
NYS Clean Heat: Statewide Heat Pump Program Implementation Plan

Version 2

Jointly Filed by:

New York State Energy Research and Development Authority

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Consolidated Edison Company of New York, Inc.

Niagara Mohawk Power Corporation d/b/a National Grid

New York State Electric & Gas Corporation

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Version History and Description of Revisions: NYS Clean Heat Implementation Plan

Date Filed	Version	Topic	Description of Change	Section/ Page
5/29/2020	1	N/A	N/A	N/A
7/1/2021	2	Shift from Future to Ongoing Perspective	The 2021 Implementation Plan reflects a change from a future looking perspective to a current 2021 program status, given that the NYS Clean Heat Program has been in market for over a year at the time of filing.	Whole document
7/1/2021	2	Eligibility-specific criteria	Information regarding program specific eligibility criteria has been removed from the Implementation Plan and included in Program Manual; the Implementation Plan references the Program Manual where this information is now located. This avoids unnecessary repetition between two documents and facilitates more streamlined process for updating information in the Program Manual.	Whole document: Technology-specific eligibility criteria; Incentive categories and related category-specific eligibility criteria; Participating Contractor eligibility criteria.
7/1/2021	2	Transition Plans	Since this transition has been completed, all discussion of Transition Plans (from NYSERDA and/or Electric Utility-specific heat pump programs to NYS Clean Heat) has been removed.	Whole document
7/1/2021	2	Criteria to determine eligibility	For scenarios in which project eligibility is not clearly defined, eligibility guidelines have been added.	Section 2.A.1 and Section C
7/1/2021	2	QA/QC	Section name has been changed from 'Quality Assurance/Quality Control ("QA/QC") to 'Field Assessments' and edits made to align with the NYS Clean Heat Statewide Heat Pump Program Quality Policies and Procedures Manual.	Section 2.E
7/1/2021	2	Utility Specific Chapter updates	Updates have been made to reflect current EAM terms. Con Ed and O&R will end the ASHP Midstream Distributor component effective 7/1/2021.	Section 5 Utility Specific Elements and Activities

**STATE OF NEW YORK
PUBLIC SERVICE COMMISSION**

In the Matter of a Comprehensive)
Energy Efficiency Initiative)

Case 18-M-0084

**NYS CLEAN HEAT: STATEWIDE HEAT PUMP PROGRAM
IMPLEMENTATION PLAN**

1. Introduction

In its Implementation Order,¹ the New York State Public Service Commission (the “Commission”) initiated a common statewide heat pump framework for New York State (“NYS”), designed to guide the efforts of the Electric Utilities² and the New York State Energy and Research Development Authority (“NYSERDA”) in this area. The Electric Utilities and NYSERDA (collectively, “Joint Efficiency Providers”) support the State’s ambitious clean energy policies and particularly its efforts to advance the development of energy efficiency resources and building electrification.

This NYS Clean Heat Statewide Heat Pump Program (“NYS Clean Heat Program”) Implementation Plan (“CHIP” or “Implementation Plan”) is a key element of the State’s clean energy pathway and is designed to support customers in transitioning to energy-efficient electrified space and water heating technologies.³ This CHIP describes the establishment and

¹ 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 (“Implementation Order”) (issued January 16, 2020).

² 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, “Electric Utilities”).

³ On June 15, 2020, the New York State Department of Public Service Staff (“Staff”) issued a letter of final approval of the initial Implementation Plan (“2020 Implementation Plan”), as filed by the Joint Efficiency

ongoing administration of the NYS Clean Heat Program by the Electric Utilities, in collaboration with NYSEERDA, as part of the new statewide framework. The framework is designed to provide contractors and other heat pump solution providers a consistent experience and business environment throughout NYS. Utility chapters at the end of this Implementation Plan provide further details on elements that are unique to each service territory.

A. Background

The Commission’s Implementation Order: (1) approved for each of the Electric Utilities budgets and targets (see Table 1 below) governing the deployment of heat pumps through 2025; (2) required a common statewide heat pump framework recognizing other market enabling actions to be provided by NYSEERDA; (3) directed NYSEERDA to allocate at least \$30 million towards low- and moderate-income (“LMI”) heat pump programs; (4) required the establishment of a Joint NYSEERDA and Electric Utility Management Committee (the “Joint Management Committee”); and (5) required the filing of a Statewide Heat Pump Program Implementation Plan and Program Manual (“Program Manual”) within 60 days of the Implementation Order.

Heat pump deployment targets are expressed in annual energy savings in million British Thermal Units (“MMBtu”), based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

Table 1: Utility Heat Pump Budgets and Targets Established in the Implementation Order through 2025⁴

Utility	Target (MMBtu)	Budget (\$millions)
Central Hudson	255,293	\$43.2
Consolidated Edison	1,000,000	\$227.3
National Grid	1,112,681	\$84.4
NYSEG	992,737	\$75.1
Orange & Rockland	86,657	\$15.0
RG&E	119,223	\$9.2
Total	3,566,590	\$ 454.3

Providers on May 29, 2020 in conjunction with the filing of the NYS Clean Heat Program Manual and documents related to the Field Assessment process. This current Implementation Plan reflects several changes from the 2020 Implementation Plan, as describe in Table 1. Version History and Description of Revisions: NYS Clean Heat Implementation Plan.

⁴ Implementation Order, Appendix C.

2. Statewide Framework

The Joint Efficiency Providers have implemented and will continue to administer and improve upon a common statewide framework to advance the adoption of heat pump systems that are designed and used for heating, integrated under the umbrella of NYS Clean Heat.⁵ The NYS Clean Heat Program supports the installation of heat pump technologies that are best suited to heat efficiently in cold climates; requires participating contractors (“Participating Contractors”) to follow best practices related to sizing, selecting, and installing heat pumps in cold climates; and promotes consumer education, including required guidance provided by Participating Contractors to customers on how to operate and maintain their system. As part of program delivery, the Joint Efficiency Providers monitor the extent to which NYS Clean Heat-incentivized heat pump systems displace or replace other heating fuels. The Joint Efficiency Providers continue to review the program’s progress and will make adjustments to improve performance as appropriate.

A. Eligible Technologies

The following technologies are currently eligible for incentives offered by the Electric Utilities, according to eligibility criteria specified in the NYS Clean Heat Statewide Heat Pump Program Manual (“Program Manual”; [NYS Clean Heat Program](#)). Eligibility on any additional technologies not listed below will also be included in the Program Manual.

- Air-Source Heat Pumps (“ASHPs”) for space heating applications;
- Ground Source Heat Pumps (“GSHPs”) for space and water heating applications;
and
- Heat Pump Water Heaters (“HPWHs”) for domestic and service water heating applications.

⁵ In all instances, the NYS Clean Heat Program will provide incentives only for heat pump systems that are designed to provide domestic and service hot water heating and/or both space heating and cooling; or for commercial/industrial process systems that provide water heating and/or cooling. Heat pumps that are designed and installed primarily for space cooling are ineligible for incentives under the NYS Clean Heat Program.

Within this Implementation Plan, incentive structures are described in terms of their applicability to various building types, which are:

- Residential (one to four units);
- Multifamily (five or more units);
- Small commercial businesses (“small commercial”); and
- Large commercial and industrial building sectors (“C&I”).

The Clean Heat Program provides incentives under several categories reflecting applicable technology type, building type, system size, and incentive structure. Further detail on eligible technologies and specific incentive structure, including utility-specific program concepts, pilots or trial offerings, is provided in the Program Manual. In general, customers are eligible for incentives under these programs no matter which heating fuel (*e.g.*, fuel oil, natural gas, propane, biomass, electricity, Con Edison district steam) they are either transitioning from or declining to include in a new construction application.

To be eligible for incentives, systems must meet all eligibility criteria as per the Program Manual and must be sized in compliance with all applicable state and municipal codes.⁶

2.A.1 **Air Source Heat Pump Systems**

Air source heat pumps typically provide space heating using electricity through vapor-compression refrigeration cycle. These systems extract heat from outdoor air and transfer the extracted heat into the conditioned spaces via various means. They are also used to provide space cooling by reversing the cycle to extract heat from a building and transfer the heat to the outside air.

Under the NYS Clean Heat Program, ASHP systems must meet the cold climate specification as outlined in the Program Manual to be eligible for a program incentive.

Several categories of cold climate ASHPs are currently eligible for program incentives:

- (1) Residential and Small Commercial Central ASHPs;

⁶ Energy Conservation Construction Code of New York State (“ECCCNYS”) 2016, Section R403.7 and 2016 New York City Energy Conservation Code (“NYCECC”), Section R403.7. ECCCNYS 2016 and 2016 NYCECC require that systems serving multiple dwelling units, where commercial code is applicable, follow Sections C403 and C404 of the respective codes. In general, heat pumps installed in dwellings where residential code is applicable are required to be sized per ACCA Manual S.

- (2) Ductless or partially ducted mini-split heat pumps (“MSHPs”), which include “single-head” (one indoor air handler per outdoor compressor) and “multi-head” or “multi-split” (more than one indoor air handler per outdoor compressor);
- (3) Commercial Unitary (*i.e.*, Large Commercial) ASHPs (Split or Single Package); and
- (4) Variable Refrigerant Flow Heat Pumps (“VRFs”).

Additional equipment and systems may be added to the eligible technologies list in the Program Manual as they become commercially available. For scenarios in which project eligibility is not clearly defined, the following shall be used to determine eligibility:

- Fossil fuel (heating oil, natural gas, steam generated by fossil fuel, etc.) energy consumption must be reduced by the new electric technology or application
- The new electric technology or application:
 1. Must not increase the overall annual site energy consumption
 2. Must be market ready and can meet or exceed applicable minimum efficiency specifications

2.A.2 **Ground Source Heat Pumps**

GSHPs achieve high efficiency by exchanging thermal energy with the ground, ground water, or other natural body of water, instead of from outside air. GSHP systems work in cold climates because of their ability to maintain capacity at low ambient air temperature. GSHPs are used in all building sectors and are sized to provide heat to the whole home or whole building. They range from single-appliance systems in residential and small commercial applications that couple one ground loop with one heat pump appliance, to large systems that extend the ground loop into an internal distribution system serving multiple heat pump units, each of which can be individually controlled.

GSHP units may have an optional desuperheater that takes advantage of waste heat generated by the compressor and transfers the waste heat to a domestic hot water system. GSHPs distribute heating and cooling in the building through air or water distribution systems. System performance depends on an effective ground heat exchanger design and system sizing.

Ground loops must comply with all applicable state and municipal regulations, such as NYS Department of Environmental Conservation (“DEC”) regulations for geothermal well

drilling.⁷ Ground loop systems must comply with eligibility criteria as listed in the Program Manual.

2.A.3 **Heat Pump Water Heaters and Ground Source Water Heaters**

HPWHs are storage tank-based water heaters that typically replace electric resistance storage tank water heaters or fossil fuel-fired storage tank water heaters. These systems provide most of the heat to domestic hot water through a heat pump, with a secondary electric resistance coil as a back-up to ensure that the water temperature meets the desired setpoint during high demand periods. HPWHs can be installed in a variety of conditioned or unconditioned spaces, where there is adequate air supply for heat exchange. HPWHs are available to customers through appliance retail channels and through heating and plumbing contractors and can be used in any type of building.

In addition to the traditional HPWH units, specific GSHP technologies that also supply domestic or service hot water are eligible for incentives, including:

1. GSHP Desuperheater for DHW desuperheaters installed and commissioned as a component within an eligible GSHP system; and
2. Dedicated DHW WWHP for ground source WWHP systems that fully satisfy domestic or service hot water needs.

