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Guidebook
C&I Heating Electrification Program
Program Year 2026

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Contents

1. Introduction

As directed in the May 2025 Non-LMI Order, beginning in 2026 Large Commercial and Industrial (LCI) and Small and Medium Business (SMB) heat pump programs will be separated from the New York State Clean Heat Program and integrated into sector-based offerings to better support the technical and engineering requirements for these customers segments.

Under this integrated proposal, the LCI and SMB segments of New York Clean Heat Program will be rebranded as the Heating Electrification Program ("HEP") and reside within National Grid's standard program portfolio. The purpose of this document is to provide guidance on the customer and project eligibility, technology types, program requirements, engineering savings analysis requirements, and other helpful information related to the Heating Electrification Program.

2. Program Summary

The Heating Electrification Program offers incentives for qualifying heat pumps and related technologies that are installed to replace fossil fuel heating systems.

Participants in the Heating Electrification Program must adhere to eligibility and requirements provided in this document. National Grid recommends that site owners assess and implement energy efficiency opportunities related to building envelope and HVAC distribution systems prior to or in conjunction with installing a heat pump system. Common thermal efficiency upgrades include attic and wall insulation, air sealing, and duct sealing. These types of improvements can significantly help provide cost-effective heating with the installation of a cold-climate heat pump.

National Grid is responsible for reviewing and maintaining the Program. National Grid may at any time make changes to program areas including incentive structure, eligible technologies, program rules, and other features in order to be responsive to technology and market developments and to maintain market confidence and stability. National Grid will notify participants of any program modifications or changes.

a. General requirements and eligible equipment

General Requirements:

- Projects shall be for full-load heating systems, except for heat recovery chiller projects. For other heat recovery projects, please consult with National Grid to determine project eligibility.
- Phased heat pump projects will be allowed if they meet the eligibility requirements described in section 3.D of this document.
- In general, incentives are only available to **retrofit** and gut rehab installations (for more information on gut rehab please see section 3b. In new construction projects, only ground source heat pump (GSHP) and heat pump water heating (HPWH) with tank sizes below 55 gallons or above 120 gals may be eligible to **receive** incentives.

- For space heating applications, installed systems must satisfy the dominant HVAC load for the building, per applicable code. If the building has a higher BHL than BCL, the system must be sized to satisfy BHL. If the building has a higher BCL, the system must be sized to satisfy BCL.
- SMB customers must verify eligibility with the SMB Heating Electrification Program.
- See section 4, "Eligible Technologies" for a list of eligible technology types

b. Incentive Offering and Structure

The tables listed below provide the incentive levels by measure type. The incentive levels for large commercial and industrial customers can be found in Table 2. The incentive levels for small and medium businesses can be found in Table 3.

Table 2: Large Commercial and Industrial Custom Incentives by measure type

Incentive Levels by Measure Type	
Measure Type	**Incentive Rate ($/Annual MMBtu Saved)**
Air Source Heat Pump (space and water heating)	$110
Ground Source Heat Pump (space heating)	$160
Heat Recovery Chiller/Heat Pump Chiller	$140
ERV with Heat Pump	$90
DOAS Systems	$90
Heat Pump Water Heater (all types)	$110

Table 3: Small-Medium Business (SMB) Prescriptive Incentive levels for system < 300,000BTU/h

Incentive Levels by Measure Type			
Measure Type	**Incentive Rate**	**DAC Incentive**	**Incentive Structure**
Central Ducted Heat Pump – Air Source (ccASHP)	$4,200	$4,700	$/ton
Ductless MSHP – Air Source (ccASHP)	$4,200	$4,700	$/ton
SPVHP – Air Source (ccASHP)	$800	$1,300	$/ton
Heat Pump - Unitary & Applied	$1,000	$1,500	$/ton
HEAT PUMP WATER HEATER (HPWH)	$1,500	$2,000	$/unit
Ground Source (GSHP)	$6,000	$6,500	$/ton
Packaged Terminal Heat Pump	$1,200	$1,700	$/ton

Table 3 applies only to eligible small business customers with project heating output less than 300,000 BTU/h.

Table 4: Small-Medium Business (SMB) Custom Incentive levels for systems >300,000 BTU/h

Incentive Levels by Measure Type			
Measure Type	**Incentive Rate**	**DAC Incentive**	**Incentive Structure**

Air Source Heat Pump (space and water heating)	$110	$120	$/MMBtu saved
Ground Source Heat Pump (space heating)	$160	$170	$/MMBtu saved
Heat Pump Water Heater (all types)	$110	$120	$/MMBtu saved
DOAS Systems	$90	$100	$/MMBtu saved
Heat Recovery Chiller/Heat Pump Chiller	$140	$150	$/MMBtu saved
ERV with Heat Pump	$90	$100	$/MMBtu saved

Table 3 applies only to eligible small business customers with project heating output less than 300,000 BTU/h. If projects pair more than one measure in Table 3, they will be subject to custom incentives in Table 4. Please refer to Section 4.1 for a detailed list of Eligible Technologies for examples of this.

Table 4 applies Small business projects greater than 300,000 BTU/h OR outside of the prescriptive measures in Table 3. Incentives for these projects will be offered the incentive rates in Table 4: SMB Custom Incentives. Please refer to Section 3 for project Eligibility and Requirements and Section 4 for a detailed list of Eligible Technologies.

In addition to the above incentive tables, Small-medium business customers are eligible for a $6,500 bonus for including weatherization as part of the project. The weatherization measure(s) must be done at the same time as the heat pump project. The weatherization measure(s) eligible for the bonus with a heat pump are roof and wall insulation of the conditioned space impacted by the heat pump.

To determine which incentive category the system is eligible for, the Contractor shall size and select equipment for the system using the methodology provided in section 3c, “System Sizing” of this document.

c. Incentive Limitations and Caps

Effective January 1, 2026, the following limitations on Heating Electrification Projects incentives apply per project application:

Large Commercial and Industrial

- Incentives will be limited to up to 50% of project cost with an incentive cap of $1,000,000, whichever is met first.

Small and Medium Business

- Incentives will be limited to up to 70% of project cost for market rate customers with an incentive cap of $50,000, whichever is met first.
- DAC eligible customers will have incentive cap up to 85% of project cost with an incentive cap of $50,000, whichever is met first.

Regarding project cost caps, only material and labor costs associated with the incentive measure(s) will be considered. Other costs, such as taxes, internal labor costs, shipping, administrative costs, or similar cost will not be included in the total project cost when calculating incentive caps.

d. Modifications to Incentives

National Grid reserves the right to change the incentive offerings at any time. National Grid reserves the right to further limit the number of incentives per site owner, site, or meter. National Grid shall make all reasonable efforts to notify the market prior to incentive changes.

Program changes will be reflected in this Guidebook. The incentive amount for any project will be based on the incentive offering and program rules that are in effect at the time of installation. National Grid reserves the right to structure incentive payments differently to accommodate unique situations.

e. Coordination with NYSERDA

NYSERDA implements programs to promote the adoption of electric heat pump technologies. National Grid and NYSERDA incentives cannot be combined towards the cost of the same installed measure. However, projects are eligible for both National Grid program incentives as well as complementary NYSERDA program funding sources, such as those that support project design and technical assistance (FlexTech).

National Grid reserves the right to limit total combined funding for any project at any time.

3. Eligibility and Requirements

Projects and participants must meet the requirements in this Guidebook for incentive eligibility.

a. General Eligibility

To be eligible for incentives, heat pump projects must comply with the requirements described in this document.

The Heating Electrification Program cannot provide funding towards ASHP installed at new construction sites. For eligible new construction projects, all components installed as part of an approved GSHP and HPWH system must be new. For projects installed at existing sites, the heat pumps must be new and any system subcomponent or subassembly such as controls or ductwork that is replaced should be replaced by a new subcomponent or subassembly.

The installed heat pump system shall serve the full space heating load of the building, or a specific area or zone (see Phase Systems in section 3.e for additional information) and must satisfy the design heating loads in the conditioned space covered by the system. Heat pump projects are eligible for incentives regardless of the heating fuel they replace.

Refer to the "Participating in the Program" section of this document for project application submission requirements including when to submit during a project's life cycle and required timeframes for heat pump installation.

b. Site Eligibility

Eligible sites are limited to buildings owned or controlled by a National Grid electric customer on eligible non-residential rate codes that pay into the System Benefit Charge. Incentives will only be made available to eligible retrofit and gut rehab projects. Incentives for new construction projects will be limited to eligible GSHP and HPHW projects.

i. Program Eligibility

Large C&I Custom Incentives:

- Average annual demand >250kW or total annual natural gas usage >50,000 therms
- Smaller account whose installation is over 300,000 btu/h heating capacity or a custom technology type. See section 4.a for details.

SMB Prescriptive Eligibility:

- National Grid electric customer on a non-residential rate code with average annual demand < 250kW.
- Prescriptive projects must be less than 300,000 btu/h heating capacity to receive prescriptive incentives.

Other customers should please refer to the appropriate program:

- Residential - https://cleanheat.ny.gov/
- Multifamily - ngrid.com/unymultifamily

ii. Construction Type Eligibility

Generally, to be eligible for incentives, the project must take place in existing buildings, including Retrofits and Gut Rehab.

A retrofit is an equipment replacement within an existing building.

For the purposes of program eligibility, Gut Rehab projects are defined as meeting one of the following conditions:

1. Change of Occupancy with Full Reconstruction:
   Projects involving a change in occupancy accompanied by the reconstruction of an existing building or interior space, including the removal of all materials, systems, and equipment down to the structural load-bearing elements.

2. Reconstruction of a Vacant Structure or Space:

Projects that involve the reconstruction of a vacant building or interior space, including removal of all materials, systems, and equipment down to the structural load-bearing elements.

In new construction buildings, including building additions as defined in the ECCCNYS, only the following equipment types will be eligible for incentives:

- Ground source heat pumps for space heating or domestic hot water
- Heat pump water heaters with tank size under 55 gallons or over 120 gallons

iii. *Space Heating and Domestic Hot Water*

Please note that the Heating Electrification Program is limited to space heating and domestic hot water applications with the Eligible Technologies described in this Guidebook. Process related projects and technologies not covered here should be submitted under National Grid's Beneficial Electrification Program.

c. System Sizing Requirements

Heat pump system performance, comfort, and energy efficiency can be significantly impacted by poor sizing and system selection. The heat pump and connected ductwork (if applicable) must be properly sized for the application to meet the building heat load requirements, ensure occupant comfort and satisfaction, and optimize system performance and energy savings.

