Multifamily Performance Programs.

NYSERDA has hired a contractor to develop results and findings from the demonstration projects that will inform development of a longer-term LMI electrification investment strategy. Initial Market Research and Policy Analysis work has been completed. The scope of additional pilot and demonstration investments is under development, including pilots in coordination with the state housing agency for integrating electrification solutions in the affordable housing pipeline. See the LMI Statewide Implementation Plan[25] for further details.

2022 Lookahead

Engagement of DACs and LMI households around electrification and other clean energy topics is essential. DAC/LMI stakeholder engagement will help ensure strategies are informed by important policy, regulatory, and financial considerations that need to be addressed to accelerate electrification of the affordable housing sector. See the LMI Statewide Implementation Plan[26] for further details including specific milestones for 2022-2025.

NYSERDA's Affordable Housing Agency partnerships with NYS HCR and NYC HPD will continue to drive progress in electrification of LMI households. Most notably, in 2022 NYSERDA and HCR will be rolling out a multiyear collaboration that will leverage $100 million of NYSERDA NYS Clean Heat, CEF, and other RGGI funds along with $750 million of HCR funds included in their 5-year capital plan to support electrification in affordable housing. The partnership with HPD will expand to support new construction electrification.

Applying the findings from the Heat Pump Demonstration Pilot, NYSERDA will phase in funding for electrification of space heating and hot water within its 1-4 family residential LMI programs, EmPower and Assisted Home Performance, beginning with use cases where electrification combined with weatherization is shown to reduce energy costs (e.g., customers using oil, propane, or electric resistance heating).

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[24] NYU Furman Center. Directory of NYC Housing Programs. https://furmancenter.org/coredata/directory/entry/public-housing#:~:text=NYCHA%20is%20the%20largest%20Public,Lower%20East%20Side%20of%20Manhattan.

[25] https://www.nyserda.ny.gov/All-Programs/Low-to-moderate-Income-Programs/LMI-Stakeholder-Resources-New-Efficiency-New-York

[26] Ibid.

5. *MAKE PRODUCTS AVAILABLE WHEN AND WHERE CONSUMERS NEED THEM BY BUILDING THE CLEAN HEAT SUPPLY CHAIN*

2021 Performance

- Gathering of insights continued in 2021, which included a series of roundtables and 1-1 interviews with key supply chain actors including heat pump manufacturers, HVAC distributors, and delivered heating fuel suppliers. Further analysis is underway to support additional roundtables with small commercial heat pump installers, envelope contractors, and ground source drillers, among others.
- A comprehensive HVAC supply chain market mapping tool was developed including value maps and profiles for each of the key supply chain actors across the full New York HVAC supply chain, including identification of the largest influencers, key interdependencies among primary and secondary market actors, and direction to identify where NYSERDA can best intervene to accelerate clean energy technology adoption.
- NYSERDA has launched an upstream partners trade ally network called Clean Heat Connect consisting of manufacturers, manufacturers' representatives, and distributors of ASHP equipment. NYSERDA is in the process of developing priority training and other technical and business resources identified by a market-wide needs assessment completed in early 2022. These resources are to be disseminated through this Clean Heat Connect network to support market growth for ccASHPs.
- Two Expert Meetings were hosted by NYSERDA to listen to the industry and develop ideas for better, more meaningful performance metrics for ccASHPs and to further explore the need for supplemental heat in colder regions of the state. Attendees represented a wide range of interests including manufacturers, national industry standard-setting organizations, regional energy efficiency organizations, consultants, and engineers. While full consensus was not achieved, valuable insights were obtained to understand where additional research is needed. An assessment was also conducted on the pros and cons associated with using various proposed performance ratios and other metrics, currently being considered by program administrators and standards bodies regionally and nationally.