B. Incentive Structure

The NYS Clean Heat Program incentives are designed to provide a consistent statewide approach to supporting the development of the heat pump market in New York, with a focus on promising technologies and applications that do not yet have a strong market presence. The purpose of these incentives is to cost-effectively aid customers in making the transition to energy-efficient electrified heating solutions.

The overall structure of the incentives that the Electric Utilities deploy, including eligibility criteria and incentive levels, is listed in the Program Manual. Utility-specific incentive levels will continue to be assessed at least annually to review whether incentives are set at optimal levels.

⁷ See, <http://www.dec.ny.gov/energy/43303.html>.

Incentives are offered as 1) a fixed dollar amount per unit, 2) per system capacity, or 3) per annual energy savings as listed in the Program Manual, Section 2.

Further detail on specific incentive levels, per technology, project type and system size, and including utility-specific program concepts, pilots or trial offerings, is provided in the Program Manual.

C. Areas for Potential Program Enhancements and Pilots

The Joint Efficiency Providers have considered several technologies and concepts for inclusion in the NYS Clean Heat Program beyond those listed above, and will continue to explore them going forward, through the Joint Management Committee process. The Program Manual has the most up-to-date information on newly added technologies and utility-specific program elements.

Additional equipment and systems may be added to the eligible technologies list in the Program Manual as they become commercially available. For scenarios in which project eligibility is not clearly defined, the following shall be used to determine eligibility:

- Fossil fuel (heating oil, natural gas, steam generated by fossil fuel, etc.) energy consumption must be reduced by the new electric technology or application
- The new electric technology or application:
 1. Must not increase the overall annual site energy consumption
 2. Must be market ready and meet or exceed applicable minimum efficiency specifications

The customer may either decide to keep their existing heating system in service to provide back-up or emergency heat, or to decommission it. The Joint Efficiency Providers acknowledge that the decommissioning of existing systems may help the State advance its heating electrification and decarbonization goals, as long as the systems are decommissioned legally, safely, and in compliance with applicable jurisdictional programs, codes and

requirements (e.g., federal, state, municipal, etc.) that govern decommissioning and facilitate best practices.⁸

The Electric Utilities will continue to coordinate with NYSERDA on residential energy efficiency and envelope programs, including the Comfort Home initiative (described in Appendix 1), making customer referrals in their respective service territories where other utility-offered services are not available and connecting customers who receive “seal and insulate” services through Comfort Home to heat pump incentives that are offered under the NYS Clean Heat Program. Upon completion of the pilot phase, NYSERDA and the Electric Utilities will review results and lessons learned to determine the best path forward in offering weatherization services to customers. Weatherization and building envelope upgrades represent a key opportunity for energy savings, further reducing the building load when coupled with an efficient heat pump solution.

NYSERDA and the Electric Utilities likewise will continue to collaborate in developing and evaluating LMI pilots and demonstration programs, to identify replicable models for heat pump deployment in the LMI market segment while maintaining or improving energy affordability. In addition to pilot design, collaboration may include identification of target customers and affordable multifamily buildings, outreach and referrals, marketing, education, and co-funding. Appendix 1: NYS Clean Heat Market Development Plan provides further information on planned investments to develop heat pump solutions for the LMI market segment and to inform longer-term utility investment.

Where applicable, the Joint Efficiency Providers anticipate coordinating on certain large-scale, competitively selected demonstration projects, including demonstrations for clean thermal district systems and for low carbon retrofit solutions in large commercial and multifamily buildings (see Appendix 1). The Joint Efficiency Providers will share insights on new solutions as well as optimize the allocation of customer funding towards heat pump activities.

⁸ See, for example, *Amended Notice of Adoption – Rule amending and updating the Uniform Code* applies to “Abandonment or removal of heating oil storage tanks.” March 25, 2020. NYS Register (April 8, 2020), pp. 14-22. I.D. No. DOS-14-20-00002-E. <https://www.dos.ny.gov/info/register/2020/040820.pdf>

D. Program Delivery

This section describes the roles of each entity under the Implementation Plan and notes key areas of collaboration among the Joint Efficiency Providers in support of the NYS Clean Heat goals.

The Electric Utilities serve as Program Administrators who manage the overall process, delivery, and interactions with customers, contractors and distributors. The Electric Utilities, through their respective implementation contractors, are responsible for program operations, delivery, and incentive payments, among other responsibilities. To support the NYS Clean Heat Program efforts, the Joint Efficiency Providers coordinate across a number of areas. Joint efforts include using a common application and having consistent contractor requirements across the State. The Joint Efficiency Providers have established a consistent incentive structure statewide. The Joint Efficiency Providers' marketing and outreach efforts, described in the Market Development section with additional detail in utility-specific chapters and Appendix 1, work in alignment to encourage program awareness and promote education in the market.

The NYS Clean Heat program delivery model provides for both customer and contractor incentives that vary by category, as described in in the Program Manual. Incentives are available for various eligible heat pump technologies that customers can install in their homes and businesses. The purpose of customer incentives is to aid customers in making the transition to energy-efficient electrified heating solutions. Heat pump installation contractors also have an important role in driving market uptake of this technology because they have continuous touchpoints with customers from the point of sale to the installation of the equipment. They are critical actors that size and install heat pumps properly as the primary heat source while providing maximum participant comfort and ultimately customer satisfaction.

Distributors' role in the market is to stock and sell highly efficient, qualifying heat pump equipment per NYS Clean Heat requirements to Participating Contractors. Distributors also have strong relationships with manufacturers and can promote the program rules, product eligibility requirements, and industry best practices on both sides of the supply chain. The Joint Efficiency Providers will consider potential expansion of distributor incentives statewide.

The Joint Efficiency Providers recognize the importance of supporting quality installations, consumer education, and continuous improvement and continue to work together to advance these objectives within the Joint Management Committee.

E. Field Assessments⁹

The Electric Utilities maintain program integrity through the Field Assessment process consisting of routine and systematic assessment activities to support quality installations and assure that Participating Contractors comply with program rules as described in the New York State Clean Heat Statewide Heat Pump Program Quality Policies and Procedures Manual. The Electric Utilities will administer these Field Assessments through the remainder of the Clean Heat program.

The Field Assessment process establishes program standards and comprehensive, technology-specific documentation requirements and site assessments to be implemented uniformly by all Program Administrators. Such approaches are unique to the heat pump technologies and include the review of associated contractor credentials, project specific calculation methods, approved construction permits, accuracy of provided application data, and site assessments to assure optimal heat pump system performance. These activities are supplemented by any utility-specific review or assessment of heat pumps that may be conducted for the purposes of program implementation and measure acquisition.

The Field Assessment process employs sampling methods proportionate to the likely program risk associated with each application. Specifically, a site assessment occurs for every project until the Participating Contractor has a proven successful track record under the incentive program, after which a sampling protocol is followed. Projects contributing a disproportionate share of anticipated savings or employing novel solutions and custom savings estimate methods may receive increased scrutiny to identify opportunities for improvement as soon as possible. For

⁹⁹ While this Implementation Plan uses the term “Field Assessments” in lieu of the term “Quality Assurance/Quality Control,” (“QA/QC”), the meaning of these terms is substantively the same for the NYS Clean Heat Program. Field Assessments, as described in this and related NYS Clean Heat Program documents, are consistent with the directives of the Implementation Order regarding QA/QC. *NE: NY Proceeding*, Implementation Order, pp. 89-91.

larger-scale projects that pursue a custom incentive and require additional engineering review, the statewide Field Assessment process (as applicable to the project and technology) may be supplemented with any utility-specific assessment and implementation processes.

The Field Assessment criteria established for NYS Clean Heat and for each category of technology supported under the program serves the following objectives, each performed by independent parties having associated expertise.

Quality Workmanship

In order to assure that the work is performed consistent with best practices and that the contractor satisfies the expectations of both the program and the customer, each contractor is required to be enrolled in the Participating Contractor Network under the NYS Clean Heat Program (with the exception of contractors that only install heat pump water heaters). As described in Section F, this credential requires both training and compliance with industry and manufacturer practices to promote quality heat pump installations under the program and to assure that the manufacturers of such equipment will honor warranties associated with the equipment. As each manufacturer and specific equipment often require compliance with unique requirements, it is impractical for the Electric Utilities to assure compliance with specific manufacturer requirements. Rather the Electric Utilities will continue to collaborate with the manufacturers and other training and certifications bodies to assure that the contractors have successfully completed such training and their respective credentials are current in order to be eligible to participate in the program.

Further the Electric Utilities have established common methods to assess whether projects selected for field assessments have heat pump technologies that are installed in a manner consistent with best practices to realize their full potential energy impact and to preserve the useful life of the equipment. For this purpose, the Joint Efficiency Providers have developed a series of checklists that incorporate the requirements of similar programs and the recommendations of numerous subject matter experts to establish uniform practical criteria that may be verified on a cost effective and timely basis.

Program Compliance

The Field Assessment process, inclusive of associated documents such as the ASHP, GSHP and HPWH checklists ([Resources - NYScleanheat - SaveEnergy.NY.gov](#)), verifies that program

requirements have been satisfied and that associated data required to perform energy saving calculations consistent with the program requirements may be independently verified. The use of these checklists allows for the collection of data using standardized methods and future evaluation as described later in this document. Such checklists have been coordinated with the Technical Resource Manual (TRM) measures when applicable to assure that such prescriptive savings calculation methods may be performed consistently and accurately throughout the state. Applications which require custom calculation of savings will be performed by the Electric Utilities consistent with the requirements of the TRM and applicable Evaluation, Measurement and Verification (EM&V) guidance to assure a fully auditable record of such savings estimates.

Field assessments are conducted by a qualified independent third party, using the appropriate comprehensive checklists. The assessor does not inspect projects for purposes of code compliance or enforcement nor compliance with manufacturers installation requirements.

The Participating Contractor is solely responsible for ensuring that the heat pump system and system components are installed in accordance with manufacturer specifications and installation requirements, and in compliance with all applicable laws, regulations, rules and standards, including requirements of the local AHJ. The contractor is responsible for correcting all nonconformances identified in the Field Assessment activities to the satisfaction of the program administrator. Contractors are required to submit proof demonstrating correction of all items identified. Contractors may also be put on probationary status, suspended or terminated based on the results of Field Assessment activities or otherwise violating program requirements.

Contractors are evaluated and provided with performance feedback through the assessment report; the Joint Efficiency Providers will develop training and resources to recommend to Participating Contractors for continuous improvement.

F. Contractor Qualification in the Participating Contractor Network

The Joint Efficiency Providers will maintain and post a list of Participating Contractors who will be eligible to install ASHP technologies and/or GSHP technologies under the NYS Clean Heat Program ([NYS Clean Heat Contractors](#)). Participating Contractors may include ASHP installers, ASHP designers, GSHP installers, GSHP designers, and GSHP drillers. All

Participating Contractors are eligible to apply for and receive incentives through this program except for GSHP drillers.

All contractors participating the NYS Clean Heat Program must meet qualifications and training requirements as identified in the Program Manual.

Contractors installing only heat pump water heaters can, but are not required to, apply for the Participating Contractor network.

In all other instances, contractors must be qualified as a NYS Clean Heat Participating Contractor before they are eligible to apply for and receive incentives through the program. To qualify, contractors must apply for participation by filling out a Participating Contractor Application, indicating each utility territory the contractor plans to operate in and submitting all required documents and credentials as specified in the Program Manual. Contractors should submit their application package to a single Electric Utility for review, via the contact information and instructions provided in the application. The responsible Utility will subsequently notify the other utilities in whose service territory the contractor plans to operate of their eligibility. The Joint Efficiency Providers will work to further streamline this process after program launch.