To be eligible for incentives, all heat pump systems must be sized in compliance with applicable state and municipal code.[1]

Equipment installed in commercial buildings must be sized in accordance with heating and cooling load calculations following ANSI[2]/ASHRAE[3]/ACCA Standard 183-2007 (RA2017) or other code-approved equivalent computational procedure.[4] The output capacity of heating and cooling equipment shall not be greater than that of the smallest available equipment size that exceeds the calculated loads. A single piece of equipment providing both heating and cooling (such as a heat pump or heat pump system) shall satisfy this provision for one function with the capacity for the other function as small as possible, within available equipment options.[5]

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[1] ECCCNYS 2025, Section R403.7. ECCCNYS 2025 require that systems serving multiple dwelling units, where commercial code is applicable, follow Sections C403 and C404 of the respective codes.
[2] American National Standards Institute
[3] American Society of Heating, Refrigerating, and Air-Conditioning Engineers
[4] ECCCNYS 2025, Section C403.1.1 Calculation of heating and cooling loads
[5] ECCCNYS 2025, Section C403.3.1. The intent of this section is to provide some flexibility in design for systems such as heat pumps that provide both heating and cooling. For a commercial building that has a higher building heating load ("BHL") than building cooling load ("BCL"), the heat pump system capacity shall be as small as possible so as to adequately satisfy the BHL, while minimizing oversizing for the cooling function to the extent possible with available equipment. For commercial buildings for which BCL is higher than BHL the heat pump system capacity shall be as small as possible so as to adequately satisfy the BCL, while minimizing oversizing for the heating function.

Please refer to Appendix 2 for more information on how to calculate heating and cooling sizing ratios. Additionally, please refer to the "Small and Medium Business Heating Load Requirements" located in section 3.h for requirements related to the minimum and maximum load calculations.

d. Full Load Requirement

All heat pump systems shall be designed and sized for full load heating, including projects designated as a phased project (see Phased Systems).

Under the Heating Electrification Program, a full load heat pump system is defined as a project where the total heating capacity of the installed heat pump(s) satisfies at least 100% of the heating load at design conditions, in accordance with applicable code, and can distribute heat adequately across all occupied spaces in the project scope. If the building has a higher BCL than BHL, the system must be sized to satisfy full building cooling load (BCL), as required by relevant municipal or state code.

e. Phased Systems

As defined in the EEBE Order (CASE 25-M-0248), phased systems are defined as "projects wherein the building electrification process is carried out over time." Additionally, the Commission provided guidance stating that, "Phased electrification approaches shall be allowed, for other than single family residences, where the space heating needs of the portion of the building (e.g., unit, apartment, or floor of an office building) that is being electrified are fully satisfied by design."

The Company has established the following guidelines for the installation of phased systems.

Customers looking to install phased projects will need to meet the following two conditions:

1. Include new equipment that uses electricity and one or more of the following sources of heat: geothermal heat exchanger, air-source heat pump, or recovered heat.
2. Permanently reduce fossil fuel or district steam use for space or water.

Additionally, projects may permanently reduce fossil fuel or district steam use, together with "legacy systems," either by disabling or disconnecting the heating equipment or system, or through the application of controls.

A sample listing of project types that do not electrify all of a building's heating needs but which the Company considers Phased and Strategic is below:

1. Projects that electrify a specific area (e.g., floor, wing);
2. Projects that electrify a specific system (e.g., space heating, DHW or ventilation only);
3. Heat recovery systems;
4. Buildings with hydronic internal distribution systems for space heating that electrify a central legacy heating plant in stages. As a result, there will likely be heat pumps working to heat the hydronic loop alongside legacy fossil equipment;
5. Ground-source heat pump projects that connect separate spaces to a shared borefield in stages;

6. Projects that electrify less than 100% of a building's domestic hot water heating load with a central plant.

To validate system performance and savings totals, National Grid may require performance tests information. This information may include temperatures, pressures, flow rates, control valve operation, controls, balancing reports, sequence of operations, power measurements, software, start-up and commissioning efforts and reports. This information may be subject to review and observation as determined by National Grid to help ensure the phased system is operating in accordance with program requirements.

- *Phased Project Example:* The heat pump system is an independent heating system that satisfies 100% of the heating load of an office space. The remaining areas/zones of the building will continue to be heated using the existing boilers. In this case, the program will consider the office space/area/zone to be within the scope of the project. Since the heat pumps satisfy at least 100% of the heating load for the areas they serve, they qualify as phased systems.

- *Phased Project Example 2:* A HP-DOAS is installed to serve a ventilation load, previously served by a fossil fuel DOAS unit. Contractor provides documentation that 100% of the ventilation load is met by the HP-DOAS.

f. Oversized Systems

The Program reserves the right to request additional justification or documentation regarding heat pump system sizing, including systems that have sizing ratios substantially greater than 120% BHL and 115% BCL.

g. Design Temperatures

Calculation of the BHL shall be at the 99% dry bulb heating design temperature for the most relevant ASHRAE (2021) location. Calculation of the BCL shall be at the 1% dry bulb cooling design temperature for the same ASHRAE location. Design temperature requirements in this Guidebook may be superseded by the local Authority Having Jurisdiction (AHJ). In such cases, contractors must provide documentation citing the applicable local requirement.

Refer to Table 5 below for examples of ASHRAE (2021) dry bulb heating and cooling design temperatures for various locations across New York State. The applicable location may be found in the Program's Design Temperature Lookup Tool by entering the project zip code.

Please note that load calculations must use dry bulb temperatures within five degrees (+/-) of the applicable values in Table 5.

Table 5: Dry Bulb Design Temperatures

City Name	2021 ASHRAE	
	99% Heating Dry Bulb (deg F)	1% Cooling Dry Bulb (deg F)
Albany	4.3	86.3
Binghamton	3.9	82.3
Buffalo	6.8	83.9
Central Long Island	16.5	86.4
Elmira	4.1	86.5
Fort Drum	-4.9	83.8
Glens Falls	-2.1	84.6
Islip	15.7	85.9
Jamestown	4.5	81.1
Massena	-7.6	84.6
Monticello	4.7	83.5
Niagara Falls	6.5	85.4
Poughkeepsie	8.04	88.4
Rochester	6.6	86.0
Saranac Lake	-12.6	81.0
Syracuse	4.1	86.4
Utica	0.8	84.4
Watertown	-5.4	83.3
Westhampton	11.9	84.2
White Plains	12.9	86.4

h. SMB Heating Load Requirements

Latest Heating and Cooling Load Calculations showing that the heat pump system design and appliance selection has been performed in accordance with ACCA Manual J, ANSI/ASHRAE/ACCA Standard 183-2007 (RA2017). Load calculations should be submitted in PDF format, unless otherwise requested.

The Program expects that projects applying for the prescriptive incentives should fall within the minimum and maximum Building Heating per square foot ("BH/square foot") guidelines in Table below for each business sector. BH/square foot is defined as the actual equipment heating output at 17F. The Program may accept projects outside of these ranges on a case-by-case basis with a reasonable, documented justification.

Guidance:

- If conditioned space for Building Heating Load ("BHL") is less than 2500 SF, use Manual J and compare against the table 6 below. If the Manual J calculation is outside the minimum

and maximum BH/SF for the building type, the installation contractor and/or Implementation Vendor the SMB Program must seek further review before submitting for an incentive.

Table 6: Building Sector Building Heating Load per SF (BH/SF) for typical small-medium businesses

Building Type	Min BH/SF	Max BH/SF
Restaurant/Fast food	20	30
Big Box retail	15	35
Small retail	20	40
Schools	18	35
Office	15	30
Religious	20	35
Grocery store	20	35
Auto repair	25	45
Hospital and Healthcare	20	40
Assembly	20	30
Fitness Center	20	35
Warehouse	8	20
Light Industrial	25	50
Hotels	15	30

- If conditioned space Over 2500 SF and where ventilation load is being handled by the heat pump being incentivized, use ASHRAE/ACCA 183

4. Eligible Technologies

Only new equipment is eligible for the Heating Electrification Program incentives. The installation of used or refurbished equipment and components is not permitted under the program. Eligible measures are grouped into several major categories:

(1) Air Source Heat Pumps for space heating applications, including:
   a. Cold Climate Air-to-Air Mini-Split Heat Pumps
   b. Cold Climate Air-to-Air Central Ducted Heat Pumps
   c. Air-to-Air Large Commercial Unitary Heat Pumps (central ducted or split system)
   d. Air Source Variable Refrigerant Flow Heat Pumps
   e. Packaged Terminal Heat Pumps
   f. Single Package Vertical Heat Pumps
   g. Air-to-Water Heat Pumps
(2) Ground Source Heat Pumps for space and water heating applications
(3) Heat Pump Water Heaters for domestic and service water heating applications, including:
   a. Water-to-Water Heat Pump added to Ground Loop
(4) Energy Recovery Ventilators (ERVs) and Heat Recovery Ventilators (HRVs) paired with eligible heat pumps

(5) Heat Recovery Chiller, Heat Pump Chillers
(6) Heat Pump Dedicated Outdoor Air Systems (HP-DOAS)

Other space heating and/or cooling recovery projects may be eligible for incentives after receiving pre-approval from National Grid. Additionally, process heating and/or cooling recovery projects may qualify for a Beneficial Electrification incentive from National Grid. For more information on process heating and/or cooling projects, please refer to National Grid's Beneficial Electrification Guidebook or contact a National Grid representative for more information on project eligibility.

a. SMB Prescriptive and Custom Incentive Eligibility

Heating Electrification Projects for SMB customers may be eligible for SMB Prescriptive Incentives or LCI Custom incentives depending on the size of the heat pump system installed. See section 2.b for the applicable incentive levels.

The following equipment types are eligible for SMB Prescriptive Incentives if the heat pump system has a heating capacity of less than 300,000 BTU/h. If the heat pump system has a heating capacity of greater than 300,000 BTU/h, it is eligible for SMB Custom Incentives.

- Cold Climate Air-to-Air Mini-Split Heat Pumps
- Cold Climate Air-to-Air Central Ducted Heat Pumps
- Air-to-Air Large Commercial Unitary Heat Pumps (central ducted or split system)
- Packaged Terminal Heat Pumps
- Single Package Vertical Heat Pumps
- Ground Source Heat Pumps for space and water heating applications
- Heat Pump Water Heaters for domestic and service water heating applications, including Water-to-Water Heat Pump added to Ground Loop

The following equipment types are eligible for SMB Custom Incentives *only*, regardless of the heating capacity of the heat pump system:

- Air-to-water heat pumps
- Air-source variable refrigerant flow heat pump
- ERV or HRV paired with eligible heat pumps
- Heat Recovery and Heat Pump Chillers
- Heat Pump Dedicated Outdoor Air Systems (HP-DOAS)

b. Equipment Installation

To be eligible for Program incentives, Participating Contractors and their agents must install systems and system components in accordance with manufacturer specifications and installation requirements, and in compliance with all applicable laws, regulations, codes, licensing, and permit requirements, including but not limited to the United States Environmental Protection Agency (EPA), New York State Environmental Quality Review Act, the Statewide Uniform Fire Prevention and Building Code and State Energy Conservation Construction Code, the National Electric Code, Fire Codes and all applicable state, city, town, or local ordinances and/or permit requirements. Participating Contractors and their agents must also follow best

practices for all aspects of installation, including the appearance of the property upon project completion. National Grid may verify adherence to these requirements and determine incentive eligibility based on its findings.