2022 Lookahead

- The newly established Clean Heat Connect information distribution channel will be tested by deploying a series of high priority resources to the network, who will then distribute to their contractor networks to build capacity and support electrification efforts.
- A summary of the findings from the Expert Meetings held in 2021 will be developed into a white paper to be presented at the ACEEE 2022 Summer Study on Energy Efficiency in Buildings. This paper will provide insights and recommended practices for program administrators and

contractors to select ccASHPs with optimized performance based on the location-specific needs of the installation.

- Dual-fuel systems in the residential sector are not currently supported with NYSERDA investments; however, further analysis is needed to better understand the need for hybrid systems by building sector and use case (single family, multifamily, small commercial) to determine what role hybrid systems and other supplemental heat strategies should play in the transition to full electrification. Related to this work, additional field study is needed to develop strategies for and better understand the potential impacts of right-sizing supplemental heat when it is needed. The team is in the process of developing the Experience Clean Heat campaign which will leverage a series of initiatives focused on getting HVAC technicians and other key influencers as well as the public at large direct experience living and working in spaces heated with heat pumps and providing them with messaging channels to spread the word.
- Further investigation is needed to explore options for additional mid-stream interventions, including potential alternatives to traditional cash incentives offered at the mid-stream level (e.g., to distributors).
- The team will continue to work with the NY Electric Utilities and the supply chain network to develop initiatives targeting these opportunities.

6. MINIMIZE WINTER ELECTRICAL PEAK BY INVESTING IN DEMAND-REDUCING "HEAT-PUMP READY" SOLUTIONS – THROUGH THE COMFORT HOME PILOT

2021 Performance

- Work has been underway to define the level of envelope performance needed, develop meaningful performance metrics and specifications for ccASHPs, and develop supplemental heat strategies that minimize peak demand impact in residential homes. Projects designed to address heat pump performance metrics and supplemental heat strategies are further discussed in the Critical Tools section of this report. Meanwhile, the Comfort Home team has refined its analysis to develop a preliminary definition for a threshold of thermal envelope performance required to deem a home "heat pump ready." Additional work is needed to further define the heat pump ready threshold of performance in NY's coldest climate zones. That work will go hand-in-hand with NYSERDA's efforts to establish a strategy allowing for right-sized supplemental heat in homes that are in very cold climates and/or cannot be upgraded to the desired level of performance to be deemed heat pump ready. In 2021, Comfort Home enrolled 26 new participating contractors for a total of 40. Comfort Home more than doubled its first-year production, completing 347 load reduction projects in 2021 for a total of more than 490 homes improved cumulatively. Cumulatively, load reduction projects completed through Comfort Home are projected to save 13,430 MMBtu in annual fossil fuel savings and 184 MWh in annual electricity savings. Potential grid impacts resulting from the homes improved include an estimated avoided electrification-driven peak demand of as much as 2500 kW in future winter peak demand reduction compared to electric resistance heat typically used as back-up for whole

house heat pump installations. With approximately 2.5 million homes in need of insulation and air sealing improvements, these basic measures are projected to reduce future winter peak demand by as much as 2,200 MW in reduced heat pump capacity and 4,500 MW in avoided electric resistance back-up heat for the 1-4 unit residential market.

- NYSERDA continued its “co-invest, co-save" collaboration with Con Edison in Westchester County, delivering incentives for weatherization improvements by combining Comfort Home with Con Edison’s existing weatherization program offering. The joint offering stacks weatherization incentives for the Better and Best measure packages to expand program reach and project work scope through a “co-invest, co-save” framework. Central Hudson is exploring offering a weatherization measure in Dutchess, Orange, and Ulster counties.
- NYSERDA and National Grid began a collaborative process to use learnings from Comfort Home to assist National Grid in developing and deploying a weatherization offering to its downstate natural gas customers. The Total Home Comfort program was launched in the Fall of 2021.