All Participating Contractors additionally must execute participation agreements with each Electric Utility in whose service territory the contractor plans to operate, to address unique legal terms and conditions. The Joint Efficiency Providers will work to further streamline this requirement after program launch.

G. Savings and Verification

As described below, the Electric Utilities will rely on *The New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs - Residential, Multi-Family, and*

Commercial/Industrial, known as the Technical Resource Manual (“TRM”) and best practices to estimate savings and verify installations of heat pumps installed through their programs.¹⁰

2.G.1 **Savings Estimation**

Savings for heat pump installations are determined using the current filed version of the TRM, that describes the prescriptive approach and algorithms for estimating energy savings for calculating energy savings for technologies that are eligible for NYS Clean Heat incentives, for either residential or small commercial applications. These prescriptive methodologies rely on site-specific inputs for building load and/or employ building type lookups that will be determined through data collected during the application process to allow for savings calculations consistent with the proposed revisions to the TRM.

For multiple-unit configurations not covered by the TRM, or for larger or custom systems, the Electric Utilities will perform custom analyses to determine savings, consistent with the approaches outlined for custom measures in the TRM.

Utility tracking systems will continue to be configured to capture and collect application information for heat pump programs to facilitate savings calculations and, subsequently, evaluations.

2.G.2 **Statewide Evaluation, Measurement and Verification**

The Joint Efficiency Providers are supporting a statewide Evaluation, Measurement and Verification (“EM&V”) study for installed heat pump systems which Staff will lead.

The Electric Utilities filed an applicable Verified Gross Savings (“VGS”) Specification as Appendix 2 to the 2020 CHIP. That filing is in accordance with CE-08 Gross Savings Verification Guidance provided by NY DPS Staff.¹¹

¹⁰ The New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs - Residential, Multi-Family, and Commercial/Industrial, known as the Technical Resource Manual (TRM), Version 7 effective January 1, 2020.

¹¹ See, Clean Energy CE-08 *Gross Savings Verification Guidance* document issued August 23, 2019. Web link <http://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/255EA3546DF802B585257E38005460F9?OpenDocument>

NYSERDA additionally will conduct statewide market assessments of the heat pump industry to guide and inform programs and state policies, working in coordination with the Electric Utilities and Staff to develop the appropriate methods and frequency of this work.

3. Market Development

NYS Clean Heat further aims to build market capacity to help achieve the State’s heat pump targets through 2025, to increase the pool of skilled labor to grow the heat pump industry, to reduce the cost of heat pump installations, and to transform the way that New Yorkers heat and cool buildings (including both space heating and cooling and water heating) through market adoption of energy-efficient cold climate heat pump technologies.

The market development investments focus on critical needs and barriers challenging widespread adoption of building electrification. These include the need to:

- Train and develop the needed clean heating and building electrification workforce.
- Build consumer demand and market confidence and reduce customer acquisition costs.
- Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations.
- Make electrification solutions available for LMI consumers.
- Make products available when and where consumers need them by building the clean heat supply chain.
- Minimize winter electrical peak by investing in demand reducing “heat-pump ready” solutions.

In addition, NYSERDA is developing a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings, as New York moves toward a low-carbon economy.

Appendix 1 provides an overview of the NYS Clean Heat Market Development Plan, an approximately \$230 million investment that is being administered by NYSERDA, in coordination with the Electric Utilities and their affiliate gas companies. Investments in workforce development and consumer education and engagement are central to NYS Clean Heat and are highlighted below.

A. Workforce Development and Training

The Joint Efficiency Providers partner with businesses, training institutions, and communities to address critical workforce development needs for heat pump installers, drillers,

technical sales staff, architects and engineers, building operators, and new market entrants. NYSERDA's *Workforce Development and Training Investment Plan*, dated March 2020, describes its expanded investment of approximately \$38 million through 2025 to train and develop the clean heating and building electrification workforce.¹² This includes NYSERDA support for targeted training and curriculum development to address workforce needs related to the NYS Clean Heat incentive program, including to enable augmented contractor training requirements and for needs identified through the Field Assessment process and customer and contractor feedback.

NYSERDA supports the development of manufacturer and distributor training for heat pump installers, such as augmented installation training for ASHPs that includes a cold climate sizing and design focus. Focal areas for training also include applying Manual J/S or Code-approved equivalent procedures to perform residential load calculations, design of complex systems in large buildings, integrated controls, and technical sales. NYSERDA provides cost-shared assistance for participating heat pump contractors to pursue training and certification. Additional activities will continue to include: (1) funding for on-the-job training for new hires, with enhanced wage support for businesses that install heat pumps as well as for businesses that employ disadvantaged workers; (2) job fairs in labor-constrained markets; (3) support for HVAC career pathway initiatives; (4) partnerships to advance the skills of building operations and maintenance workers; and (5) targeted community-based training, including in disadvantaged communities.

Heat pump contractors, distributors, manufacturers and trade organizations participating in the statewide heat pump program and other training providers supporting building electrification in NYS can take advantage of multiple Workforce Development Opportunities currently provided by NYSERDA. Workforce development investments will continue to focus on enabling current and future workers to develop the skills and hands on experience needed to deliver clean heating and building electrification solutions, and will place emphasis on activities that target veterans, low-income workers, and other disadvantaged workers.

¹² All referenced NYSERDA Clean Energy Fund ("CEF") Investment Plan Chapters, are publicly filed in NYS PSC Case 14-M-0094 and posted at www.nyserdera.ny.gov/cef.

B. Consumer Education and Engagement

The Joint Efficiency Providers collaborate to deliver a statewide consumer awareness, education, and marketing effort to encourage heat pump adoption. This complements utility efforts to reach their customers directly with targeted offers.

Consumer education and marketing focuses on maximizing the benefits of heating with heat pumps, communicating the economic benefits, the comfort benefits, and the environmental benefits of heat pumps when they are used effectively for heating. This effort includes:

- Promotion of full-load solutions that allow the customer to retire old fossil fuel systems, and tips on how to dispose of them properly, including access to contractor services and programs that facilitate removal.
- Educational materials providing tips on how to effectively control heat pumps, in order to maximize energy performance without compromising comfort.
- Materials promoting the installation of heat pump water heaters, especially when old fossil heating systems are being replaced by heat pumps, in order to prevent the orphaning of fossil fuel water heaters on existing chimneys, which could lead to unsafe conditions.
- Materials promoting weatherization to make homes and buildings “heat pump ready” and maximizing the comfort, energy and environmental benefits of the improvements. This includes publicizing NYSERDA’s Comfort Home Pilot, as appropriate.

NYSERDA’s *Clean Heating and Cooling Investment Plan* describes its approximately \$19 million investment through 2025 across both consumer education and marketing campaigns (coordinated and co-branded with the Electric Utilities) and enhanced Co-op Advertising with industry partners, which will be aligned with an additional \$10 million investment in Community Campaigns. These efforts are central components of a broader strategy to build consumer demand and market confidence around clean heating and cooling solutions and to reduce customer acquisition costs for installers, which is funded through NYSERDA’s Clean Energy Fund CEF and summarized in Appendix 1.

NYSERDA and utility co-branded marketing activities will continue to provide customers with a trusted source of information before and during their decision to purchase an energy efficient, cold climate heat pump. Co-branded marketing will continue to focus on consumers who have a higher propensity to adopt clean heating and cooling technologies, in particular, reaching customers based on characteristics of their home and heating fuel and reaching customers who are actively searching to replace their HVAC equipment. Additionally, broad reach media will continue to be deployed in higher opportunity geographies. While utility-specific heat pump program information is available on each of the Electric Utilities' websites, NYSERDA has established a central online landing environment to help drive customers to qualified contractors by segmenting the customer offers based by utility company and geography. Coordination between the Joint Efficiency Providers and industry partners will continue to deliver aligned messaging across the State.

Additional information regarding utility specific customer education and outreach is presented in the utility-specific chapters.

4. Joint Management Committee

This section provides a description of the Joint Management Committee. The Joint Efficiency Providers created and filed the NYS Clean Heat Statewide Heat Pump Program Joint Management Committee Plan on June 15, 2020, a companion document that provides additional details on topics including, but not limited to: how the Joint Management Committee operates; the membership and chairs of the committee; committee process and procedures; and contact information for interested parties.¹³

A. Overall Structure, Governance, and Flexibility

4.A.1 Purpose

¹³ The Joint Management Committee meets at least monthly and reviews program performance and significant program changes at least annually. *NE: NY Proceeding*, NYS Clean Heat: Statewide Heat Pump Program Joint Management Committee Plan, (filed on June 15, 2020).

The Joint Management Committee provides the Joint Efficiency Providers and Staff the ability to closely coordinate and improve heat pump efforts across the State.¹⁴ This Committee is responsible for reviewing and maintaining the NYS Clean Heat program.

4.A.2 **Participants**

The Joint Management Committee consists of the Electric Utilities and NYSERDA. Staff provides an oversight and consultative role on the Joint Management Committee. Consistent with the Implementation Order, Joint Management Committee activities also includes consultation with gas utilities in gas supply-constrained areas as well as engagement with the Long Island Power Authority for shared learning and to align heat pump related activities.

4.A.3 **Functions**

The Joint Management Committee works in a collaborative manner to develop and maintain a common statewide program design and focus on technical and operational aspects of program administration. It manages the process for qualifying contractors in different territories as well as reviewing contractor performance to ensure high quality installations.

The Joint Management Committee supports a process for making ongoing changes to the program including incentive structure, eligible technologies, program rules and other program features in order to be responsive to technology and market developments and maintain market confidence and stability. As part of this process, the Joint Management Committee periodically obtains feedback from market participants and other stakeholders regarding program progress.

If program or process changes are warranted the Joint Management Committee undertakes the following process: (1) gather market data; (2) provide notice to market participants, other stakeholders, and Staff; and (3) consult with market participants, other interested stakeholders, and Staff. Notice is provided in advance of substantive changes. Substantive changes will be reflected in a revised Implementation Plan, which will be jointly filed by the Joint Efficiency Providers for approval by Staff, or in a revised Program Manual.

¹⁴ Implementation Order, pp. 83-84.

The Joint Management Committee also provides periodic opportunities for market participants and other stakeholders to offer input and suggestions for improvement to the NYS Clean Heat incentive program and market development initiatives. In particular, the Joint Management Committee will continue to seek input from participants in the Performance Management and Improvement Process that has been convened by Staff. Following meetings or forums convened to solicit input from stakeholders, whether in advance of a specific program change or for broader input into the NYS Clean Heat initiatives, the Joint Management Committee will provide a summary report to be published on the NYS Clean Heat – Resources website.

A foundational function of Joint Management Committee is to support and maintain feedback loops between the utility-led and NYSERDA-led components of the NYS Clean Heat Program. As is reflected in all elements of this Implementation Plan, the Joint Efficiency Providers, together and with other stakeholders, will continue to identify and execute optimal approaches to achieve the NYS Clean Heat goals in transitioning New Yorkers to energy-efficient electrified space and water heating technologies.

5. Utility-Specific Elements and Activities

A. Central Hudson Chapter

This chapter of the Implementation Plan will explicitly discuss Central Hudson’s plans to meet the ordered MMBtu goal, and includes information on budgets and targets, incentive amounts, predecessor program, transition details, Earnings Adjustment Mechanisms (“EAMs”), and coordination with the other gas utilities.