Participants must adhere to all applicable laws, regulations, codes, licensing, certification, and permit requirements pertaining to the scope of work. For example, where U.S. Environmental Protection Agency (EPA) Clean Air Act Section 608 Technician Certification of the type applicable to the equipment being installed or serviced, including attaching or detaching hoses and gauges to and from an appliance to measure pressure, is required as prescribed by federal law. Technicians who maintain, service, repair, or dispose of equipment that could release ozone-depleting refrigerants into the atmosphere must be certified.

For reference, EPA has developed the following 4 types of certifications.

1.) For servicing small appliances (Type I).
2.) For servicing or disposing of high- or very high-pressure appliances, except small appliances and MVACs (Type II).
3.) For servicing or disposing of low-pressure appliances (Type III).
4.) For servicing all types of equipment (Universal)."

In general, Type II or Universal certification is required for residential AC/HP equipment and Type III or Universal is required for commercial AC/HP units. Some refrigerants are exempt from Section 608 requirements. It is the contractor's responsibility to maintain the appropriate level of certification for the type of equipment being serviced or installed and should reference the law directly to ensure full compliance. Additional information can be found here: https://www.epa.gov/section608/section-608-technician-certification-0

c. Exceptions to AHRI Performance Standards

In instances where AHRI minimum performance standards are not achieved, the contractor and utility may utilize the manufacturer's system design report to demonstrate that the modeled capacity and efficiency is more representative of the expected operating conditions than the AHRI test point. In the scenario, the utility will have full discretion on the projects eligible. All projects seeking this exception must obtain National Grid approval in order to receive an incentive offer.

d. Air-Source Heat Pumps (ASHP)

To be eligible for a program incentive, ASHP systems must either meet or exceed the specification listed in the NEEP Product List[6] or meet the criteria established in this Guidebook and the Heating Electrification Program Implementation Plan for equipment that is not covered by the NEEP Product List.

The ASHPs eligible for the Heating Electrification Program include:

[6] The current specification and listed eligible units are available at https://neep.org/ASHP-Specification.

i. Central Cold Climate ASHPs (central ccASHP)

Central ccASHP with cooling capacities less than 65,000 Btu/h must meet or exceed the criteria listed in the NEEP ccASHP specification, and may not be contained within the same heating system as a furnace with rated capacity greater than 225,000 Btu/h.[7]

ii. Cold Climate Mini-Split Heat Pumps (MSHP)

Cold climate MSHPs must consist of individual heat pump appliances that meet or exceed the criteria listed in the NEEP ccASHP specification.

iii. Commercial Unitary Systems/Large Commercial ASHP

Commercial Unitary Systems must have the following characteristics:

- Systems other than single phase with rated cooling capacity <65,000 Btu/h must consist of multi- stage (including dual-stage) or variable speed compressors
- Systems must meet the criteria in the applicable table below

Single phase, variable speed units with rated cooling capacity <65,000 Btu/h

- Must meet or exceed the specification in the NEEP cold-climate heat pump directory (NEEP specification requirements are shown in Table 7)
- must be variable speed or have three or more stages.
- Note: Units of this size are rated using AHRI 210/240.

Table 7: Commercial Unitary Systems Criteria - Single Phase Variable Speed Units with Rated Cooling Capacity <65,000 Btu/h

Rated cooling capacity (Btu/h) <65,000	SEER2	HSPF2	COP@5°F
Single phase, variable speed	≥14.3	≥7.7	≥1.75

Three phase (either multi-stage or variable-speed) equipment with rated cooling capacity <65,000 Btu/h

- The code minimum performance specifications are shown in Table 8.
    - Equipment must exceed the stated values for ONE parameter in the applicable row; the others can be equal to or greater than the values shown.
- For three phase equipment, SEER and HSPF may be used for compliance instead of SEER2 and HSPF2 only for models that have not been rated with SEER2 and HSPF2.
- Note: units of this size are rated using AHRI 210/240.

Table 8: Commercial Unitary Systems Criteria - Three Phase Multi-Stage or Variable Speed Equipment with Rated Cooling Capacity < 65,000 Btu/h

Rated cooling capacity (Btu/h) <65,000	SEER	HSPF	SEER2	HSPF2

[7] Code of Federal Regulations ("CFR") 10 CFR part 430, Subpart A, § 430.2 Definitions: definition of central air conditioner or central air conditioning heat pump: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=29d99fa0a367f0166b9cc8528ad29023&mc=true&n=pt10.3.430&r=PART&ty=HTML#se10.3.430_12.

Single-package	>14	>8.0	>13.4	>6.7
Split	>14	>8.2	>14.3	>7.5

Systems with rated cooling capacity (Btu/h) ≥ 65,000

- must be variable speed or have two or more stages.
- The code minimum performance requirements are shown in Table 9.
    - Systems with rated cooling capacity (Btu/h) ≥ 65,000 and <240,000 must meet or exceed ***both*** values in the applicable row.
    - Systems ≥240,000 Btu/h must exceed one value in the applicable row and must meet or exceed the other value.
- Note: units of this size are rated using AHRI 340/360 (2023).

Table 9: Commercial Unitary Systems Criteria - Multi-Stage or Variable Speed Equipment with Rated Cooling Capacity ≥ 65,000 Btu/h

Rated cooling capacity (Btu/h) [1]	Supplemental heat type	IEER	COP @ 47 °F
≥65,000 and <135,000	Electric resistance or none	≥14.1	≥3.5*
≥135,000 and <240,000		≥13.5	≥3.4*
≥240,000		>12.5	>3.2
≥65,000 and <135,000	All other types of heating	≥13.9	≥3.5*
≥135,000 and <240,000		≥13.3	≥3.4*
≥240,000		>12.3	>3.2

* Energy Star requirement for COP at 47F. All other values are federal minimum requirements.

iv. Air Source Variable Refrigerant Flow Heat Pump Systems

ASVRF Systems must meet the following requirements:

- ASVRF systems must be rated under AHRI Standard 1230 to be considered for eligibility.
- ASVRF systems between 65,000 and 240,000 Btu/h cooling capacity must meet or exceed current requirements under ENERGY STAR Criteria for Certified Cold Climate Light Commercial Heat Pumps[8]
- For systems with capacities greater than those covered by ENERGY STAR, heat pump efficiencies must exceed local energy code.

In addition to submitting AHRI certificates, the applicant must provide documentation showing capacities at heating and cooling design conditions for the system as *designed (not* AHRI ratings*)*, using the same outdoor design temperatures that were used for calculating the building design loads.

ASVRF systems must comply with ASHRAE Standard 15-2019 Safety Standard for Refrigeration Systems and Designation and Classification of Refrigerants, which addresses refrigerant capacities and possible leakage, especially if the system serves small rooms, which could cause

[8] Like central ASHP, VRF systems are also covered under the ENERGY STAR Light Commercial HVAC specification: https://www.energystar.gov/products/heating_cooling/light_commercial_heating_cooling/light_commercial_hvac_key_product_criteria

oxygen depletion. In addition, the ASVRF systems must comply with ASHRAE Standard 34-2019 Addendum L, which establishes the maximum refrigerant concentration limit ("RCL") of 26 lbs./1,000 ft3 of room volume for occupied spaces. Systems must be installed to pass all requirements of the Program Compliance and Field Assessments process detailed in the "Program Compliance and Field Assessments" Section, and its associated field assessment checklists.

v. Cold Climate Packaged Terminal Heat Pumps (ccPTHP)

ccPTHP are tested under AHRI standard 310/380. Each unit in the system must meet or exceed the specification on NEEP Product List.[9]

vi. Single Package Vertical Heat Pumps (SPVHP)

SPVHP are tested under AHRI Standard 390. The heat pump must meet or exceed the criteria listed in the NEEP Cold Climate SPVHP Specification. These units may be powered by a single- or 3-phase current.

The NEEP Cold Climate Air Source Heat Pump (ccASHP) Product List and Specifications can be found here: https://neep.org/heating-electrification/ccashp-specification-product-list

vii. Air-to-Water Heat Pump for Space Heating (AWHP)

The AWHP equipment heating COP at 5°F ambient and 110°F leaving water temperature (A5W110) must be 1.7 or greater. Further, the rated cooling capacity (at A95W45) must be less than 72,000 Btu/h. Units larger than this size will be considered on a case-by-case basis.

e. Ground Source Heat Pumps (GSHP)

There are several categories of GSHPs eligible for the Heating Electrification Program, including:

(1) Open-Loop GSHPs
(2) Closed-Loop GSHPs
(3) Direct exchange (DX) GSHPs
(4) Console type GSHP systems
(5) Non-Console GSHPs less than 24,000 Btu/h (2 tons)
(6) Ground-Source Variable Refrigerant Flow Systems (GSVRFs)

For projects where more than one building shares a common borefield, consult your utility program representative to determine eligibility. Customers or projects participating in Utility Thermal Energy Network ("UTEN") projects are not eligible for incentives for the Heating Electrification Program.[10]

GSHP systems must meet or exceed the ENERGY STAR Geothermal heat pump specification for single phase units and NYECC code minimums for 3-phase units and

[9] See also NEEP Cold Climate PTHP Specification: https://neep.org/sites/default/files/media-files/ccpthp_spvhp_specification_v1.pdf

[10] UTEN projects are defined by the New York Department of Public Service in Case 22-M-0429, filing dated December 1, 2023.

exhibit one or more of the following characteristics:

- Systems with individual heat pump appliances powered by three-phase electricity
- Systems with a total system heating capacity ≥300,000 Btu/h
- Systems that have individual appliance cooling capacity for closed-loop GSHP installs ≥135,000 Btu/h
- Systems that have an individual appliance cooling capacity for direct exchange GSHP installs ≥180,000 Btu/h

Please note that Ground Source Variable Refrigerant Heat Pump ("GSVRF") projects must meet or exceed the minimum efficiencies listed in Table 10, regardless of total heating system size or individual appliance cooling capacity. GSVRF full load heating capacity is determined at 32°F entering water temperature and must be <300,000 Btu/h.

Table 12. Efficiency requirements applicable to Water Source Variable Refrigerant Flow heat (VRF) pumps tested under AHRI 1230 water source configuration, however intended to be used in a ground source configuration.