2022 Lookahead

- NYSERDA will continue modeling analysis and launch a field study to further refine the definition of a heat pump ready envelope inclusive of all climate zones in the state and establish guidance for right-sized supplemental heat where needed.
- The program will focus on maintaining a presence in the market for continuity as we seek to identify opportunities for utilities to adopt the model to support their energy efficiency and heat pump goals. Projections based on organic market-driven growth estimate adding up to 10 new contractors and completing more than 1,000 load reduction projects in 2022. Additional utility partnerships may accelerate increased production levels. 2022 work will include further testing of demand impact calculation methods and quantification of comfort impacts for load reduction measure packages.
- NYSERDA will be working closely with National Grid to provide assistance in building out market capacity to deliver the weatherization services needed for National Grid to meet its goals for the Total Home Comfort gas weatherization program.

7. DEVELOP A LONG-TERM BUILDING ELECTRIFICATION ROADMAP TO GUIDE THE TRANSFORMATION OF HOW NEW YORKERS HEAT AND COOL THEIR BUILDINGS

2021 Performance

NYSERDA continued to gain technical and market insights from subject matter experts and stakeholders, with emphasis on deepening understanding of electrification challenges and opportunities in commercial building typologies and for affordable housing and LMI households, including through convening the Roadmap’s Market Advisory Group and additional stakeholders on these topics. NYSERDA refined its in-house analytical tool (in particular for commercial building typologies) to estimate achievable market uptake for heat pumps and building shell upgrades, and subsequently began scenario

analysis to explore uptake under possible policy approaches. In conjunction with the Carbon Neutral Buildings Roadmap, key market and policy insights were shared with an advisory panel focused on the building sectors in the NYS Climate Action Council process.

2022 Lookahead

- NYSERDA anticipates issuing draft Roadmap content for stakeholder input in summer 2022 and incorporating the input received into a Building Electrification Roadmap published in December 2022.
- Key insights and scenario analysis also will inform a forthcoming plan to achieve 2 million climate-friendly electrified or electrification-ready homes by 2030, a commitment included in Governor Hochul's 2022 State of the State agenda.

6. Appendix A. Additional NYSERDA Activities to Advance Building Electrification

The initiatives identified below, while not specifically included in the NYS Clean Heating Market Development Plan, are focused upon driving carbon-neutral buildings – of which electrification of heating, cooling and appliances is a key element. These programmatic efforts are expected to produce additional benefits beyond those mentioned above.

Multifamily

In 2020, NYSERDA identified the five most prevalent types of multifamily buildings in NY and worked with building owners and technical consultants to develop a playbook for each building type. Each playbook lays out the path to make these buildings highly efficient and fully electrified over time, leveraging upcoming capital improvement points such as equipment end-of-life or compliance with local ordinances.

In 2021, NYSERDA published these playbooks[27] in partnership with the Building Energy Exchange, and they serve as an important building block for the launch of additional technical support for low carbon retrofits and electrification and the Low Carbon Pathways for Multifamily Buildings Program.

Multifamily Affordable Housing

In addition to the activities outlined in this report, NYSERDA is implementing and developing several initiatives that are advancing electrification in multifamily affordable housing. The RetrofitNY program is working aggressively to bring many affordable housing units to or near net-zero energy use by 2025, including full electrification. NYSERDA has worked with HPD to launch a pilot that will integrate subsidies for electrification of main building systems into HPD's existing refinancing and renovation programs. NYSERDA has also implemented a similar initiative with NYS HCR, which, in addition to electrification of building systems, also incentivizes aggressive envelope improvements to achieve Passive House or near-Passive House performance.

Lastly, NYSERDA is working with NYCHA and NYPA to develop and test standalone, unitary heat pump technologies that would enable more cost-effective electrification of heating and cooling in the largest public housing portfolio in the country.

New Construction

The New Construction team is actively engaged in market transforming activities that decarbonize and electrify buildings across all building sectors in New York. The 2022 budget for all new construction activities is approximately $30 million-$20 million in market rate and another $10 million in LMI funds. The total 2022-2025 budget for market rate activities is $70 million and LMI funding is $55 million.