5.A.1 Budgets and Targets

Central Hudson was authorized a budget of \$43.2M to achieve 255,292 Gross MMBtu of savings beginning April 1, 2020 through December 31, 2025. The below table outlines the annual funding and savings targets identified in the Implementation Order:

Table 3: Central Hudson 2020-2025 Heat Pump Budgets and Targets¹⁵

Central Hudson	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	\$3,354,852	\$5,559,173	\$7,049,949	\$8,265,836	\$9,186,504	\$9,804,997	\$43,221,311
Base Target (MMBtu)	17,728	30,183	38,850	48,190	56,479	63,863	255,293

5.A.2 Marketing and Outreach

Central Hudson’s marketing and outreach efforts include targeted direct mail, email campaigns, program information sheets, in-store point of purchase signage, newsletter inserts, printed, digital and radio advertisements, bill inserts and participation in public events.

Messaging will continue to focus on environmentally beneficial electrification and educating consumers on the benefits of converting from fossil fuel heating systems to cleaner and more efficient energy alternatives. Educational content will continue to be developed and shared with partnering local contractors, who will be encouraged to distribute the information to their customers. Employees who have knowledge of the NYS Clean Heat Program and incentives will represent the company at conferences, county fairs, expos, trade shows and other

¹⁵ MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

events. Central Hudson will continue to work with and develop relationships with HPWH manufacturers and distributors to expand the promotion of ductless systems, concentrate on carbon reduction benefits and cobrand with participating retailers and manufactures.

Central Hudson will explore future opportunities to collaborate with NYSERDA. This can include outreach and education for low- to moderate-income customers and contractor education on NYSERDA energy audits and heat pump-ready homes and other buildings. In addition, Central Hudson continues to work closely with neighboring utilities in areas where customer territories overlap, to ensure consistent messaging and efficient marketing efforts take place.

In some cases, Central Hudson will promote heat pump technologies to targeted areas where updating or extending natural gas is not cost effective.

5.A.3 **Earning Adjustment Mechanisms**

Included in Central Hudson's current Rate Plan,¹⁶ Central Hudson has an EAM active for program years 2018-2021 applicable to heat pump installations. Within the Environmentally Beneficial Electrification EAM, each ASHP and GSHP installation is multiplied by the agreed avoided lifetime short tons of carbon dioxide (Appendix W of current Rate Plan), to calculate the associated carbon reduction. The Environmentally Beneficial Electrification EAM also includes carbon reductions from Electric Vehicles (EVs). In program years 2020 and 2021, the Company is counting the MMBtu savings from all eligible equipment under the NYS Clean Heat Program towards the NYS Clean Heat Program targets and will also count the carbon savings for each eligible heat pump installation from any eligible customer type [excluding Heat Pump Water Heaters (HPWH)] installed towards the Beneficial Electrification EAM using the existing EAM calculation.

Further plans on EAMs shall be expanded upon in future rate case proceedings.

¹⁶ Case 17-E-0459, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan. (Issued and Effective June 14, 2018)

5.A.4 **Coordination with Gas Constrained Areas and/or Non-Pipeline Alternatives**

In some cases, heat pump technologies would be leveraged to address gas distribution or transmission system needs. Through a separate funding stream, Central Hudson currently has a framework to implement Non-Pipes Alternative (“NPA”) program¹⁷ to defer or eliminate the need for pipeline infrastructure projects. The Company is currently implementing its first NPA designed to eliminate the need for certain leak prone pipe (“LPP”) replacements planned throughout their service territory. This type of NPA project, referred to as “Transportation Mode Alternative,” requires the conversion of existing natural gas customers to high efficiency heat pumps and electric water heating, so that natural gas is no longer needed. Future constraints and NPA’s may be addressed with heat pump solutions and will be developed on a case-by-case basis. Where applicable, customers within these project areas may receive additional “kicker” incentives for these technology types to promote program participation.

¹⁷ See, Order: <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={9E4F3908-1FBC-4F49-AB00-FDFE18D5586F}>
Attachments: <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={13CED81C-066E-48ED-A795-9D7300C4587F}>

B. Con Edison and Orange & Rockland Chapter

This section describes Consolidated Edison Company of New York, Inc. (“Con Edison”) and Orange and Rockland Utilities, Inc. (“O&R”) (jointly, “CECONY/O&R”)¹⁸ expanded heat pump program offerings under the statewide heat pump framework. These programs are designed to serve CECONY/O&R’s diverse customer base and reflect the unique needs of its respective service territories while supporting attainment of the NYS Clean Heat Statewide Heat Pump target. The following describes CECONY/O&R’s respective program characteristics, including program delivery mechanisms, incentive levels, and NYSERDA program transition plans; this section will also detail the coordination efforts necessary to respond to gas supply constrained areas.

5.B.1 Budget and Targets

Table 4: Con Edison and O&R 2020-2025 Heat Pump Budgets and Targets¹⁹

		2020	2021	2022	2023	2024	2025	Total
Con Edison	Base Budget	\$18,037,338	\$29,128,534	\$35,884,450	\$42,823,631	\$48,526,394	\$52,915,488	\$227,315,835
	Base Target (MMBtu)	72,921	119,716	151,334	186,941	219,927	249,162	1,000,000
O&R	Base Budget	\$1,236,326	\$1,973,311	\$2,397,539	\$2,828,131	\$3,164,633	\$3,403,947	\$15,003,887
	Base Target (MMBtu)	6,440	10,421	13,027	16,109	18,912	21,748	86,657

With respect to the Implementation Order budgets and targets, Con Edison will also dedicate a minimum of \$56.8 million towards heat pump installs in the Brooklyn Union Gas Company d/b/a National Grid (“KEDNY”) service area.

5.B.1.1 Midstream distributor component

In addition to the program structure components discussed in the Incentive Structure section, Con Edison and O&R will continue to assess the viability of a midstream distributor cold climate

¹⁸ O&R and Con Edison are utilizing the same implementation contractor and will share similar program designs. Any differences will be identified in this chapter.

¹⁹ MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

ASHP incentive. Any modifications to the approach shall be included in future versions of the Program Manual. The goal of this incentive would be to promote the availability of qualified products that meet program efficiency and performance standards of the program. As CECONY/O&R refines its approach to midstream distribution, it will share its market insight and experience with the other Joint Efficiency Providers.

5.B.2 Marketing and Outreach

CECONY/O&R's marketing and outreach strategy will include a variety of printed and digital channels based on customer segment, contractor awareness and technology type. All program requirements, incentives and participation guidelines will be included on the program heat pump webpages. The program team will develop printed educational materials which may include fact sheets highlighting technology benefits and point of purchase ("POP") materials advertising rebates in big box retailers. CECONY/O&R will also consider creating materials for direct mail campaigns (letters, post cards) to customers with a high propensity for heat pump adoption who have not recently participated in a previous heat pump program.

CECONY/O&R will continue to participate in regional community outreach events including home shows and conferences to promote heat pump incentives. O&R has also developed and published a Heating Comparison Calculator²⁰ to the program website comparing the costs of fossil fuels technologies to electric heat pump alternatives; CECONY is reviewing the tool for future consideration and applicability throughout New York State.

CECONY/O&R will also engage the market through email, digital and social media campaigns. Emails will be sent to eligible customers to promote incentive amounts and educate customers on eligible heat pump technology. Contractors and distributors will also receive relevant program information via email in addition to direct mail options, website, webinars and in-person contractor events. Digital and social channels may include banner ads and social media ads/video clips on Instagram and Facebook platforms as well as paid search terms. Marketing efforts will pursue opportunities to cobrand and collaborate with NYSERDA and other relevant stakeholders including National Grid for customers in shared territories areas.

²⁰ www.oru.com/en/save-money/estimate-your-energy-usage

5.B.3 Earnings Adjustment Mechanisms

For Con Edison, between 2020 and 2022, its 2019 Rate Plan²¹ included three earnings adjustment mechanisms that focus on savings associated with heat pump use. These EAMs include Share the Savings (“STS”), Deeper Energy Efficiency Lifetime Savings (“DEEL”), and Beneficial Electrification (“BEEL”) EAMs. The STS EAM is designed to reduce unit costs for the Company’s combined electric and gas energy efficiency portfolio, which includes heat pumps. The DEEL EAM is designed to drive achievement of energy efficiency savings from “deep” measures, which includes heat pumps and heat pump related envelope measures. The BEEL EAM is designed to encourage company-wide efforts that will result in adoption of beneficial electrification technologies, including heat pumps, which lead to a decrease in lifetime CO2 emissions.

For O&R, during 2020 and 2021, its 2018 Rate Case²² included one EAM, Environmentally Beneficial Electrification (“EBE”). The EBE EAM is designed to encourage O&R company-wide efforts that will result in increased adoption of beneficial electrification technologies, including heat pumps and electric vehicles, which lead to a decrease in lifetime CO2 emissions. O&R’s heat pump bonus rebates, which support this EAM, are now being offered through the NYS Clean Heat Program. These rebates are in addition to the amounts calculated for various incentives, as described in the Program Manual.

For O&R, customers can also qualify for a \$52 rate impact credit (“RIC”) by installing equipment that meets the NYS Clean Heat Program requirements

In future rate cases, CECONY/O&R will provide initial testimony and work with Staff and other stakeholders on the development of future appropriate EAM structures to encourage the adoption of heat pumps.

5.B.4 **Coordination with Gas Utilities in Gas Supply Constrained Area**

²¹ Case 19-E-0065, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan, issued January 16, 2020.

²² Case 18-E-0067, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Electric Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans, issued March 14, 2019.

As per the December 2018 New Efficiency: New York Order,²³ Con Edison is fuel agnostic with respect to a customer’s heating fuel source, which include fossil fuel customers such as propane and oil. Oil customers have higher baseline costs including oil deliveries and maintenance that would make them prime candidates for whole home electrification.

Con Edison is also committed to supporting customers affected by natural gas constraints, both in its own gas service territory and in areas where it provides only electric service. Any new or modified incentive offerings to support customers in gas-constrained areas shall be included in future versions of the Program Manual. The Company’s Smart Solutions and Non-Pipeline Solutions programs have already begun advancing the adoption of heat pumps in Westchester County and New York City. The Company’s heat pump programs described herein will be coordinated with and complement these programs, further expanding support for affected customers. As noted earlier, Con Edison is also committed to “a minimum of \$56.8 million towards the installation of heat pumps in the KEDNY service area.” Con Edison is committed to working with National Grid and will provide electric heat pump offerings to Con Edison electric customers that reside within National Grid’s New York City gas territories (Brooklyn, Queens, and Staten Island). Con Edison will work with National Grid to identify interested customers and record the uptake in heat pump adoption. To that end, Con Edison has been in discussions with National Grid to set up a customer referral process and is working to finalize the process which may include direct, collaborative marketing and outreach.

²³ Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Adopting Accelerated Energy Efficiency Targets (issued December 13, 2018).

C. National Grid Chapter

This chapter provides information specific to Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid” or the “Company”) regarding its implementation of the NYS Clean Heat Program as described above in the CHIP. Included herein are National Grid’s program budgets and targets, marketing and outreach, EAMs, and coordination in gas-supply constrained areas.