Equipment Type	Cooling Capacity (Btu/h)	Min. EER at 86F EWT (without heat recovery)		Min. EER at 86F EWT (with heat recovery)		Min. COP at 68F EWT	Testing Procedure
Water Source VRF Multisplit System	<65,000	12 EER	16 IEER	11.8 EER	15.8 IEER	4.3	AHRI 1230
	> 65,000 < 135,000	12 EER	16 IEER	11.8 EER	15.8 IEER	4.3	AHRI 1230
	≥ 135,000 < 240,000	10 EER	14 IEER	9.8 EER	13.8 IEER	4.0	AHRI 1230
	≥ 240,000	10 EER	12 IEER	9.8 EER	11.8 IEER	3.9	AHRI 1230

The following are exceptions to the above GSHP eligibility criteria:

- Console type GSHP systems, regardless of total heating system size or individual appliance cooling capacity, are eligible if they meet or exceed the minimum efficiencies listed in Table 11 below. These systems do not need to meet or exceed the ENERGY STAR Geothermal heat pump specification efficiency requirements.
- Non-console GSHP systems that have rated cooling capacities less than 24,000 Btu/h, regardless of total heating system size, are eligible if they meet or exceed the minimum efficiencies listed in Table 12 below. These systems do not need to

meet or exceed the ENERGY STAR Geothermal heat pump specification efficiency requirements.

Program applications for GSHPs with less than 10 tons of cooling capacity must include an AHRI rating certificate for each heat pump model to be installed. For units larger than 10 tons of cooling capacity, which are not rated by AHRI, manufacturer specification sheets must be submitted instead, provided the units have been tested in accordance with AHRI/ISO 13256-1, 13256-2, 550/590, or 870/871, as applicable.

GSHP console units—which are only eligible for the program if they are required due to sizing and/or space constraints—must have an AHRI-rated EER and an AHRI-rated COP of no less than the following:

Table 11: Efficiency Requirements for Console Units

System Type	EER	COP
Water to Air		
Closed-Loop Water-to-Air	14.0	3.0
Open-Loop Water-to-Air	14.0	3.0
Water-to-Water		
Closed-Loop Water-to-Water	N/A	N/A
Open-Loop Water-to-Water	N/A	N/A
Direct Exchange		
Direct Exchange	N/A	N/A

The EER and COP must be calculated using the following equations:

- EER = (full load EER + part load EER)/2
- COP = (full load COP + part load COP)/2

GSHP systems that are not console units and have AHRI-rated cooling capacities less than 24,000 Btu/h (2 tons) must have AHRI-rated EER and AHRI-rated COP of no less than the following, please see Table 11:

Table 11. Efficiency requirements for non-console units with AHRI-rated cooling capacities < 24,000 Btu/h

System Type	EER	COP
Water to Air		
Closed-Loop Water-to-Air	15.0	3.2
Open-Loop Water-to-Air	20.0	4.1
Water-to-Water		

Closed-Loop Water-to-Water	16.6	3.1
Open-Loop Water-to-Water	20.1	3.5
Direct Exchange		
Direct Exchange	N/A	N/A

EER and COP calculations for such systems must be calculated using rated EER and COP.

General Well/Borehole/Loop Field Requirements

- All projects must comply with New York State Department of Environmental Conservation ("DEC") regulations for geothermal well drilling.[11]
- For non-DX GSHP systems, only polyethylene piping is appropriate for underground loop field piping.
- For large scale systems, Participating Contractors must show rated walls and ceilings and specify firestopping of pipe penetrations.
- All well/bore fields must provide adequate well/bore spacing and thermal dispersion to accommodate the thermal load and thermal balance.
- For large GSHP systems, provide emergency eye washes on site during installation, as required by OSHA.
- Piping must be stored on site in a manner that prevents damage and the introduction of foreign matter. Piping shall be kept free from damage, debris, and foreign matter during installation.
- Grout and admixture must be received and stored in a way that protects them from moisture and contamination.
- Manifolds installed underground or in a buried enclosure must have proper valves, pressure, and temperature ports.
- All equipment and system parts should be labeled per IGSHPA and ASHRAE guidelines.
- Performance tests must be verifiable. Temperatures, pressures, flow rates, control valve operation, controls, balancing reports, sequence of operations, power measurements, software, start-up and commissioning efforts and reports are all subject to review and observation.
- Projects must meet all setback requirements enforced by the local Authority Having Jurisdiction.
- It is also recommended that GSHP systems meet the ANSI/CSA C448 Series-16 standard.

Vertical-Loop Systems: Any vertically bored, closed-loop GSHP system must have a borehole depth that is sufficient to provide a minimum entering water temperature to the heat pump of 30°F in heating mode and a maximum entering water temperature to the heat pump of 90°F in cooling mode. The system must be designed in accordance with manufacturer specifications and installation requirements.

[11] NYS DEC guidance for Geothermal Wells Deeper Than 500 Feet, https://www.dec.ny.gov/energy/1748.html, and NYS DEC Well Permitting Requirements, https://www.dec.ny.gov/energy/1783.html.

Exception: Vertically bored ground loops designed for a minimum entering water temperature >25°F and <30°F in Department of Energy Climate Zones 5 and 6 shall be considered eligible provided they meet the following additional criteria:

1. Heat Pumps shall be designed to provide at least 100% of the building heating load without supplemental heating
2. Requires submission of loop sizing documents signed off by a New York State Professional Engineer or Certified GeoExchange Designer

Closed-Loop Systems: Unless specifically superseded by the requirements detailed in this manual, the design and installation of closed-loop GSHP systems (including ground-loop and interior systems) must comply with the standards and practices outlined in the most recent edition of the Closed- Loop/Geothermal Heat Pump Systems: Design and Installation Standards edited by the IGSHPA

Standards Committee and published by the International Ground Source Heat Pump Association. These standards are available online on the IGSHPA website.12

Table 13 presents program requirements for the maximum allowable rated pumping power at design conditions (based on duty point), as well as good-practice guidance based on an ASHRAE GSHP Design Guide13 for large systems and field measurements for small systems.

Table 13: Maximum Allowable and Good Practice Pumping Power for Closed-Loop GSHP Systems in watts(W) per AHRI rated[14] full-load heating or cooling capacity of the installed system

GSHP System Configuration	Maximum Allowable Pumping Power in watts (W) per 10,000 Btu/h of full-load heating capacity OR in watts (W) per ton of full-load cooling capacity	Good Practice Pumping Power in watts (W) per 10,000 Btu/h of full-load heating capacity OR in watts (W) per ton of full-load cooling capacity
GSHP units in residential and small commercial applications where each GSHP unit has its own dedicated loop pump	100	Less than 75
GSHP systems with multiple heat pump units served by centralized ground loop pumping	85	Less than 60

Closed Loop Antifreeze Protection Requirements: Propylene glycol (CAS No. 57-55-6),

[12] International Ground Source Heat Pump Association, https://igshpa.org/manuals
[13] Kavanaugh and Rafferty (2014). Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
[14] Reference the AHRI Ground-loop Heat Pump Application (GLHP) rating for Full-Load Heating Capacity and for Full-load Cooling Capacity.

ethylene glycol (CAS No. 107-21-1), methanol (CAS No. 67-56-1) and ethanol (CAS No. 64-17-5) are the four presumptively acceptable antifreeze additives for use in the loop field. Use of any other antifreezes requires prior approval from the Joint Efficiency Providers. The acceptable denaturants for ethanol additives are denatonium benzoate (CAS No. 3734-33-6), ethyl acetate (CAS No. 141-78-6), isopropanol (CAS No. 67- 63-0), pine oil (CAS No. 8002-09-3), and tertiary butyl alcohol (CAS No. 75-65-0). Systems with ethanol and methanol must comply with Section 1207 of the 2020 Mechanical Code of New York State and, therefore, "the flash point of transfer fluid in a hydronic piping system shall be not less than 50oF above the maximum system operating temperature."

The maximum allowable concentration of methanol is 12.5% by weight. The maximum allowable loop field temperature in small systems using methanol as an antifreeze is 75°F. In addition, the designer and installer should ensure the loop field operating temperature is at least 50°F lower than the flash point of methanol at all times.

The maximum allowable concentration of ethanol is 10% by weight. The maximum allowable loop field temperature in a small system using ethanol as an antifreeze is 70°F. In addition, the designer and installer should ensure that the loop field operating temperature is at least 50°F lower than the flash point of ethanol at all times.

For loop fields with glycol or organic antifreeze, the Participating Contractor must sterilize with a chlorine shocking protocol that is similar to what is required in potable water plumbing systems. If the manufacturer recommends specific disinfection, the Participating Contractor should follow the manufacturer's protocols.

Horizontal-Loop Systems: Horizontal loops must be installed below the frost line and have a surface area that is sufficient to provide a minimum entering water temperature of 30°F to the heat pump in heating mode and a maximum entering water temperature of 90°F to the heat pump in cooling mode.

Systems must be designed in accordance with manufacturer specifications and installation requirements. Incentive applications must include the file from the horizontal-loop design software showing inputs and system design specifications. Exception: Horizontal ground loops designed for a minimum entering water temperature >25°F and <30°F in Department of Energy Climate Zones 5 and 6 shall be considered eligible, provided that they meet the following additional criteria:

- Heat pumps shall be designed to provide at least 100% of the Building Heating Load without supplemental heating
- Requires submission of loop sizing documents signed off by a New York State Professional Engineer or an IGSHPA- or AEE- Certified GeoExchange Designer

Open-Loop Systems: A standing column well must include a bleed circuit, drywell, or locally approved receptor to maximize thermal efficiency based on available water production.

Incentive applications must quantitatively explain the method for determining pressure and flow rate. All projects must comply with NYS DEC regulations for geothermal well drilling, which can be found on the DEC website.15

All projects must comply with ANSI/CSA/IGSHPA C448.6, Installation of open-loop systems ground water heat pump systems. All standing column well projects must comply with ANSI/CSA C448.7, Installation of standing column well heat pump system.

Table 14 presents program requirements for the maximum allowable rated pumping power at design conditions (based on duty point), as well as good-practice guidance.

Table 14: Maximum Allowable and Good Practice Pumping Power for Open-Loop GSHP Systems in watts(W) per AHRI rated[16] full-load heating or cooling capacity of the installed system

GSHP System Configuration	Maximum Allowable Pumping Power in watts (W) per 10,000 Btu/h of full-load heating capacity OR in watts (W) per ton of full-load cooling capacity	Good Practice Pumping Power in watts (W) per 10,000 Btu/h of full-load heating capacity OR in watts (W) per ton of full-load cooling capacity
GSHP units in residential and small commercial applications where each GSHP unit has its own dedicated loop pump	140	Less than 105
GSHP systems with multiple heat pump units served by centralized ground loop pumping	120	Less than 90

DX GSHP System: Direct exchange heat pumps, which circulate a refrigerant typically through a closed-loop copper pipe system (whereas most systems utilize plastic pipes that circulate water or a water-antifreeze mixture), must meet the following additional conditions:

- DX GSHP systems must have a minimum loop field length of 100 feet per 12,000 Btu/h of heating capacity
- DX GSHP wells require cathodic protection ensuring a minimum expected well life of 25 years
- DX GSHP system owners must certify that they will undergo an end-of-life decommissioning that includes full refrigerant recovery
- The entire well depth interval for DX GSHP wells must be grouted with thermally enhanced grout with hydraulic conductivity below 1 x 10-7 centimeters/second
- A permanent placard must be attached to the heat pump unit, detailing the following:
    - loop field refrigerant content, type, and volume
    - loop location description

[15] NYS DEC guidance for Geothermal Wells Deeper Than 500 Feet, https://www.dec.ny.gov/energy/1748.html, and NYS DEC Well Permitting Requirements, https://www.dec.ny.gov/energy/1783.html.