[27] https://be-exchange.org/lowcarbonmultifamily-main/

One of the signature market initiatives is NYSERDA's Buildings of Excellence ("BOE") program, which provides funding and recognition for the design, construction, and/or rehabilitation of carbon neutral buildings in the multi-family sector. This sector represents 40% of new construction in NYS and about two thirds of units are affordable housing. The BOE program is the only program of its kind in the nation, combining carbon neutral performance requirements with exceptional design for aesthetics, resiliency, affordability, and health. In the first two rounds of the program (2019 & 2021), 42 very low-carbon and carbon neutral buildings have received awards. All Round 2 projects were 100% electric, and most include improved resiliency and reduced embodied carbon versus typical code buildings. NYSERDA is able to show that the premium for high performing, all-electric buildings is being reduced by this community of leading designers and developers. Round 3 is scheduled for launch in 2022.

Building on the success of BOE in both performance and cost premium reduction, NYSERDA was able to fund $7.5 million in carbon neutral affordable housing within the MOU between NYSERDA and HCR in 2021. This partnership will continue and expand to other housing agencies in 2022.

NYSERDA launched its single-family design initiative, Building Better Homes, in December of 2021. The effort is focused on growing the capabilities of the single-family design and homebuilder industry. It focuses on the health, safety, and comfort of high performing combustion-free homes. Funding to encourage all electric sub-divisions and promote the attributes of carbon neutral homes are part of the program and will be rolled out in 2022.

Through the Carbon Neutral Communities for Economic Development Program in the 2021 Consolidated Funding Application ("CFA"), NYSERDA was able to support 19 carbon neutral new construction and adaptive re-use projects in the commercial sector. The portfolio of projects is diverse by end use and location.

NYSERDA's standard new construction programs have been reformatted to only support decarbonized projects and NYSERDA will be moving its focus to early design stages to gain maximum leverage over the next year.

Codes & Standards

NYSERDA continues its work to advance codes and standards, using research, analysis, market engagement, education, pilots, and direct community support to improve compliance and enforcement while advancing towards more stringent codes throughout New York State. A significant portion of work in the codes and standards space will focus on using statutes and regulations to build on the market development work outlined throughout this report. Specifically, research, analysis, and market outreach are currently underway on how best to include electrification-readiness requirements and allow for the use of low-GWP refrigerants in the next NYS uniform code, preparing the way for a cost-effective shift to electric space and water heating in the future. In addition, NYSERDA has been working with stakeholders to map out how a combination of codes, appliance standards, and other mandates can be used to drive decarbonization in new construction and existing buildings. NYSERDA actively supported the Climate Action Council throughout the development of the draft Scoping Plan, which is currently out for public review. More work remains, but market development success will allow these mandates and requirements to move forward in a timely manner, helping NYS meet its 2050 decarbonization goals.

Clean Green Schools Initiative

NYSERDA's Clean Green Schools Initiative, launching in 2022, will invest over $50 million to help public schools that traditionally lack resources to invest in infrastructure improvements to become healthier, more productive learning environments. This initiative aims to improve the environmental sustainability of those schools by reducing school energy loads, decarbonizing their building portfolio, improving indoor air quality, and providing clean energy educational opportunities.

7. Appendix B. NYSERDA Output/Outcome Progress Summary

Several NYSERDA investment plans (initiatives) support the NYS Clean Heat Market Development plan. However, not all initiatives have output/outcome indicators with targets attributed solely to NYS Clean Heat. Indicators shown below are limited to those specifically identifying targets for NYS Clean Heat. **Table 18. NYSERDA Output/Outcome Progress Summary**