5.C.1 Budgets & Targets

Table 5: National Grid (Niagara Mohawk) 2020-2025 Heat Pump Budgets and Targets²⁴

National Grid	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	\$6,983,416	\$11,891,672	\$14,789,044	\$16,424,789	\$17,190,980	\$17,118,933	\$84,398,834
Base Target (MMBtu)	71,239	132,010	172,203	210,694	245,889	280,647	1,112,681

5.C.2 Coordination with Utilities in Neighboring Territories

National Grid will continue to coordinate closely with NYSEG/RGE and Central Hudson in areas where the three companies share customers (*i.e.*, where one utility may be the gas service provider, and another, the electric service provider) to create consistency. National Grid, Central Hudson, and NYSEG/RG&E will have the same Participating Contractor Reward amounts (*i.e.*, the portion of the incentive contractors are able to retain). National Grid and NYSEG/RG&E will have the same incentives. As National Grid launches the online application portal for the NYS Clean Heat Program aligning with the other Electric Utilities, they will work together where possible to create efficiencies in program operation and delivery.

5.C.3 Marketing and Outreach

National Grid will work with the Electric Utilities and NYSERDA on awareness, education, and marketing as described above in the Consumer Education and Engagement Section.

²⁴ MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site.

National Grid expects to continue its marketing partnership with NYSERDA by sharing costs on a co-branded customer campaign which will provide greater visibility and support education goals cost-effectively. National Grid will also perform its own utility specific targeted marketing to its customers.

National Grid will target both customers and contractors to generate awareness, increase product education, and increase demand by broadly sharing rebate information to encourage participation in the NYS Clean Heat Program.

Various marketing awareness tactics will be explored, including email, paid search and other digital channels, partnerships, and cross-promotional opportunities with relevant customer programs, including Home Energy Reports, online assessments, and the Company's online marketplace.

The Company will leverage the NYS Clean Heat Program web pages to increase educational content and improve the web experience by offering customers relevant information on new technologies, as well as product and customer benefits.

Direct marketing efforts such as email and direct mail, will be key, particularly during shoulder seasons when customer attention to weather and savings is heightened.

5.C.4 Earnings Adjustment Mechanism

National Grid has an EAM active for program years 2021-2023 that applies to heat pump installations, which is known as the Building Electrification EAM, and is measured via a carbon metric. Heat pump technology is multiplied by an agreed upon carbon factor to determine the total heating electrification carbon reduction. The Building Electrification EAM is compared against the minimum, mid, and maximum targets to determine the Company's earnings. In program year 2021, the Company will count the MMBtu savings from all eligible equipment under the NYS Clean Heat Program toward that program's targets and will also count carbon savings toward the Building electrification EAM from each eligible heat pump unit installed for any eligible customer type, using the pre-agreed upon carbon factor from the Niagara Mohawk Rate Case.

5.C.5 Coordination in Gas-Supply Constrained Areas

In the Brooklyn Union Gas Company d/b/a National Grid (“KEDNY”) gas service territory, KEDNY will continue to support the New York State carbon reduction goals and Con Edison in their requirement to dedicate \$56.8 million toward the installation of heat pumps in the KEDNY gas service territory.²⁵ National Grid will continue to coordinate with Con Edison to deliver a lead referral process for customers that are interested in alternative methods to gas heating and water heating and/or installing electric heat pump technologies.

In the KeySpan Gas East Corporation d/b/a National Grid (“KEDLI”) gas service territory, KEDLI will continue to support New York State’s carbon reduction goals and coordinate with PSEG Long Island to deliver a lead referral process for customers that are interested in alternative methods to gas heating and water heating and/or installing electric heat pump technologies.

National Grid will coordinate with all other gas utilities in gas supply-constrained areas of its electric service territory to support the installation of electric heat pump technologies to help alleviate gas supply-constraints. The Company may also consider an enhanced incentive for heat pump installations in gas-supply constrained areas. Any new or modified incentive offerings to support customers in gas-constrained areas shall be included in future versions of the Program Manual.

²⁵ Implementation Order, pg. 57-58.

D. NYSEG and RG&E Chapter

This chapter provides information specific New York State Electric & Gas (“NYSEG”) and Rochester Gas & Electric (“RG&E”) (together and collectively, the “Companies,”) under the NYS Clean Heat Program, including program budgets and targets, transition details, and program outreach. The Joint Proposal approved on November 19, 2020 in the Companies’ latest rate cases includes annual funding for each rate year for their Heat Pump programs of \$6.137 million for NYSEG and \$786 thousand for RG&E, with an opportunity to defer any overspend associated with the programs. The remainder of this section refers to budgets and targets that were included in Commission orders that preceded the Companies’ rate case decision.

5.D.1 Budgets and Targets

Table 6: NYSEG 2020-2025 Heat Pump Budgets and Targets²⁶

	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	\$6,204,522	\$10,605,014	\$13,173,160	\$14,628,326	\$15,300,267	\$15,219,288	\$75,130,577
Base Target (MMBtu)	63,614	117,911	153,328	187,944	219,558	250,383	992,737

Table 2: RG&E 2020-2025 Heat Pump Budgets and Targets

	2020	2021	2022	2023	2024	2025	2020-2025 Total
Base Budget	\$747,986	\$1,278,915	\$1,611,466	\$1,799,548	\$1,900,472	\$1,909,389	\$9,247,775
Base Target (MMBtu)	7,541	14,206	18,304	22,468	26,422	30,282	119,223

5.D.2 Transition Plans

The Companies adopted the New York State Clean Heat framework April 1, 2020. The NYS Clean Heat program promotes energy-efficient electrified space and water heating technologies

²⁶ MMBtu savings targets are based on estimated first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the customer site

across all customer sectors. The Companies continue to work with the other NYS electric utilities in delivering consistent messaging to stakeholders, aligning statewide initiatives and enhancing heat pump adoption.

5.D.3 Marketing and Outreach

The marketing plan specifies strategies for expanding customer awareness of and interest in heat pump technologies for space conditioning and water heating. The marketing effort has several key features:

Focus on Maximizing the Benefits of Heating with Heat Pumps: As described in the body of this Plan and working in collaboration with NYSERDA and other utilities, the Companies' marketing efforts include a focus on the environmental benefits of heat pumps, in addition to the economic benefits, when they are used effectively for heating. This effort will include, but not be limited to:

Market channel focus: The fact that heat pump technology is broadly applicable across the major market sectors (residential, multifamily, small commercial and large commercial and industrial) presents special challenges for building customer awareness. It is important to clearly educate customers about the specific heat pump technologies that are appropriate for the buildings in which they live or work. Marketing materials therefore need to help customers navigate the options that are available to them. For instance, residential customers who live in homes with centrally ducted furnaces and air conditioners are best matched with central cold climate ASHPs or GSHPs, while customers in home that don't have ductwork should understand that MSHPs are probably the best option for them. This type of education extends across commercial sector building types, as well. Marketing tactics and materials will help break these options down and, importantly, direct customers to get in touch with a participating contractor to learn more.

Leverage NYSERDA and Other JU Marketing Resources: The Companies and their implementation contractor continue to leverage the marketing resources of NYSERDA and the other utilities to harmonize customer outreach and education messaging and leverage resources in the development of website content, program collateral, and marketing tactics. This approach

more cost-effectively utilizes Company budgets and increases the effectiveness of marketing campaigns conducted both by the Companies and by neighboring utilities. In addition, the Companies collaborate with NYSERDA and Participating Contractors to access NYSERDA cooperative advertising support, subject to adherence to mutually developed advertising branding and messaging guidelines and requirements.

Focus on Contractor Education: Because program success relies on a well-educated and motivated contractor network, the Companies in coordination with the Joint Efficiency Providers, continue to emphasize effective contractor training and education. This includes materials to help contractors effectively sell full-load heat pump systems, as well as strong communications to make contractors aware of training being provided by NYSERDA, manufacturers, distributors, or third-party training providers.

5.D.4 Earnings Adjustment Mechanism (EAM)

The Companies have two EAM's for program years 2020-2023 that apply to heat pump installations, which are known as Heat Pump Share the Savings (HPSTS) and Beneficial Electrification (BE). The HPSTS EAM is designed to reduce unit costs for each Company's heat pump portfolio by reducing the unit cost of lifetime energy savings (on a dollar per lifetime million British thermal units ("MMBtu") while increasing the overall achievement level of energy savings. The BE EAM is designed to measure expected carbon savings over the life of two beneficially electrifying technologies: heat pumps and light-duty electric vehicles ("EVs"). In program years 2020-2021 the Companies will count the MMBtu savings from all eligible equipment under the NYS Clean Heat Program toward the program's targets and Heat Pump Share of the Savings EAM and will also count carbon savings toward Beneficial Electrification EAM from each eligible equipment type using the -agreed upon carbon factor from the Companies' approved rate case.

5.D.5 Coordination in Gas-Supply Constrained Areas

The Companies will coordinate market channel and stakeholder outreach in gas supply-constrained areas of their respective electric service territories to support the installation of electric heat pump technologies to help alleviate gas supply-constraints. The Companies may also consider an enhanced incentive for heat pump installations in these gas-supply constrained

areas. Any new or modified incentive offerings to support customers in gas-constrained areas shall be included in future versions of the Program Manual.

Dated: July 1, 2021

Respectfully submitted,

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Appendix 1: NYS Clean Heat Market Development Plan

Overview of NYSERDA’s Marketing-Enabling Initiatives for Building Electrification

To achieve the statewide heat pump goals and build the market infrastructure for a low-carbon future, the NYS Clean Heat incentive program will be implemented in coordination with a portfolio of market development initiatives. NYSERDA will invest approximately \$230 million in market enabling initiatives funded through Clean Energy Fund (CEF). This appendix provides an overview of the NY Clean Heat Market Development Plan. Additional information can be found in the referenced CEF Investment Plan Chapters, which NYSERDA publicly files in NYS PSC Matter Number 16-00681 and posts at www.nyserda.ny.gov/cef.

Across its component initiatives, the NYS Clean Heat Market Development Plan aims to build market capacity to deliver building electrification solutions – including cold climate air-source heat pumps (cold climate ASHP), water- and ground-source heat pumps (GSHP), and heat pump water heaters – in order to meet the following central goals by 2025:

- Help achieve the state’s energy savings targets from the installation of heat pumps.
- 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.
- Reduce the cost of heat pump installations by at least 25%.
- 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.

The Market Development Plan is designed to address critical barriers and market needs, as outlined in Table 1. Specific initiatives and target outcomes are described below.

Table 1. NYS Clean Heat Market Development Plan

Critical Market Need	Budget (Millions)	Initiative	Initiative Budget (Millions)
Train and develop the needed clean heating and building electrification workforce	\$38.2	Workforce Development	\$38.2
Build consumer demand and market confidence and reduce customer acquisition costs	\$60.9	Marketing	\$19.2
		Community Campaigns	\$10.0
		Critical Tools	\$4.0
		Technical Assistance & Audits	\$27.7
Drive performance improvements, reduce cost, and deliver new economic solutions through technology innovation and demonstrations	\$60.0	Clean Thermal District Systems	\$15.0
		HVAC Technology Challenges	\$15.0
		* Empire Building Challenge	\$15.0
		* Multifamily Building Demonstrations	\$5.0
		Exploratory Cost Reduction Strategies	\$10.0
Make electrification solutions available for LMI consumers	\$31.0	LMI	\$31.0
Make products available when and where consumers need them by building the clean heat supply chain	\$12.0	Clean Heat Supply Chain	\$12.0
Minimize winter electrical peak by investing in demand reducing “heat-pump ready” solutions	\$26.5	Comfort Home	\$26.5
Develop a long-term building electrification roadmap to guide the transformation of how New Yorkers heat and cool their buildings	\$1.0	Building Electrification Roadmap	\$1.0
Total			\$229.6

* Funding estimated for building electrification; initiative will include other low-carbon solutions.