[16] Reference the AHRI Ground-water Heat Pump Application (GWHP) rating for Full-Load Heating Capacity and for Full-load Cooling Capacity

    - loop piping material
    - required maintenance schedule on loop field, refrigerant, and heat pump
    - planned decommissioning date and process, consistent with loop field useful life
- DX GSHP systems must also comply with ANSI/CSA/IGSHPA C448.8, "Installation of direct expansion heat pump systems"
- DX GSHP systems must use only ACR B280 Copper Piping for Underground Loop Field
- DX GSHP systems must conform to requirements of ASHRAE Standard 15-2019

Large GSHP System-Specific Requirements

- For large systems, a loop field design includes:
    - Loop/site plan
    - Loop sizing report (flexible)
    - Loop field pressure drop calculations
    - Antifreeze type and concentration
    - System documentation must include a piping schematic accurately representing below grade and above grade piping strategy
- Large systems with ethanol and methanol must comply with Section 1207 of the 2015 Mechanical Code of New York State and, therefore, "the flash point of transfer fluid in a hydronic piping system shall not be less than 50°F above the maximum system operating temperature"
- Large systems must implement the following:
    - Show rated walls and ceilings and specify firestopping of pipe penetrations
    - Detail cross connection control devices in the design
    - Conform to the requirements and standards of ASHRAE 15

Thermal Conductivity Tests: For any new construction or retrofit for which a new vertically bored, closed-loop ground loop greater than 300,000 Btu/h system heating capacity is being installed, a test borehole must be drilled prior to system design to more accurately determine the soil's thermal conductivity and enable accurate system modeling and design optimization. Testing should conform to the requirements detailed in the latest edition of the ASHRAE Applications Handbook and must report undisturbed ground temperature.

Test boreholes are recommended, but not required, for projects with system capacities between 135,000 Btu/h and 300,000 Btu/h.

f. Heat Pump Water Heaters and Ground Source Water-to-Water Heat Pumps

In addition to space heating, the Heating Electrification Program also promotes the use of heat pump technology for heating domestic hot water, as a retrofit replacement or in new construction. As with space conditioning heat pump technologies, for retrofit applications, the program will require that applicants report the existing water heating fuel that is being replaced; for new construction, the replaced unit will be determined on a case-by-case basis, based on contemporary construction practice in the area.

Incentives are *not* provided for domestic heat pump water heaters with tank sizes between 55-120 gallons due to changes in code.

As with space conditioning, heat pump water heaters can be air source or ground source technology.

The following types of equipment are eligible for incentives:

Air-to-Water Heat Pump Water Heater

A **residential-duty HPWH**, defined as having a Uniform Energy Factor (UEF) rating, must meet or exceed ENERGY STAR Residential Water Heater requirements. [17]

The following **centralized DHW systems** are eligible:

- Air-to-water or water-to-water heat pump systems that meet applicable ASHRAE 90.1-2022 requirements using AHRI 550/590
- Commercial HPWH (rated with COPH) that meet applicable ENERGY STAR requirements.
- Heat Recovery Chillers and Heat Pump Chillers (see eligibility requirements below)
- Systems listed on the NEEA Commercial Qualified Products List[18]

    - Any DHW system must exceed applicable minimum efficiency specifications to meet applicable codes and standards. Additionally, National Grid will only provide incentives for heat pump water heating (HPWH) with tank sizes below 55 gallons or above 120 gals may be eligible to receive incentives. New Construction HPWH projects that meet eligibility requirements may receive an incentive from National Grid.

Systems shall be sized according to equipment manufacturer recommendations.

In addition to the equipment installation requirements described in the "Equipment Installation" section of this document, HPWHs must be installed in spaces that provide sufficient make-up air to support efficient heat pump operation, per manufacturer specifications.

g. Energy Recovery Ventilators (ERVs) and Heat Recovery Ventilators (HRVs)

Energy Recovery Ventilators (ERVs) and Heat Recovery Ventilators (HRVs) employ air-to-air heat exchangers to recover energy from exhaust air for the purpose of pre-conditioning outdoor air prior to supplying the conditioned air to the space, either directly or as part of an air-conditioning system. When paired with a heat pump system, the ERV/HRV can significantly reduce the size of the required HVAC system.

For the purposes of this measure, ERVs and HRVs are distinguished as follows:

- ERV: Transfers both sensible (heat content) and latent (moisture content) heat

[17] See energystar.gov: energystar.gov/products/water_heaters/residential_water_heaters_key_product_criteria
[18] https://neea.org/img/documents/commercial-HPWH-qualified-products-list.pdf

between supply and exhaust airstreams
- HRV: Transfers sensible heat only between supply and exhaust airstreams

Eligible ERV/HRVs must meet the following criteria:

1. Exceed federal, state, or municipal efficiency codes or standards
2. Must be paired with an eligible heat pump system in one of the following configurations:
   - Independent heat pumps are sized to meet space heating eligibility requirements of custom categories, including the ventilation air (after accounting for the heat or energy recovery) for the zone(s) served by the ERV/HRV
   - A dedicated heat pump in series with the ERV that is sized to meet space heating eligibility requirements of the custom categories, relative to the ERV/HRV ventilation load after accounting for the heat or energy recovery
   - An ERV with dedicated electric resistance or fossil fuel heating source to provide conditioning of the ventilation air is not eligible

h. Heat Recovery Chillers (HRC) and Heat Pump Chillers (HPC) and Other Heat Recovery

To be eligible for Heating Electrification Program Incentives, HRC/HPCs must be electrically operated and meet or exceed the minimum efficiency requirements at operating conditions set forth in ASHRAE Standard 90.1-2022 under AHRI 550/590.

If AHRI certificates containing heating performance under AHRI standard 550/590 are not available, data must be presented by the manufacturer's representative that satisfy ASHRAE 90.1-2022, Table 6.8.1-16 calculated with parameters consistent with AHRI standard 550/590 under heating and cooling operation appropriate for the project.

i. Heat Pump Dedicated Outdoor Air Systems (HP-DOAS)

HP-DOAS systems must meet the following criteria:

1. Design heating load is satisfied without fossil or electric supplemental heat. This may require an additional submittal run at design conditions. The applicant must provide documentation of control strategy to switch from heat pump to supplemental heat mode.

2. Unit must satisfy efficiency requirements set forth in Tables C403.3.2(12) and (13) in NYSECC2025:

Minimum HP-DOAS Efficiency Requirements for units without Energy Recovery

Equipment Type	Minimum Dehumidification Mode Efficiency (ISMRE2)	Minimum Heating Mode Efficiency (ISCOP2)	Test Procedure
Air Source Heat Pump	3.8	2.05	AHRI 920 2020
Ground source, closed loop	4.6	2.13	

Ground source, open loop	4.6	2.13	
Water Source	3.8	2.13	

Minimum HP-DOAS Efficiency Requirements for units with Energy Recovery

Equipment Type	Minimum Dehumidification Mode Efficiency (ISMRE2)	Minimum Heating Mode Efficiency (ISCOP2)	Test Procedure
Air Source Heat Pump	5.0	3.2	AHRI 920 2020
Ground source, closed loop	5.0	5.0	
Ground source, open loop	5.0	5.0	
Water Source	4.6	4.04	

Since AHRI certificates with above parameters generated under AHRI 920 may not be available, the applicant must provide documentation from the manufacturer's representative demonstrating that the HP-DOAS meets above criteria.

Please note that water source HP-DOAS coupled with fossil fuel boilers as heat source are not eligible for incentives.

***Requirements for Savings Calculations**:* To ensure robust energy savings, the applicant must provide the manufacturers performance data below:

For Air Source HP-DOAS:

- EER and cooling capacity at 95°F outdoor dry bulb air temperature
- COP and heating capacities at 17 and 47°F outdoor dry bulb air temperatures

For ground source, closed loop HP-DOAS:

- EER and cooling capacity at outdoor cooling design dry bulb air temperature, 77°F entering water temperature
- COP and heating capacity at outdoor heating design dry bulb air temperature, 32°F entering water temperature

For water source HP-DOAS:

- EER and cooling capacity at outdoor cooling design dry bulb air temperature, and project appropriate entering water temperature
- COP and heating capacity at outdoor heating design dry bulb air temperature, and project appropriate entering water temperature

For HP-DOAS with energy recovery, the applicant must also provide documentation defining if the energy recovery is required, or not required, by code per NYS ECC 2025 section C403.7.4, and the summer and winter efficiency parameters for energy recovery.

5. Warranty Requirements

All ASHPs, including ASVRF, and AWHP
Each qualified small commercial ASHP receiving an incentive under this program must include a minimum five (5)-year manufacturer's warranty for parts including compressor.

Custom GSHP Systems
For large GSHP systems, the minimum manufacturer's warranty must be at least one-year parts and labor, as required by law. Participating Contractors must present to the customer any optional extended warranty up to the maximum supported by the manufacturer.

HPWH Systems
Each HPWH system receiving an incentive under this program must include a manufacturer's warranty for parts and tank.

6. Operation and Maintenance Requirements

Electrified heating systems are often a new type of appliance for the site owner, so it is important that owners understand how to effectively operate and maintain their new systems. Participating Contractors must inform site owners about system operation and maintenance, including the use of these systems in both heating and cooling modes. A detailed manufacturer's operation handbook as well as a maintenance manual containing information on the major components and a schedule of required system maintenance must be provided by the Participating Contractor.

The manual must include maintenance and testing requirements of antifreeze solutions used on the project. It must include any startup/commissioning documentation for the system(s). For large systems, the O&M manual must include as-built drawings.

National Grid strongly recommend that GSHP systems include a performance monitoring system. Recommended best practices for performance monitoring of GSHP systems can be found at https://cleanheat.ny.gov/resources-for-applications/ under the Ground Source Heat Pump (GSHP) section in the Prescriptive (Small Projects) drop-down menu.

Participating Contractors should strongly encourage system owners to purchase a maintenance agreement.