			Baseline	*Cumulative Progress*	*Cumulative Targets by Year*					
	Initiative	**Indicators**	**Before/Current**	**2021**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Outputs		Number of energy-efficient electrified space and water heating technologies installed through NYS Clean Heat	0	22,756	3,900	18,200	32,500	55,900	88,400	130,000
	Residential	Number of homes that reduce energy loads in their homes to prepare for heat pump installations	0	709	800					8,775
	Multifamily	Number of low carbon technology demonstrations	0	966 units				10,217 units		
	Building Operations and Maintenance Partnerships	Increase in number of workers trained (electrification target shown in parenthisis)	20	2,968 (0)					9,600 (1,000 electrification)	
	Talent Pipeline	Students placed in internships by training providers as part of training through this initiative (electrification target shown in parenthisis)	0	148 (0)			400 (150 electrification)			600 (300 electrification)
		Interns hired directly by businesses through Internship Program (electrification target shown in parenthisis)	0	856 (39)			900 (200 electrification)			2,000 (500 electrification)
		New hires through OJT Program (electrification target shown in parenthisis)	0	753 (264)			950 (500 electrification)			2,050 (1,200 electrification)
		Total workers trained through this initiative (electrification target shown in parenthisis)	0	9,056 (2,862)			14,000 (5,000 electrification)			25,000 (11,000 electrification)
Outcomes	Heat Pumps Phase 2 (2020)	Increase in awareness of CH&C technologies*	TBD	N/A			15%			50%
		Replication of Clean Thermal District System projects beyond NYSERDA supported projects	0	N/A					1	2
		Reduce the cost of heat pump installations in New York*	0%	N/A			10%			25%
		Increase stocking of heat pumps above HARDI 2019 shipments*	0%	37%			20%			50%
		Increase penetration of high-performance cold climate heat pumps as a percent of all heat pumps shipped for space conditioning in New York (baseline 2018 HARDI ASHP data)*	61%	N/A			70%			90%

Table notes

a. A 0 (zero) denotes that the actual value is currently believed to be zero for baseline/market metrics.

* This investment plan includes broader market progress metrics, for example overall heat pump market size and market penetration of cold climate heat pumps. These market progress metrics will be supported collectively by all of NYSERDA's market development activities that extend beyond this singular investment plan. NYSERDA will measure market progress broadly, rather than for each specific investment plan. Progress will be reported collectively within the Statewide Heat Pump Program

8. Appendix C. PSEG Long Island 2020-2021 Heat Pump Summary

LIPA has adopted a target of approximately 1.15 TBtu of savings through heat pump deployment on Long Island between 2020 and 2025. This equates to a goal of installing 30,000 new residential or commercial heat pumps for space, water, and pool heating in LIPA's service territory. Technologies supported include both full- and partial-load ASHP, heat pump water heaters, heat pump pool heaters, and GSHP. All residential, multifamily, and commercial customers are eligible, with added rebates for income-qualified residential customers who install full-load ccASHP.

As of December 31, 2021, LIPA had achieved 42% of the goal, having deployed approximately 12,700 new heat pumps with the support of PSEG Long Island-administered rebates. In 2020, LIPA customers installed nearly 6,000 heat pumps totaling over 218,000 net MMBtu of energy savings, with over $6.2 million in rebates and incentives provided to support heat pump deployment. In 2021, LIPA customers installed over 6,700 heat pumps totaling 272,000 net MMBtu of energy savings and over $7.6 million of rebates and incentives. 2021 represented an increase over 2020 of 13%, 25%, and 23% for total heat pumps installed, net MMBtu of energy savings, and total rebates and incentives, respectively. In each year, there were about 100 participating contractors in the Home Comfort program who performed the majority of the space heating work, in addition to other pathways for participation for heat pump water heaters and pool heaters.

Full breakdown of program data is available below:

LIPA	2020	2021	Totals
Heat Pumps Installed[28]	5,973	6,722	**12,695**
Total MMBTUs	218,172	272,257	**490,429**
Total Rebates & Incentives	$6,210,640	$7,628,514	**$13,839,154**
# Participating Contractors	105	100	**N/A**
# Partial Air Source Heat Pumps	3,176	3,002	**6,178**
# Whole House Air Source Heat Pumps	587	1,088	**1,675**
# Geothermal Heat Pumps	293	146	**439**
# Heat Pump Water Heaters	229	207	**436**
# Heat Pump Pool Heaters	1,635	1,867	**3,502**
# Commercial Heat Pumps	53	412	**465**

[28] Heat pump pool heaters are not eligible under the New York State Clean Heat program.