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

Objective: Train and develop the skilled labor needed to grow the nascent heat pump industry alongside market demand, providing jobs and career pathways for New Yorkers and upskilling existing workers

Investment: \$38.2 million

Overview: NYSERDA's workforce development and training strategy targets high growth or high need sectors and works in partnership with clean energy employers, in order to deliver the skills needed by employers and to support job placement. Consistent with this strategic approach, NYSERDA will increase its workforce training investments to advance the state's building electrification and energy efficiency goals, specifically through its **Talent Pipeline** and **Building Operations and Maintenance (O&M) Industry Partnership** workforce initiatives.

Approximately \$38 million of NYSERDA's total workforce budget will target the clean heat and building electrification workforce, addressing critical workforce development needs for heat pump installers, drillers, technical sales staff, architects and engineers, building operators, and new market entrants. This investment will focus on developing the necessary skills and hands-on experience to enable current and future workers to deliver building electrification solutions to meet New York's growing needs for a low-carbon building stock.

Key activities will:

- Prioritize support for populations including veterans, low-income individuals, formerly incarcerated individuals, and former power plant workers and other displaced workers – to support disadvantaged workers and a just transition to a clean energy economy.
- In collaboration with utilities, provide targeted training to address workforce needs related to the NYS Clean Heat incentive program, including training needs identified through Field Assessments ~~quality assurance (QA) inspections~~, evaluations, and customer and contractor feedback.
- Enhance HVAC and heat pump curriculum, provide training equipment, train trainers, support degree, apprenticeships and certificate programs, and develop more hands-on and on-site training to meet the skills and job placement needs of clean energy employers. Focal areas for heat pump training include support for manufacturer-sponsored installation training for cold climate ASHPs that includes a cold climate sizing and design focus, applying Manual J procedures to perform residential load calculations, design of complex systems in large buildings, integrated controls, and technical sales.
- Provide community-based training and cooperative training with industry/manufacturers that meets regional needs for heat pump and other clean energy labor, delivering low-and no-cost training to critical links in the supply chain (e.g., installers and sales staff, architects, engineers, and municipal officials).
- Provide businesses with wage support for on-the-job training for new hires, including enhanced wage support for disadvantaged workers and for businesses that install heat pumps.
- Pursue partnerships with owners of buildings (or portfolios of buildings) that have large energy expenditures to advance the skills of their building operations and maintenance workers.

- Develop career pathways in HVAC and heat pumps for disadvantaged workers, training new workers through partnerships with educational and training institutions and the trades. Initiatives will include classroom- and hands-on training, internships, apprenticeships, and job placement, with requirements to work with low- and moderate-income individuals, women, people of color, veterans, disconnected youth, and individuals in Environmental Justice communities.

Target market impacts: Working in partnership with businesses, training institutions, utilities and communities, this investment will provide building electrification training support for 4,200 heat pump installers; 2,700 entry level jobs for priority populations; 5,500 architects, engineers, college students and other technicians; and 1,600 workers trained in heat pump system O&M practices – helping meet the labor needs associated with the state’s 2025 heat pump target and positioning vocational and training institutions to support the long-term transformation of the way New Yorkers heat and cool buildings.

For more information, see NYSERDA’s *CEF Workforce Development and Training Chapter*.

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

Objective: Build consumer demand for and market confidence in heat pumps, and reduce customer acquisition costs for installations, by providing consumer education, community engagement, and timely decision-quality information.

NYSERDA will undertake multiple complementary initiatives to meet this market-enablement need.

- 2.1. NYSERDA will support consumer awareness and lead generation via two marketing initiatives: **NYSERDA and Utility Co-branded Marketing** and **NYSERDA and Contractor Co-op Marketing**. The objective of these marketing efforts is to increase New Yorkers’ awareness of heat pumps as an option for heating and cooling homes and businesses, improve consumer perceptions, and increase demand and reduce customer acquisition costs for heat pump installations and energy efficiency projects.

Investment: \$19.2 million

Overview: NYSERDA and utility co-branded marketing activities will provide customers with a trusted source of information before and during their decision to purchase.

NYSERDA also will enhance its cooperative (“co-op”) advertising activities with clean heating and cooling industry partners to enable contractors participating in New York State’s heat pump programs to market to grow their business and build market demand.

Key activities will:

- Develop a central online landing environment for NYS Clean Heat that will serve as a resource for the customer, segment the customer’s offers based on their utility company and geography, and drive to qualified contractor listings.
- Co-brand heat pump outreach and awareness campaigns with the utilities, to leverage the name recognition of both the utilities and NYSERDA and drive market uptake.

- Support marketing campaigns that target customers who have a higher propensity to adopt clean heating and cooling technologies, including broad-based marketing to targeted geographies, hyper-targeting customers based on characteristics of their home and heating fuel, or reaching customers who are actively searching to replace their HVAC equipment.
- Continue co-op advertising, which offers clean heating and cooling industry partners marketing funds and materials; planned enhancements include templated ads, opt-in opportunities, and re-targeting.
- Coordinate with trade allies (including manufacturers, distributors, contractors) and community groups to maximize reach and frequency in advertising and deliver a consistent message regarding the benefits of cold climate heat pumps.
- Deliver in concert with community campaigns (described below) to maximize impact.
- Test and refine marketing approach, messages and effectiveness throughout.

2.2. NYSERDA will pursue **Community Campaigns** with the objective to provide support to communities and local groups to stimulate adoption of heat pump technologies along with building envelope solutions, while leveraging local labor and facilitating soft cost reduction.

Investment: \$10 million

Overview: Community-led campaigns help move customers from intent to purchase. Through Clean Heating and Cooling community campaigns, NYSERDA supports communities in implementing multi-year campaigns that help homes and businesses in the same area install heat pump technologies through locally organized community outreach. These campaigns are similar to the *Solarize* campaigns which have become common across the region. Campaigns can select an installer competitively and negotiate to reduce installation costs.

Key activities will:

- Continue, extend, and expand existing Clean Heating and Cooling community campaign activity.
- Expand NYSERDA’s comprehensive toolkit of materials and leverage complementary resources and technical assistance that NYSERDA’s Clean Energy Communities program offers to local governments.
- Explore additional aggregation strategies such as via buying groups, community organizing groups, affinity groups, homeowners’ associations, and developers.
- Target marketing in communities with campaigns and leverage data on enrollees to increase effectiveness.

2.3. NYSERDA will develop and publish **Critical Studies, Tools, and User Guides** for contractors and consumers, with the objective to address market concerns or barriers and to make it easier for consumers to adopt clean heat solutions.

Investment: \$4 million

Overview: NYSERDA will develop resources that range from market analysis to user guides.

Key activities will:

- Develop user-friendly resources to aid consumers in their decision-making and contractors in adopting good industry practices, including the identification of standardized heat pump packages for common buildings types in New York State, tools to support good practice heat pump design and selection, and a prioritization tool for energy efficiency investments.
- Provide assistance to the market and utilities in developing appropriate quality assurance and quality control protocols for heat pump deployment programs to improve customer satisfaction and build customer confidence in this nascent market.
- Conduct market research and analysis to address critical market challenges (e.g., refrigerant management); to assess potential impacts as markets shift and new challenges emerge; and to support the evolution of the statewide heat pump program framework.

2.4. NYSERDA will offer **Technical Assistance and Audits** with the objective to build customer confidence and provide consumers with decision-quality information to enable uptake of energy efficiency and heat pumps.

Investment: \$17 million for commercial and multifamily buildings and \$10.7 million for residential homes

Overview: NYSERDA will leverage technical services to provide guidance and direction to building owners to make investments in building electrification and clean heating and cooling technologies.

Key activities will:

- Support 1,000 large building electrification screening studies and 300 site-specific technical assessments for commercial and multifamily buildings, through the FlexTech Program.²⁷
- Expand large building screening program to natural gas constrained areas as needed.
- Invest in outreach/concierge resources to focus on large portfolio companies.
- Support 112,000 residential energy audits, through the Green Jobs – Green New York Residential Audit Program.²⁸

Target market impacts: Across the suite of initiatives focused on building consumer demand and market confidence, NYSERDA has defined impacts by major market segment.

For large commercial and multifamily buildings, NYSERDA will provide 1,300 building owners with reliable information and will complete building electrification feasibility studies with the 20 largest property owners in the state, ultimately driving heat pump installations in a target of 325 large buildings.

²⁷ NYSERDA’s Flexible Technical Assistance (FlexTech) Program shares the cost to produce an objective, site-specific, and targeted study on how best to implement clean energy and/or energy efficiency technologies. See: www.nyserderda.ny.gov/flextech.

²⁸ For one-to-four family homes, NYSERDA offers a no cost home energy audit conducted by participating residential auditors. See: www.nyserderda.ny.gov/All-Programs/Programs/Energy-Audit-Programs.

For the small (one-to-four unit) residential sector, NYSERDA’s marketing and engagement activities will generate one million leads and NYSERDA will complete 112,000 audits targeting electrification, helping to support 100,000 residential heat pump installations by 2025. On average, NYSERDA expects to invest \$400 per residential heat pump installation for marketing, community campaigns, and home audits, while leveraging \$13 million for marketing through industry co-op advertising. NYSERDA estimates that enabling streamlined field and administrative procedures and novel customer targeting and sales approaches will reduce the customer acquisition costs experienced by contractors by \$28 million through 2025. In time, engaging communities and raising consumer awareness will drive more clean energy actions and local clean energy policies.

For more information on these initiatives see the following CEF Chapters: *Clean Heating and Cooling*, *Multi-Sector Solutions (Technical Services)*, and *Residential*.

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

Objective: Invest in technology innovation and demonstrations to develop, demonstrate, and de-risk building electrification solutions that can deliver better performance, cost reduction, and new economic solutions for a wider range of building types.

NYSERDA will invest in several initiatives to develop next generation technologies and business models, with milestones and impacts defined for each initiative.

3.1. NYSERDA’s **Clean Thermal District Systems** initiative will test and demonstrate potentially scalable models for clean thermal district systems that leverage economy-of-scale or Energy-as-a-Service (EaaS) models at new and redevelopment sites (e.g., campuses, downtown corridors).

Investment: \$15 million

Overview: A clean thermal district heating and cooling system includes a network of underground water pipes delivering either thermal-source/sink services used by heat pumps installed in many buildings, or hot/chilled-water services used by heat exchangers installed in many buildings. NYSERDA will help develop and demonstrate clean thermal district systems and related business models that can drive cost reductions and make ground-source heat pumps accessible for more customers.

Key activities will:

- Provide technical assistance (for scoping) to fund initial scoping, pre-development and environmental impact studies. Scoping studies are expected to identify anchor customers, appropriate heat sources/sinks, and opportunities to dovetail with other major construction projects on the horizon. Studies may characterize issues regarding rights-of-way or create a request for proposals to recruit additional experts for the next steps of detailed design.

- Provide technical assistance (for design) to cost-share detailed design work that will develop cost estimates and a financial plan for the proposed system; develop draft agreements with customers, including the customer billing structure; and produce schematic drawings of major equipment and systems.
- Provide installation incentives (for construction) to competitively selected clean thermal district demonstration projects, providing “gap” funding to enable construction. Where applicable, NYSERDA will work with the Joint Utilities, LIPA, and NYPA that elect to offer future incentives or financing towards clean thermal district systems. NYSERDA will coordinate with the utilities on potential projects to both share insights as well as to optimize the allocation of ratepayer funding towards heat pump activities.
- Advance related outreach, tools, and training

Target market impacts: NYSERDA will support 20 scoping studies (2021), 8 detailed design studies (2022), and the launch of 2 demonstration projects (2023). This investment will demonstrate viable business models (e.g., thermal Energy as a Service unlocks accessibility/affordability for more customers) and identify and target systemic frictions in the development of clean thermal district systems.