7. Engineering Savings Analysis Requirements for Custom Projects

Applications for custom categories must include a detailed engineering analysis showing energy savings in net MMBtu related to the project measures. Savings may be calculated through one of the following methods:

1. The Custom Heating Electrification Program Custom Calculator
2. Engineering Modeling
3. Temperature Bin Analysis

In the case of ERV/HRV installation measures, the latest version of the TRM Energy and Heat Recovery Measure may be used to calculate energy savings.

All calculations must be clear and transparent utilizing standard engineering methodologies, including a listing of source values. Below is a list of energy savings analyses and format types that is allowed after pre-approval from National Grid:

- Unlocked Microsoft Excel spreadsheet (PDFs not accepted) showing all equations, parameters, formulas, and assumptions used to calculate savings
- Whole-building energy modeling using pre-approved simulation software
    - The pre-approved modeling software will be based on current computational capabilities and familiarity of National Grid.

a. Heating Electrification Program Custom Calculator

The Custom Heating Electrification Program Calculators are Excel-based tools that have been developed to assist contractors applying to the program with calculating energy savings and incentives for various types of heat pump technologies. The Custom Heating Electrification Program Calculator can be found at ngrid.com/heating-electrification.

The Heating Electrification Program Calculator should be used as the default method to calculate energy savings for custom projects.

Under certain circumstances, applicants may bypass using this calculator, opting instead to calculate savings using their own custom bin analysis or energy modeling approach. Pre-approval from the National Grid Program Manager is required before a project can submit a custom bin analysis or an energy modeling approach.

The Heating Electrification Program Prescriptive Calculator should be used as the default method to calculate energy savings for prescriptive projects for heating loads under 300,000 BTU/H AND for measures on the SMB Heating Electrification Measure

list. Any technology outside of this list must use the Custom Heating Electrification Program Calculator for calculating energy savings for those projects.

b. Energy Modeling

Whole-building energy models shall be prepared using approved modeling software and shall be simulated following one of the compliance paths prescribed in ASHRAE Standard 90.1. The model shall be developed using a "Stacked" parametric approach, where energy savings are modeled by starting with the proposed design model, and gradually transforming this analysis into the minimally code compliant baseline design by subtracting the Energy Efficiency Measures ("EEMs") one-by-one in the following order:

- Base load measure(s) such as lighting, process loads, plug loads, etc.
- Envelope measure(s)
- Interactive measures(s) such as energy recovery ventilators or heat pump water heaters in conditioned space
- HVAC measure(s)

If there are several EEMs of the same type, for example several HVAC EEMs, the order in which they are modeled relative to each other is not prescribed to allow flexibility in supporting the specific project circumstances and may be determined by the entity performing the modeling based on communications with the customer. For example, if a design includes a high efficiency make-up air unit, and energy recovery is considered as a design alternative, the energy recovery EEM should be modeled (subtracted from the proposed design) first, to show the added energy savings for this option, with the unit efficiency EEM modeled (subtracted) second.

With the stacked approach, the difference between the sum of EEM savings and the total savings of the proposed design relative to the baseline is attributed entirely to the impact of components that differ between the baseline and proposed models but are not included in any EEM.

Guidance on load calculation methodologies, hot water use and other parameters for energy calculations are provided in Appendix 1.

Modeling Submittals

The simulation reports with the following information for the baseline, proposed design, and each energy measure model must be included in the report appendix:

- Monthly Energy End-use Summary (such as PS-E: Energy End-Use Summary for All Meters)
- Overall annual building energy consumption including all fuels and meters (such as BEPS: Building Energy Performance Summary and BEPU: Building Utility Performance)
- Energy cost summary (such as ES-D: Energy Cost Summary)

- Information on hours when space/system loads are not met (such as BEPS/BEPU)
- System design parameters report (SV-A: System Design Parameters for HVAC)

c. Establishing Baselines

Establishing the equipment or system baseline is a necessary step in calculating energy savings for any project. This section defines the types of baselines used by the Program and the general requirements for each baseline type. Baselines will depend on the type and vintage of the facility.

Baseline Equipment Types

Equipment baselines are defined as the type of equipment that would have been installed without the influence of the program. In other words, the savings baseline should represent customer choice in absence of the Program, not optimal behavior or policy goals.

Existing Facilities

The default baseline equipment type for the existing facilities is the existing equipment type and efficiency compliant with the minimum code efficiency per ECCNYS.

However, the customer may instead choose to select a baseline in accordance with contemporary construction practice for the area and based on an evaluation of the technology's cost effectiveness. If the applicant selects a baseline that differs from the existing system, the applicant shall provide a separate analysis supporting its selection, showing that the baseline chosen aligns with contemporary construction standards and is cost effective from both an installation and life cycle standpoint.

New Construction

Please note that only GSHP and HWHP are eligible for new construction incentive offerings. See Section 3.b.ii, Construction Type Eligibility, for details.

Gut Rehab

Gut Rehab projects are defined in Section 3.b.ii, Construction Type Eligibility.

Baseline Efficiencies

Baseline system efficiencies for all projects shall be based on minimally code compliant equipment in accordance with the latest ECCCNYS prescriptive code values. There are three exceptions to this requirement:

1. Project qualifies as a Special Circumstance Replacement in accordance with the TRM requirements – i.e. Early Replacement or Extended Life. For Special Circumstance Replacements, the existing equipment efficiency shall be used for the baseline condition in accordance with the TRM two-step analysis method.

2. Projects involving new construction or gut rehab whose design demonstrates compliance with Section 406 of the latest ECCCNYS by providing more efficient

HVAC performance shall set the baseline system efficiencies to exceed the minimum code efficiency requirements by 10%.

Energy Code Compliance

New construction and gut rehab projects must demonstrate minimum compliance with the 2025 applicable local Energy Code 2025, *e.g.*, ECCCNYS2025, or local code in one of the following ways:

- **Prescriptive**: Each discrete component complies with specific requirements
- **Component Performance Alternative**: Prescriptive approach that allows trade-offs between some components (some can be below code if others are above)
- **Total Building Performance**: Using an energy model, show the entire building's compliance with code. With this method, performance trade-offs are allowed, meaning that some components in the proposed design may be less efficient than the minimally code-compliant like component in the baseline. In these instances, a trade-off must be made to "make up" for a component that does not comply with code. For example, a building owner might choose to install a larger, more energy efficient heat pump system to "make up" for putting in more window area than allowed by the code.

If trade-offs are taken, applicants must provide a side-by-side comparison table between proposed and baseline identifying the areas where trade-offs are made (i.e., building or system elements that do not comply with the prescriptive requirements of the code, elements exceeding requirements, and building elements or systems modeled to provide additional energy savings to offset the non-complying elements). The savings will be calculated based on the proposed heat pump design net of any trade-offs.

Projects that follow the total building performance path and whose design includes trade-offs must set their savings baselines in accordance with minimally code-compliant ECCCNYS prescriptive code values. While energy models created per Appendix G or Section 11 of ASHRAE 90.1 may be used for program eligibility, the Appendix G or Section 11 baselines shall not be used to calculate savings.

New Construction and Gut Rehab Energy Savings Analysis

New construction and gut rehab projects that follow a prescriptive approach, preparing a COMcheck or Tabular (or similar) analysis to demonstrate compliance with energy code, may opt to submit an energy analysis using Excel calculations, *i.e.*, the Statewide Calculator or a whole building energy model.

When a project uses a "Total Building Performance" compliance path or trade-offs, the applicant shall submit a whole building energy model for review. Excel calculations will not be accepted.

8. Early Replacement Projects

Projects may qualify for early replacement if they meet the criteria summarized below as defined in the TRM.[19] For full details, refer to Appendix M in the latest version of the TRM for guidelines for early replacement conditions.

[19] New York Standard Approach for Estimated Energy Savings from Energy Efficiency Programs – Residential, Multi-Family, and Commercial/Industrial Measures, ("TRM"). See Appendices M & N.

For existing cooling and/or heating equipment to be eligible for early replacement under the Program:

1. Proposed work must involve a retrofit or substantial improvement to an existing facility and must include the entire portion of the building within project scope.
2. The savings baseline for calculating energy savings must be based on the existing heating and/or cooling equipment type installed at the facility.
3. At the time of application to the Program, the existing equipment cannot exceed its Effective Useful Life ("EUL") and should have at least one year of its EUL remaining (Refer to Appendix P in the latest version of the TRM for EUL for various heating/cooling equipment).
4. The existing equipment must be fully functioning.

A facility's existing cooling and heating systems shall be evaluated separately against the criteria noted above to determine whether each individually qualifies for early replacement. One or both systems may be eligible.

a. Required Project Documentation

In addition to the requirements listed in this Guidebook and any applicable supplementary guidelines issued for the proposed energy conservation measures, early replacement projects must submit the following documentation:

1. Cooling/heating capacity of the existing equipment
    - Supported by manufacturer's equipment data sheets or industry standard performance testing results for existing equipment
    - Supported by manufacturer's equipment data sheets or AHRI certificate
2. Age of the existing equipment
    - Supported by original invoice, bill of sale, construction permit, service log, or nameplate date

b. Special Circumstance

Special circumstance replacement does not change the incentive category for a project. Qualifying for special circumstance replacement may affect the project baseline, which affects the energy savings calculated for the project. Thus, special circumstance replacements may benefit projects whose incentive rates are calculated on a $/MMBtu saved basis in accordance with custom categories.

Only projects in existing buildings can be eligible for special circumstance replacement. New Construction projects do not qualify for special circumstance replacement.

There are two criteria for existing cooling and/or heating equipment to be eligible for special circumstance replacement under the Program. Full details on special circumstance replacements are found in Appendix M of the latest version of the TRM.

1. Age Rule
2. Energy Use Rule

c. Age Rule

1. The savings baseline for calculating energy savings must be based on the existing heating and/or cooling equipment installed at the facility.
2. At the time of application, existing cooling and/or heating equipment must exceed its EUL by at least 25% (Refer to Appendix P in the latest version of the TRM for EUL for various heating/cooling equipment).
3. If the equipment is determined to be less than 125% of its EUL, it is not eligible for special circumstance extended life treatment regardless of consumption or any other factor.
4. There must be a history of significant repair or replacement with existing equipment.
5. Existing equipment must be fully functioning.

d. Energy Use Rule

For cases in which the age of the existing equipment cannot be determined relative to 125%, the Energy Use Rule may be considered for eligibility; existing equipment energy consumption must exceed that of the new high efficiency model by at least 35% for chillers, and 20% for all other HVAC types to do the same amount of work.

A facility's existing cooling and heating systems shall be evaluated separately against the criteria noted above to determine whether each individually qualifies for extended life replacement. It is noted that one or both systems may be eligible.

e. Required Project Documentation

The minimum documentation required for all special circumstance projects is listed below. These requirements are in addition to the requirements listed in the Heating Electrification Guidebook and any applicable supplementary guidelines issued for the proposed energy conservation measures.

1. Cooling/heating capacity and performance of the existing equipment:
   - Supported by manufacturer's equipment data sheets or industry standard performance testing results for existing equipment
   - Supported by manufacturer's equipment data sheets or AHRI certificate
2. Age of the existing equipment
   - Supported by original invoice, bill of sale, construction permit, service log, or nameplate date
3. Actual repair cost, including component replacement for at least the past 3 years
   - Supported by invoices or proof of payment
   - Total repair cost must be added and summarized in a document

Incentives for projects applying for prescriptive incentives are not affected by early replacement/extended life (ER/EL).

9. General Information

a. Waiver

The purpose of these requirements is to ensure that electric heat pump systems installed under this

Program are high-performing, high-quality installations that are used for space heating or hot water heating, which is critical to enabling market growth. However, National Grid encourage innovation in design and installation practices that improve performance and lower costs. If a Participating Contractor can substantiate that a deviation from a specific requirement will maintain or improve performance at a similar or lower cost, National Grid will consider granting a waiver to that specific requirement.

b. Logo Use Disclaimer

Participating Contractors are not permitted to use, reproduce, or otherwise publish any of National Grid' or NYSERDA's logos. Contractors are permitted and encouraged to use the "Heating Electrification Program" name.

There are very strict policies regarding use of National Grid' and NYSERDA's logos. There are very few companies that are eligible to use a version of National Grid' or NYSERDA's logo on their marketing materials or for any other purpose.

10. Contact Information

Submit questions by email to NYelectrificationCI@nationalgrid.com

Heating Electrification Program - Glossary of Terms

This glossary provides definitions of key terms used in the Heating Electrification Program Implementation Plan and Guidebook.

Backup Heating System: The backup heating system is a redundant system that provides heating in the event that the heat pump system is not operating. It is not intended to supplement the full load heat pump system.

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 ASHRAE 2017 location.

Building Equivalent Full Load Hours (BEFLH): is used for the estimation of heating and cooling savings from heat pump systems, 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. The New York Technical Resource Manual employs the following vintage categories for determining BEFLH in residential buildings:[20]

- Built prior to 1940, uninsulated masonry buildings, referred to as "Pre-War uninsulated brick." This category is used only for full load heating hours for multifamily low-rise and high-rise buildings.
- Built prior to 1979, before the Energy Conservation Construction Code of New York State (ECCCNYS) went into effect. This vintage is referred to as "Old" in the Appendix G EFLH tables for single family detached buildings, and "Prior to 1979"in the EFLH tables for low-rise and high-rise multifamily buildings.
- Built from 1979 through 2006, with insulation conforming to the 1980s era building codes (1979 ECCCNYS). This vintage is referred to as "Average" in the Appendix G EFLH tables for single family detached buildings, and "From 1979 through 2006" in the EFLH tables for low-rise and high-rise multifamily buildings.
- Built from 2007 through the present, new construction conforming to the 2007 ECCCNYS for residential buildings and the New York City Energy Conservation Code (if applicable). This vintage is referred to as "New" in the Appendix G EFLH tables for single family detached
  building, and "From 2007 through the present" in the EFLH tables for low-rise and high-rise multifamily buildings. Appendix G also provides EFLH tables for selected small and large commercial buildings; however, for these building types, EFLH values are the same across all building vintages.

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

[20] New York State Standard Approach for Estimating Energy Savings from Energy Efficiency Programs, Appendix G, See TRM v. 10 https://dps.ny.gov/technical-resource-manual-trm

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.

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

Disadvantage Community ("DAC"): defined by the New York Climate Justice Working Group (CJWG) by developing criteria to ensure that frontline and otherwise underserved communities benefit from the state's historical transition to cleaner, greener, sources of energy, reduced pollution and cleaner air, and economic opportunities. DAC definition and map maintained by NYSERDA can be found here: https://www.nyserda.ny.gov/ny/Disadvantaged-Communities

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 heating system where the total heating capacity of the installed heat pump(s) satisfies at least 100% of the heating load at design conditions, in accordance with applicable code, and can distribute heat adequately across all occupied spaces in the project scope.

Gut Rehabilitation ("Rehab"): A renovation that removes material down to structural load-bearing beams, as defined by the TRM v10, effective January 1, 2023.

For the purposes of program eligibility, Gut Rehab projects are defined as meeting one of the following conditions:

1. Change of Occupancy with Full Reconstruction:
   Projects involving a change in occupancy accompanied by the reconstruction of an existing building or interior space, including the removal of all materials, systems, and equipment down to the structural load-bearing elements.

2. Reconstruction of a Vacant Structure or Space:
   Projects that involve the reconstruction of a vacant building or interior space, including removal of all materials, systems, and equipment down to the structural load-bearing elements.

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.

Market Rate Customers: Defined as National Grid customers that do not fall within the DAC definition.

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 <100% 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 Heating Electrification Program.

Supplemental Heat: Supplemental heat refers to heating sources that are installed separate from the heat pump, such as legacy fossil fuel-fired systems, but work in tandem with the heat pump to meet the building's heating load.[21]

Total Heat Pump System Heating Capacity: The sum of all installed heat pump capacities at heating design temperature.

[21] NENY Proceeding, DNV, "Technical Study of New York State Heat Pump Performance," (filed: August 15, 2024), p. xiii.

Appendix 1: Guidance for Acceptable Load Calculations

This Appendix provides guidance on how to perform heating and cooling load calculations for applications to the New York State Clean Heat Program. Load calculations are required for all applications for Heating Electrification Program Incentives and are subject to review by National Grid. Participating Contractors who choose to perform load calculations that do not meet the criteria outlined in this document may be asked to provide written justification and their projects may be subject to additional review.

1) **Methodology**
   a) Calculations shall be in accordance with ACCA Standard 183-2007 for commercial projects, or other approved calculation methods in accordance with the Guidebook.
   b) Each outdoor condensing unit should be sized for the dominant heating or cooling load of its corresponding zone. When multiple outdoor condenser units condition separate zones within a building, the individual zonal loads should be equal to the dominant heating or cooling load of that zone. When one outdoor condenser unit conditions multiple zones within a building (e.g., a VRF system), the block load of the entire conditioned space should be used (which may be smaller than the sum of the individual zone loads).

2) **Temperatures**
   a) Outdoor design temperatures should be within ±5°F of the Heating Electrification program default for the project's location, based on the Weather Station Reference (zip code lookup tool). In cases where the design professional chooses to use a different weather city or different ACCA reference, the design temperatures shall remain within 5°F of the site found in the weather station reference.
      i) Design temperature requirements may be superseded by manufacturer-specific requirements. In such cases, Clean Heat applicants must provide documentation citing the applicable manufacturer's requirement.
   b) Indoor design temperatures for space heating load calculations shall not exceed 72°F, and for cooling shall not be less than 75°F.

3) **The following component loads should NOT be included in load calculations:**
   a) Humidification loads;
   b) Hot water piping distribution losses;
   c) Adiabatic surfaces (surfaces in which there is no heat transfer; i.e., party walls, within the building or between buildings, floors, or ceilings between conditioned floors);
   d) Duct losses/gains, where indoor equipment is ductless or where ducts are located inside conditioned space;
   e) Multiplicative or additive safety factors with no defined source.

4) **Component load guidance**
   a) Ventilation loads shall be supported by mechanical schedules and account for heat recovery, so that they represent only the loads served by heat pumps.
   b) Unless otherwise supported by blower door testing, heating and cooling infiltration shall be:

Table 19: Infiltration Guidance for Acceptable Load Calculations

	Natural ACH heating	Natural ACH cooling
Retrofits	≤0.7	≤0.4
Typical new construction and gut rehab	≤0.3	≤0.17
Passive House	≤0.06	≤0.034

c) Clean Heat provides guidance on calculating design infiltration based on blower door testing.
d) Enclosure (envelope) component loads should use R values consistent with plans for new construction or gut rehab and existing conditions for retrofit.
    i) Heat pump and envelop project baseline loads should be calculated based on the existing building for retrofit or gut rehab projects and the energy code minimum for new construction projects.
    ii) All documented energy-efficient features and specifications shall be accounted for when defining component loads.
e) Internal gains above normal levels (e.g., those from industrial process heat) shall be accounted for as offsetting design heating load.
f) Heating load calculations shall account for cold processes or equipment in the zone that absorb heat (for example, indoor unitary heat pump water heaters or some refrigerated cases).
g) Surface areas and geometry of exterior components (thermal envelope) and floor area used in loads must be consistent with architectural plans.

Note: The infiltration guidance document, zip code weather station reference, and other helpful resources can be found at https://cleanheat.ny.gov/contractor-resources/ under the Air Source Heat Pump and Ground Source Heat Pump expanders.

Appendix 2: Calculating Sizing Ratios

1. Cold Climate Air Source Heat Pump / Mini-Splits (<65,000 Btu/h cooling capacity)

AHRI Test Method: 210/240

$$Heating\ Sizing\ Ratio = \frac{Max\ Heating\ Capacity\ at\ Design\ Temperature, F}{Calculated\ Heating\ Load}$$

$$Cooling\ Sizing\ Ratio, when\ BCL > BHL = \frac{Max\ Cooling\ Capacity\ at\ Design\ Temperature, F}{Calculated\ Cooling\ Load}$$

$$\frac{Cooling\ Sizing\ Ratio, when\ BHL > BCL = Min\ Cooling\ Capacity\ at\ Design\ Temperature, F}{Calculated\ Cooling\ Load}$$

Maximum heating and cooling capacities at design temperatures may be obtained in the following ways:

a. Download the NEEP performance data sheet for the appropriate make/model heat pump. Linearly interpolate (if necessary) between the known maximum heating capacities at 5 degrees and 17 degrees to obtain the maximum heating heat pump performance at the design temperature. For cooling, linearly interpolate (if necessary) between known maximum cooling capacities at 95 degrees and 82 degrees to obtain the maximum cooling performance at the design temperature. Note that if the BHL>BCL, the cooling size ratio may be calculated using minimum cooling capacity at the design temperature, by extrapolating between known minimum NEEP cooling capacities at 95 degrees and 82 degrees respectively.
b. Obtain manufacturer-specific performance and capacity data at the design temperature or use manufacturer software that provides equipment performance and capacity at the design temperature.