- 3.2. NYSERDA’s **NextGen HVAC** initiative focuses on heating, cooling and ventilation (HVAC) in buildings, with the objective to develop, demonstrate, commercialize, and de-risk solutions that can deliver better performance and cost reductions.

Investment: \$15 million

Overview: Activities under NextGen HVAC will be coordinated with the other identified building electrification initiatives. This program will work with commercial/residential property owners to define technical needs and performance specifications, engage the industry and innovation community to deliver or tailor products to meet New York building needs, support cost-shared demonstrations of innovative solutions in New York, and leverage opportunities to grow the green economy in New York through industry and university partnerships, investor community engagements, and international partnerships.

Key activities will:

- Determine technology performance and cost needs for technologies including building electrification technologies, seeking market intelligence to understand thresholds that are likely to drive adoption.
- Invest in technology development through competitive “innovation challenges” focusing on opportunity areas including: increasing the output temperature for air-to-water cold climate heat pumps to facilitate reducing the cost of replacing hydronic heating systems, exploring distributed HVAC solutions to reduce distribution losses, advancing peak-reducing thermal storage solutions combined with advanced controls, and technology development for early detection of refrigerant losses and to support the adoption of low Global Warming Potential (GWP) refrigerants.
- Support technology demonstration/validation efforts to test innovations in real-world buildings.
- Provide tech to market support to technology developers to help drive the commercialization of new innovations, specifically to help early-stage companies

navigate the typical channels to market for buildings technologies (e.g., via introductions to key decision makers).

Target market impacts: This investment will support new commercially available heat pump systems that offer higher performance, lower cost, and needed solutions, such as for: cold climate or package terminal applications, cost-effective retrofits for existing hydronic heating systems, integration with thermal storage, and lower global warming potential refrigerants.

- 3.3. Through the **Empire Building Challenge** and **Multifamily Building Demonstrations**, NYSERDA will accelerate private sector investment in low carbon retrofits for large, commercial and multifamily buildings – with building electrification as a focal solution – and build market confidence in their value proposition.

Investment: \$20 million

Overview: There are limited examples of big, tall buildings in climates similar to New York that have conducted retrofits that deliver significant carbon reduction. NYSERDA will partner with owners of large commercial and multifamily buildings to support cost-shared demonstration of low carbon retrofit solutions in these buildings in New York.

Key activities will:

- Convene real estate portfolio owners to develop a shared definition of “carbon neutral” for big, tall buildings and to partner with NYSERDA toward achieving this goal.
- Compile and publish market data that provides OEMs better visibility on the needs and market potential for low carbon solutions for big, tall buildings.
- Support cost-shared demonstration projects of low carbon retrofit solutions in big, tall buildings, competitively selecting projects that show the building owner’s commitment and strong potential for replicability, carbon reduction, and cost effectiveness.
- Where applicable, NYSERDA will work with the Joint Utilities and LIPA that elect to offer heat pump incentives to big, tall commercial and multifamily buildings. NYSERDA will coordinate with the utilities on potential projects to both share insights as well as to optimize the allocation of ratepayer funding towards heat pump activities.
- Measure the impact of demonstration projects, assess outcomes, and determine how learnings could be applied.

Target market impacts: NYSERDA will establish partnerships with ten portfolio owners (representing over 100 million square feet of commercial and multifamily real estate) that make public commitments to achieve carbon neutral buildings by 2035 and will fund six retrofit projects that demonstrate replicable and scalable approaches to achieving low carbon buildings.

3.4. Exploratory Cost Reduction Strategies

Overview: NYSERDA will support additional cost reduction efforts to be scoped in the future, informed by learnings from the Building Electrification Roadmap and other investigative work.

Investment: \$10 million

For more information on these initiatives see the following CEF Chapters: *Clean Heating and Cooling, NextGen HVAC, and Market Challenges*.

4. MAKE ELECTRIFICATION SOLUTIONS AVAILABLE FOR LMI CONSUMERS

Objective: Support the development of electrification solutions for the LMI market segment by addressing institutional barriers to adoption while maintaining or improving energy affordability.

Investment: \$31 million

Overview: The LMI market segment consists of nearly half of the occupied housing units in New York State. Realizing the goal of a low-carbon future will require that solutions for electrifying these homes while addressing energy affordability, institutional barriers unique to affordable housing, and consumer protections be developed and scaled. Over the next two years, NYSERDA will invest in research and analysis, demonstrations, targeted incentives, and consumer education to inform the long-term LMI electrification strategy in New York State. As the broader set of electrification strategies contained in the NYS Clean Heat Market Development plan develops the market for building electrification strategies, this investment will inform program modifications, policy, and consumer protections necessary to better address the needs of the LMI consumers and building owners.

Key activities will:

- Develop best practices for utilizing heat pumps for space conditioning and water heating for common LMI building types. Related research and analysis will assess challenges associated with older housing stock such as structural deficiencies and insufficient electric service; examine market, policy, and institutional barriers in the areas of energy and affordable housing to mitigate cost shifts associated with electrification; identify use cases that provide the most benefits to LMI consumers; and identify necessary consumer protections.
- Through demonstrations and pilots, identify replicable models for heat pump deployment in affordable multifamily and single-family buildings. Possible examples include developing a model for delivering heat pumps while improving energy affordability, developing a retrofit prototype for manufactured housing, and pilot aggregation strategies. Replication will be supported through the development of playbooks that provide guidance on implementing successful models for electrification and targeting large portfolio owners and property managers with heat pump solutions.
- Engage market participants such as building owners, property managers, installers, and manufacturers to identify early-stage opportunities for such demonstrations and pilots.
- Provide short-term, targeted incentives to offset the cost of heat pump solutions for LMI consumers and building owners where there is a clear energy affordability benefit, such as in the displacement of deliverable fuels. The development and implementation of LMI

incentives will be done in collaboration with the utilities. Additional financial support for heat pump installations in the LMI market segment will be conditioned on minimum building performance thresholds.

- Educate LMI consumers who install heat pumps on how to operate and maintain the system, and coordinate consumer education across direct outreach and the communication channels of utilities, state agencies, local government, and community-based organizations.

Target market impacts Through this investment, NYSERDA will develop a foundation for heat pump deployment in the LMI market segment and inform longer-term utility investment. Targeted incentives and demonstrations will directly support heat pump installations in over 7,500 LMI housing units. To catalyze replication of successful demonstrations, NYSERDA will make specifications and playbooks available for heat pump installation that maximizes energy affordability for LMI consumers and in affordable housing; and NYSERDA will publish data on cost, performance, and energy affordability impacts to improve market confidence. NYSERDA also will help advance policy change in the energy and affordable housing realms to enable the adoption of heat pumps while addressing energy affordability.

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

Objective: Draw a larger pool of companies across the supply chain into business activities that make clean heating products and solutions available when and where consumers need them, support and accelerate heat pump adoption, and enable wide-scale deployment statewide.

Investment: \$12 million

Overview: NYSERDA's Clean Heat Supply Chain Development initiative will expand on ongoing work to engage additional companies across the supply chain in providing clean heating solutions.

Key activities will:

- Conduct regional roundtables with distributors, vendors, and OEMs to define and describe the value proposition to the market through “value maps” and “market maps.”
- Build and support the activities of a network of trade allies to support the technical transfer and dissemination of training, tools, and resources to a wide range of contractor markets.
- Provide business development support and technical resources to help companies transition to building electrification solutions, focusing first on larger HVAC companies (25+ employees).
- Support improvements to stocking practices and explore midstream interventions in coordination with utilities. NYSERDA will gather best practices from the utilities, such as Con Edison, that are currently offering midstream incentives and have established relationships with distributors.

Target market impacts: NYSERDA's investments will support 200 businesses across the supply chain by providing training, tools, technical support, and business development assistance;

secure partnerships with midstream and upstream market actors whose businesses represent at least 80% of heating equipment sales statewide; and increase mid-stream and upstream stocking of clean heating technologies by 50% above 2019 HARDI shipment data for New York State.

For more information, see the CEF *Clean Heating and Cooling Chapter*.

6. MINIMIZE WINTER ELECTRICAL PEAK BY INVESTING IN DEMAND REDUCING “HEAT-PUMP READY” SOLUTIONS

Objective: Build markets for “heat-pump ready” services that provide consumers with improvements in building envelopes (through air sealing, insulation, and windows) to accompany new heat pump solutions, to reduce thermal load and peak energy demands.

Investment: \$26.5 million

Overview: NYSERDA’s new **Comfort Home** initiative builds markets for “seal and insulate” services in conjunction with heat pump adoption, enabling consumers to save money on HVAC equipment, reduce monthly bills, and create a more comfortable living environment – while reducing peak electricity demands.

Key activities will:

- Develop and deliver simple packages (starting with air sealing/insulation/windows solutions, and potentially expanding as needed) that can reduce customer acquisition costs and deliver more value. Potential expansions could include standardized electrical panel upgrades and solutions for overcoming commonly occurring weatherization barriers.
- Support new business models (e.g., product-based sales of seal and insulate packages) and enable more contractors to offer this service (e.g., develop contractor resource network, provide customer targeting tools and referrals).
- Provide incentives for standardized packages of building envelope measures that improve home comfort and reduce thermal load in approximately 10,000 homes.
- Coordinate with utilities to provide additional “kicker” incentives to promote rapid adoption of heat pump technology following the installation of envelope improvements and to transition to offering combined envelope and heat pump incentives. NYSERDA will coordinate with utilities that are already offering or considering future weatherization program offers and seek to align these offers to avoid market confusion. NYSERDA will provide insights acquired from Comfort Home to support or augment any existing or future utility offering.

Target market impacts: NYSERDA’s investment in the Comfort Home program will serve 10,000 households, enroll 70 contractors to offer the heat-pump ready services statewide, reduce contractor average sales cycle times for the packaged measures by 50% relative to traditional home performance approaches, and increase heat pump sales close rates for participating HVAC contractors by 20%.

For more information, see the CEF *Residential Chapter*.

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

Objective: Develop a policy and program framework that can be advanced in New York State to enable energy efficient and cost-effective building electrification for consumers, consistent with the state's low-carbon future.

Investment: \$1 million

Overview: In January 2020, NYSERDA launched a Building Electrification Roadmap process as a companion to the ongoing development of a Carbon Neutral Buildings Roadmap for the State.

Key activities will:

- Support a comprehensive analysis of technology and market readiness for efficient electric heat pump solutions by building type.
- Develop a roadmap for advancement of the technical and business model solutions and the policy supports necessary to transform how New York consumers heat and cool buildings.
- Engage industry experts and stakeholders to ensure relevant, informed, and market- and customer-oriented work.
- Model scenarios for achievable market uptake, energy savings, and greenhouse gas emissions reductions from efficient electric heat pumps through 2030.
- Use analysis to guide policy and program interventions, including the refinement of NYS Clean Heat initiatives. Opportunities to refine the market development work include identifying and expanding high-potential building typologies to target for support; identifying building use cases that displace gas heating to target for support; informing investments in technology innovation and demonstrations; and developing additional cost-reduction strategies.

Target market impacts: Through the roadmap analysis and stakeholder engagement, NYSERDA will characterize for each major building typology in New York State a path to develop and scale building electrification solutions that are cost-effective and attractive to building decision makers. NYSERDA will identify public policies and investments that are needed to support the development of a robust 2030 market for these solutions with greater speed, efficiency, and certainty.

These NYS Clean Heat Market Development Plan initiatives will be complimented by the suite of energy efficiency initiatives currently offered by NYSERDA under the Clean Energy Fund including: LMI programs, New Construction programs (supporting net zero new construction), Retrofit NY (developing scalable models for renovating existing buildings to achieve deep carbon reductions), Clean Energy Communities (leveraging local engagement and helping localities achieve their energy goals), the Commercial & Industrial Carbon Challenge (helping business to achieve their carbon goals), Energy Management for commercial and multifamily buildings, and assistance for Schools and Universities – all driving at decarbonizing buildings, leveraging market partnerships, and delivering value

Appendix 2: Verified Gross Savings Specifications for NYS Clean Heat Statewide Heat Pump Program

Verified Gross Savings Specifications	
Date of Filing	NYS Clean Heat Statewide Heat Pump Program Implementation Plan March 16, 2020, Case 18-M-0084
Program Name	NYS Clean Heat Statewide Heat Pump Program
Program Description	The NYS Clean Heat Statewide Heat Pump Program is designed to incentivize residential, multifamily, small commercial, and Large Commercial and Industrial customers to invest in high-efficiency air and ground source heat pump systems that provide heating.
Gross Savings Methodology	Energy savings are calculated by using the formulas and factors/parameters found in the Technical Resource Manual (TRM). ²⁹ Internal Field Assessment protocols verify compliance with installation standards and will comply with any future decisions made regarding appropriate assessment procedures.
Realization Rate (RR)	No RR has been determined for this program within the preceding five-year time frame. The statewide study is expected to produce utility-specific realization rates by June 2022.
Planned VGS Approach	The Companies are committed to contribute and participate in the statewide EM&V study to be directed by Staff.
Exemption from EAM Status	Heat pump programs will exercise the option for exemption from the application of the realization rate determined through the verified gross savings process, for purpose of energy efficiency-related EAM savings claims, allowed under CE-08: Gross Savings Verification Guidance until completion of the 2022 statewide evaluation review. ³⁰

²⁹ <http://www3.dps.ny.gov/W/PSCWeb.nsf/All/72C23DECF52920A85257F1100671BDD>

³⁰ Case 18-M-0084, In the Matter of a Comprehensive Energy Efficiency Initiative, Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025, page 55 footnote 40.

Appendix 3: NYS Clean Heat Program - Glossary of Terms

This glossary provides definitions of key terms used in the NYS Clean Heat Implementation Plan and Program Manual.

Air-Conditioning, Heating, and Refrigeration Institute (AHRI): A trade association representing manufacturers of heating, ventilation, air-conditioning, refrigeration, and water heating equipment. AHRI provides the database of equipment performance specifications, which is used in this program to determine the rebate amount.

Air Source Heat Pump (ASHP): An HVAC system that provides space heating using electricity through vapor-compression refrigeration cycle. An ASHP extracts heat from outdoor air and transfers the extracted heat into the conditioned spaces via various means. ASHPs are also used to provide space cooling by reversing the cycle to extract heat from a building and transfer the heat to the outside air.

Btu/h: Unit of thermal power capacity that represents one British Thermal Unit (Btu) of energy transferred per hour.

Building Cooling Load (BCL): Building total sensible and latent heat gain in British Thermal Units per hour (Btu/h). For residential buildings, BCL shall be calculated using ACCA Manual J or another code-approved methodology. For commercial buildings, BHL shall be calculated following ANSI/ASHRAE/ACCA Standard 183-2007 (RA2017), or other code-approved equivalent computational procedure. Calculation of the building's design cooling load shall be at the 1% dry bulb cooling design temperature for the most relevant ACCA location.

Building Equivalent Full Load Hours (BEFLH): is for heating and cooling based on building type and location. It represents the equivalent full load operating hours for HVAC equipment based on 1% design temperature, TMY3 weather data, and the design heating load.

- Old, poorly insulated buildings constructed before 1979, before the NY State Energy Code went into effect. This vintage is referred to as the “old” vintage.
- Existing, average insulated buildings conforming to the 1980s era building codes. This vintage referred to as the “average” vintage, covering buildings constructed from 1979 to 2006.
- New construction conforming to the 2007 Energy Conservation Construction Code of New York State (ECCCNYS) for residential buildings. This vintage is referred to as the “new” vintage, and covers buildings constructed from 2007 to present.

Building Heating Load (BHL): Building heat loss in British Thermal Units per hour (Btu/h). For residential buildings, BHL shall be calculated using ACCA Manual J or another code-approved methodology. For commercial buildings, BHL shall be calculated following ANSI/ASHRAE/ACCA Standard 183-2007(RA2017), or other code-approved equivalent computational procedure. Calculation of the building's design heating load shall be at the 99% dry bulb heating design temperature for the most relevant ASHRAE 2017 location.

Central ASHP: An ASHP system that is typically sized to provide heating and cooling to the whole building through an air duct distribution system.

Coefficient of performance (COP): COP is the ratio of work or useful energy output of a system versus the work or energy input, measured in the same units. It is a measure of performance often used for electrically-powered heating and cooling equipment, with the higher the system COP corresponding to the more efficient operation.

Cold Climate ASHP: A heat pump product designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher).

Cold Climate ASHP defined as ccASHP: A heat pump product listed on the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Air Source Heat Pump (ccASHP) Specification and Product List (“NEEP Product List”), designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher). The current specification and listed eligible units are available at (<https://neep.org/ASHP-Specification>).

Commissioning Report: A report that shows the results of project start-up tests conducted to ensure the system is operating effectively.

Corrective Action: In the field assessment inspection process, action(s) that must be undertaken by a participant at the direction of NYSERDA or the Electric Utility to correct identified nonconformances (i.e., specific deviations or work that fails to meet the established quality standard).

Commercial Unitary (i.e., Large Commercial) ASHP: Large commercial heat pump systems that include individual heat pump appliances that are powered by three-phase electricity or have rated cooling capacities $\geq 65,000$ Btu/h for the individual appliance.

Custom Incentive Categories: Incentive Categories 4, 4A and 6.

Designer: Individual or company that designs heat pump system. Requirements to be an eligible designer in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

Desuperheater: An optional feature of a GSHP system that takes advantage of waste heat generated by the compressor and transfers the waste heat to a domestic hot water system.

Direct Exchange (DX) GSHP: Direct exchange GSHP systems circulate a refrigerant through a buried, closed-loop copper pipe.

Driller: Individual or entity that drills GSHP systems. Requirements to be an eligible driller in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

Energy Efficiency Ratio (EER): A measure of how efficiently a cooling system will operate when the outdoor temperature is 95 degrees Fahrenheit. It is calculated by dividing the rated cooling output at 95 degrees Fahrenheit by the watts used by the AC/HP system. A higher EER means the system is more efficient. It is an instantaneous measure of electrical efficiency, unlike SEER (Seasonal Energy Efficiency Rating), which is an averaged value of efficiency. This is a term applied to air conditioning equipment.

Full Load Heating System: A system installed that satisfies at least 90% of total system heating load at design conditions. For locations where the total system cooling load is greater than the heating load, the heat pump system cooling capacity shall be as small as possible to satisfy the cooling load, while minimizing oversizing for the heating function to the extent possible.

Ground Source Heat Pump (GSHP) system: An HVAC system comprising one or more heat pumps, ground loops, interior distribution systems and terminal units that enables the air and/or water in buildings to be conditioned by exchanging thermal energy with the ground, ground water, or other natural body of water.

Heat Pump System: One or more heat pump appliances installed in a building to provide partial or full load heating and cooling to the building's conditioned space. The heat pump appliances and associated components may be centrally or separately controlled. In a multifamily building in which a central heating plant serves more than one apartment, the heat pump system must be designed and installed to provide heating to all of the individual apartments and common areas otherwise served by the central heating plant.

Heat Pump System Heating Capacity: For buildings whose BHL exceeds BCL, the heat pump system heating capacity shall be as small as possible to satisfy BHL, while minimizing oversizing for the cooling function to the extent possible with available equipment.

Heat Pump System Cooling Capacity: The sum of the cooling output of all heat pump appliances in the system, expressed in British Thermal Units per hour (Btu/h), at the cooling design temperature used for the building cooling load (BCL) calculation. For buildings whose BCL exceeds BHL, the heat pump system cooling capacity shall be as small as possible to satisfy BCL, while minimizing oversizing for the heating function to the extent possible with available equipment.

Heat Pump Water Heater (HPWH): HPWHs are water heater tanks that heat domestic hot water or process hot water through the use of an onboard air source heat pump that extracts heat from the air in the building surrounding the unit. They use a secondary electric resistance as a back-up to ensure that the water temperature meets the desired setpoint during times of high demand. Air source HPWH models come in two versions (integrated and split-system HPWH) and both versions are eligible for incentives under the program.

Incentive Category: Grouping in the NYS Clean Heat Program reflecting applicable technology type, system size, customer type, and incentive structure.

Installer: Individual or entity that installs a heat pump system. Requirements to be an eligible installer in the NYS Clean Heat Program are described in the NYS Clean Heat Program Manual.

International Ground-Source Heat Pump Association (IGSHPA): An association established to advance GSHP technology, which conduct geothermal research and installer training and accreditation.

Mini-Split Heat Pump (MSHP): A type of cold climate ASHP or ccASHP that can circulate refrigerant between an outdoor unit containing a variable capacity compressor and one or more indoor air handlers. MSHPs are often referred to as “ductless mini-splits” because they are

typically ductless. These units can also be installed with short duct runs that enable single air handlers to serve more than one room at a time.

MMBtu of Annual Energy Savings: Estimation of first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the site.

Nonconformances: In the field assessment inspection process, specific deviations or work that fails to meet the quality standard established for program requirements, industry standards and quality requirements.

Partial Load Heating System: A partial load heating system is a primary, first stage, heat pump system installed alongside a supplemental, second stage, heating system for the purpose of providing heating. The supplemental heating system may be either the existing system or a new system. In this type of system, the total heat pump system heating capacity satisfies <90% of the building's design heating load ("BHL") at design conditions.

Participating Contractor: ASHP and GSHP designer and installer that is eligible to apply for and receive incentives under the NYS Clean Heat Program. To become a Participating Contractor, an entity must submit the statewide Participating Contractor Application and a Contractor Participation Agreement for each Electric Utility service territory where work will be performed (available at <https://saveenergy.ny.gov/NYScleanheat/become-participating-contractor/>). Upon approval, the applicant will receive an approval notification from the Electric Utility and become eligible to apply for incentives in the Program. GSHP drillers must also be approved through this process to become a "participating driller," but are not eligible to submit for and receive incentives. Each GSHP installation must be completed by a participating driller. Contractors installing only HPWH do not have to be a Participating Contractor to submit an incentive application on behalf of a customer.

Packaged Terminal Heat Pump (PTHP): A packaged terminal heat pump is a wall sleeve and a separate un-encased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall, and that is industrial equipment. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by builder's choice of hot water, steam, or electricity. A PTHP utilizes reverse cycle refrigeration as its primary heat source and is equipped with supplementary heating via hot water, steam, or electric resistant heat.

Prescriptive Incentive Category: Incentive Categories 1, 2, 3, 5,7, 8, and 9.

Variable Refrigerant Flow Heat Pump (VRF): VRF systems circulate refrigerant between a variable capacity compressor and multiple indoor air handlers, each capable of individual zone temperature control. VRF systems can be built with heat recovery and cooling capabilities that allow simultaneously heating to some zones and cooling to other zones.