For using manufacturer software, ensure all software inputs are accurate to the specific heat pump application. The following bullets list common data-entry errors that result in inaccurate design capacity calculations:

i. Entering the wrong indoor unit model numbers, or quantity of connected indoor heads, particularly for multi-split applications
ii. Entering inaccurate line-lengths
iii. Entering inaccurate outdoor design temperatures. Design temperatures must match what is used, and allowed, in Manual J modeling.
iv. Entering inaccurate indoor setpoints. Setpoint temperatures shall not exceed 72°F for heating and shall not be less than 75°F for cooling.
v. Entering the outdoor humidity inaccurately – outdoor relative humidity should be 60% to 80%.
vi. Entering inaccurate refrigerant volumes

Example using NEEP method: Downstate location with heating design temperature at 12°F.
Heating Design Temperature: 12°F
Proposed Heat Pump Make: Fujitsu
Proposed Heat Pump Model: AOU36RLAVM
Maximum Heating Output at 5°F: 37,900 Btu/h
Maximum Heating Output at 17°F: 42,000 Btu/h
Heating Load at 12°F: 38,500 Btu/h

$$\frac{42{,}000\ Btu/h - 37{,}900\ Btu/h}{17\ degree - 5\ degree} = \frac{42{,}000\ Btu/h - x\ Btu/h}{17\ degree - 12\ degree}$$

$$x = \ 40{,}291.67$$

$$Heating\ Sizing\ Ratio = \frac{40{,}291.67\ Btu/h}{38{,}500\ Btu/h} = 1.05$$

FUJITSU J-Series
Multizone All Non-ducted
AHRI Cert #: **8693480**
Outdoor Unit #: **AOU36RLAVM**
Indoor Unit #:
Maximum Heating Capacity (Btu/hr) @5°F: **37,900**
Rated Heating Capacity (Btu/hr) @47°F: **42,000**
Rated Cooling Capacity (Btu/hr) @95°F: **36,000**

Information Tables

Brand	FUJITSU
Series	J-Series
Ducting Configuration	Multizone All Non-ducted
AHRI Certificate No.	8693480
Outdoor Unit #	AOU36RLAVM
Indoor Unit Type	Non-Ducted Indoor Units
Indoor Unit #	
Furnace Unit #	
SEER	19
EER	13.3
HSPF Region IV	11.4
Energy Star	✓
Variable Capacity	✓
Turndown Ratio (Max 5°F/Min 47°F)	2.3
Capacity Maintenance (Max 5°F/Max 47°F)	90%
Capacity Maintenance (Rated 17°F/Rated 47°F)	61%
Capacity Maintenance (Max 5°F/Rated 47°F)	90%
Integration	
Connectivity	
Operational Diagnostics	
Refrigerant(s)	

Performance Specs

Heating /Cooling	Outdoor Dry Bulb	Indoor Dry Bulb	Unit	Min	Rated	Max
Heating	-4°F	70°F	Btu/h	12,960	-	33,600
			kW	1.13	-	3.74
			COP	3.36	-	2.63
Heating	5°F	70°F	Btu/h	14,860	-	37,900
			kW	1.1	-	4.06
			COP	3.96	-	2.74
Heating	17°F	70°F	Btu/h	16,460	25,800	42,000
			kW	1.2	2.7	4.43
			COP	4.02	2.8	2.78
Heating	47°F	70°F	Btu/h	16,460	42,000	42,000
			kW	0.87	3.2	3.2
			COP	5.54	3.85	3.85
Cooling	82°F	80°F	Btu/h	18,190	-	36,000
			kW	0.95	-	2.37
			COP	5.61	-	4.45
Cooling	95°F	80°F	Btu/h	18,190	36,000	36,000
			kW	1.09	2.71	2.71
			COP	4.89	3.89	3.89

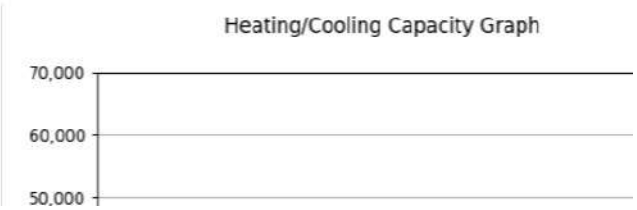

Figure 1: NEEP Certification ccASHP

2. Larger Unitary Heat Pumps (>65,000 Btu/h)

AHRI Test Method: 340/360

$$Heating\ Sizing\ Ratio = \frac{Heating\ Capacity\ at\ Design\ Temperature}{Calculated\ Heating\ Load}$$

$$Cooling\ Sizing\ Ratio = \frac{Cooling\ Capacity\ at\ Design\ Temperature}{Calculated\ Cooling\ Load}$$

Heating and cooling capacities at design temperatures may be obtained in the following ways:

a. Download the AHRI certificate for the appropriate make/model heat pump. Extrapolate (if necessary) between the known certified rated heating capacities at 17 degrees and 47 degrees to obtain the heating heat pump performance at the design temperature. For cooling, use AHRI cooling capacity at 95 degrees directly as values cannot be extrapolated from the AHRI certified data.
b. Obtain manufacturer specific performance data at the design temperature.

Example using AHRI method: Downstate location with heating design temperature 15°F and cooling design temperature 87°F.
Heating Design Temperature: 12°F
Cooling Design Temperature: 87°F
Proposed Heat Pump Make: Daikin
Proposed Heat Pump Model: DPS010AHHE2
Rated Heating Output at 17°F: 62,000 Btu/h
Rated Heating Output at 47°F: 105,000 Btu/h
Rated Cooling Output at 95°F: 119,000 Btu/h
Heating Load at 12°F: 56,000 Btu/h
Cooling Load at 17°F: 118,000 Btu/h

$$\frac{105{,}000\ Btu/h - 62{,}000\ Btu/h}{47\ degree - 17\ degree} = \frac{105{,}000\ Btu/h - x\ Btu/h}{47\ degree - 12\ degree}$$

$$x = \ 54{,}833\ Btu/h$$

$$Heating\ Sizing\ Ratio = \frac{54{,}833\ Btu/h}{56{,}000\ Btu/h} = 0.978$$

$$Cooling\ Sizing\ Ratio = \frac{119{,}000\ Btu/h}{118{,}000\ Btu/h} = 1.008$$

AHRI CERTIFIED®
www.ahridirectory.org

Certificate of Product Ratings

AHRI Certified Reference Number : 5831165 Date : 03-31-2021 Model Status : Active

Brand Name : DAIKIN

Model Number : DPS010AHHE2**-4*

AHRI Type : HSP-A

Refrigerant Type : R-410A

Hertz : 60

Sold In? : USA, Canada, Outside USA and Canada

Rated as follows in accordance with the latest edition of AHRI 340/360 Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment and AHRI 365 and subject to rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity 95F/Cooling Capacity 95F at 230v : 119000/119000

EER 95F/EER 95F at 230v : 11.70/11.70

Heating Capacity 47F/Heating Capacity 47F at 230v : 105000/105000

COP 47F/COP 47F at 230v : 3.42/3.42

Heating Capacity 17F/Heating Capacity 17Fat 230v : 62000/62000

COP 17F/COP 17Fat 230v : 2.38/2.38

IEER/IEER at 230v : 18.0/18.0

The following data is for reference only and is not certified by AHRI

Full Load Indoor Coil Air Quantity (scfm) : 3850

Figure 2: AHRI Large Unitary Heat Pump

Note that if interpolation/extrapolation of heating capacities using the AHRI method results in irregularities, reviewers shall request manufacturer specific performance data at the design temperature.

If product is not AHRI rated, manufacturer performance-specific data may be used. For non-AHRI rated equipment, performance data should be provided at the same rated conditions as the applicable AHRI test method for the purposes of determining eligibility.

3. Air Source Variable Refrigerant Flow

AHRI Test Method: 1230

$$Heating\ Sizing\ Ratio = \frac{Heating\ Capacity\ at\ Design\ Temperature}{Calculated\ Heating\ Load}$$

$$Cooling\ Sizing\ Ratio = \frac{Cooling\ Capacity\ at\ Design\ Temperature}{Calculated\ Cooling\ Load}$$

Heating and cooling capacities at design temperatures may be obtained in the following ways:

a. Download the AHRI certificate for the appropriate make/model heat pump. Extrapolate (if necessary) between the known certified rated heating capacities at 17 degrees and 47 degrees to obtain the heating heat pump performance at the design temperature. For cooling, use AHRI cooling capacity at 95 degrees directly as values cannot be extrapolated from the AHRI certified data.
b. Obtain manufacturer specific performance data at the design temperature

Note that if interpolation/extrapolation of heating capacities using the AHRI method results in irregularities, reviewers shall request manufacturer specific performance data at the design temperature.

Relevant example showing AHRI method is provided in Appendix 2, Section 2 Above.
If product is not AHRI rated, manufacturer performance specific data may be used. For non-AHRI rated equipment, performance data should be provided at the same rated conditions as the applicable AHRI test method for the purposes of determining eligibility.

4. Geothermal Heat Pumps (including GSVRFs and console type units)

Heating and cooling capacities at design temperatures may be obtained in the following ways:

a. Downloading the AHRI certificate for the appropriate make/model heat pump and pulling the certified full load heating and cooling capacities directly from certificates to calculate sizing ratio. Note that if BHL>BCL, the cooling sizing ratio may be calculated using AHRI ground source part load capacity.
b. Obtain manufacturer specific performance data at the design temperature.

Test Method: ANSI/AHRI/ASHRAE/ISO Standard 13256-1

$$Heating\ Sizing\ Ratio = \frac{Full\ Load\ Heating\ Capacity\ at\ Design\ Temperature}{Calculated\ Heating\ Load}$$

$$Cooling\ Sizing\ Ratio = \frac{Full\ Load\ Cooling\ Capacity\ at\ Design\ Temperature}{Calculated\ Cooling\ Load}$$

Example:
Make: Ice Air
Model: 8VSHPGE12
Full Load Heating Capacity: 9,000 Btu/h
Heating Load: 8,000 Btu/h

Certificate of Product Ratings

AHRI Certified Reference Number : 205746251 Date : 11-19-2020 Model Status: Active

Old AHRI Reference Number :

Product : Water-to-Air and Brine-to-Air

Model Number : 8VSHPGE12**

Brand Name : ICE AIR LLC

Rated as follows in accordance with ANSI/AHRI/ASHARE/ISO Standard 13256-1 Water-toAir and Brine-To-Air Heat Pumps and subject to verification of rating accuracy by AHRI-sponsored, independent third party testing:

	Full Load	Part Load1	Part Load2	Part Load3
Air Flow Rate - Cooling:	500			
Air Flow Rate - Heating:				

GLHP (Ground -Loop Heat Pumps)	
Cooling Capacity (Btuh)	13800/13800
Cooling EER Rating (Btuh/Watt)	20.10/30.10
Cooling Fluid Flow Rate (gpm)	3.00
Heating Capacity (Btuh)	9000/9000
Heating COP (watt/watt)	3.70/3.70
Heating Fluid Flow Rate (gpm)	3.00

Figure 4: Geothermal AHRI Certificate

If equipment is being installed in non-standard temperatures, option B should be followed to calculate sizing ratio. The participating contractor will be required to submit manufacturer performance data at the specific design conditions. The AHRI method will apply in most circumstances.

If product is not AHRI rated, manufacturer performance-specific data may be used. For non-AHRI rated equipment, performance data should be provided at the same rated conditions as the applicable AHRI test method for the purposes of determining eligibility.