NY STATEWIDE CLEAN HEAT CALCULATOR Version 2.2.2 USER GUIDE February 16, 2023

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Summary

The Statewide Clean Heat Program Savings Calculator (Clean Heat Calculator) is an excel based tool that has been developed to assist participating contractors applying to the New York State Clean Heat Program (Clean Heat Program) with calculating custom energy savings and incentives for the following heat pump technologies:

- Northeast Energy Efficiency Partnerships (NEEP) listed cold climate single package air source heat pumps
- NEEP-listed cold climate air source Mini-Splits, Single Package Vertical Heat Pumps and Package Terminal Heat Pumps
- Air-Conditioning, Heating, and Refrigeration Institute ("AHRI") Rated Large Unitary Air-to-Air Heat Pumps
- AHRI Rated Air Source Variable Refrigerant Flow (VRF) Heat Pumps
- AHRI Rated Large Closed Ground Loop Heat (Ground Source) Pumps with Centralized Pumping

This updated version users to quantify savings for Heat Pump Upgrades, such as Heat Pumps coupled with Building Envelope Upgrades and Energy /Heat Recovery Ventilator applications. It also allows users to get a rough estimate of the savings and incentives for projects in the early stages to get a feasibility check on pursuing the project further.

When to Use this Calculator:

The Clean Heat Calculator should be used as the default method to calculate energy savings for the technologies mentioned above if one or more of the following statements are true:

- The project involves installing NEEP-listed cold climate air source or mini-split units in new construction or existing multi-family buildings.
- The project proposes to install a combination of the above heat pump technologies. For example, the project scope includes the installation of both NEEP-listed mini-splits and Air Source VRFs.
- The project scope of work involves installing Heat Pump technologies and Energy Recovery or Heat Recovery Ventilators (Heat Pump + ERV/HRV) - *Provided ERV/HRV systems are not mandated by federal, state, or local code.
- The project scope of work involves installing Heat pump technologies and building envelope upgrades for new construction, existing building retrofit, or gut renovation of a facility. (Heat Pump + Envelope Upgrade)
- The project scope involves installing Heat pump technologies along with building envelope upgrade coupled with ERV/HRV. (Heat Pump + Envelope Upgrade + ERV/HRV) *Provided ERV/HRV systems are not mandated by federal, state, or local code

In addition, the version 2.2 calculator must be used for projects that have not yet received a **Preliminary Incentive Offer Letter** before Jan 1, 2023, superseding results obtained with previous versions.

Revisions and Updates:

The following are the summary of updates from the last version 2.2.2 of the Statewide Clean Heat calculator:

Tab	Section	Summary of Revisions
Inputs	Building Characteristics	Updated to enter no. of dwelling more or less than 200 sf. specific for Multifamily building type selection
	Layout and User interface	Follows a General Data entry followed by ASHP /AHRI/NEEP specific data and GSHP data
Eqpt Sched and Eligibility	Ground Sourced Heat Pump	Entry requires GSHP Heating and Cooling capacities and Efficiencies at different temperatures from the AHRI certificate as compared to those at temperatures used in v2.1
ERV	Column Headers	Renamed Sensible and Total ERV efficiency Column Headers more specific entries

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Exceptions to Using Calculator:

Under certain circumstances, applicants may bypass this calculator, opting instead to calculate savings using their own custom approach, even when one of the above statements is true. Justifiable reasons for doing so include, but are not limited to:

- The applicant has prepared a whole building energy model using one approved modeling software listed in the Clean Heat Program Guide.
- The project proposes installing a heat pump technology that does not fall into one of the above applicable categories available in the clean heat calculator. No prescriptive TRM methodology is available for calculating savings, i.e. Heat Recovery Chillers.
- The project involves a heat pump installation at an existing building, whose existing heating and cooling equipment types do not align with pre-programmed baselines provided in the Clean Heat Calculator. In this case, the applicant may still use the Clean Heat Calculator and should select a counter-factual baseline using pre-programmed baselines in the tool. Alternatively, the applicant may submit custom calculations comparing the proposed heat pump installation to the existing heating and cooling types currently installed at the facility. It is noted that baseline efficiencies should be based on minimum code efficiencies and not the existing equipment efficiency, except for category 4a and LMI projects

All calculation approaches must use NYS ECC code minimum efficiencies for baseline systems.

General

Users shall review the 'Input,' Eqpt Eligibility & Sched' and 'ERV' tabs and input project-specific details where needed. Cells requiring user input are highlighted in yellow. Cells in white will auto-populate based on the inputs the user enters. Red cells indicate there may be an issue with project or equipment eligibility. Users can fill in the costs and related data in the 'Results Summary Tab'

Instructions	Inputs	Eqpt Sched & Eligibility	ERV	Tabs requiring user inputs.
				, , ,

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	Project Information Zip Code 10577 Utility Con Edison Program Multifamily Building Type (If Custom, fill in Custom Information in cells G4:J37) Multifamily # of dwellings > 2,000SF 100 # of dwellings < 2,000SF 100 # of dwellings < 2,000SF 1 Construction Type New Construction Gross Building Area impacted by SOW (SF) 449,000 LMI Building non-LMI Floor to Floor Height (ft) 9 Scope of work - Heat Pump installation Pundle Set Bundle Set					
	Zip Code	10577				
	Utility	Con Edison				
	Program	Multifamily	Velleur			
	Building Type (If Custom, fill in Custom Information in cells G4:J37)	Multifamily	shaded cells indicate user			
Building Characteristics	# of dwellings > 2,000SF	100				
	# of dwellings < 2,000SF	1	input is			
	Construction Type	New Construction	required.			
	Gross Building Area impacted by SOW (SF)	449,000				
	LMI Building	non-LMI				
	Floor to Floor Height (ft)	9				
	Scope of work					
	- Heat Pump installation	Dura dia Cat				
	- Bundle Set: Heat Pumps with Envelope Upgrades and/or ERVs	Bundle Set				

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Heat Pump Technology	Outdoor Unit Tag(5) (OPTIONAL)	Outdoor Unit Quantity	Application	Du
NEEP Listed Cold Climate Mini-Split Heat Pump		6	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump		22	Cooling Only	
NEEP Listed Cold Climate Mini-Split Heat Pump		5	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump		6	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump		1	Cooling and Heating	
Air Source Variable Refrigerant Flow Heat Pump		1	Cooling and Heating	

When a row highlights in red, there may be an eligibility issue.

Tabs should be completed in the following order:

- 1. Inputs
- 2. Eqpt Sched & Eligibility
- 3. ERV
- 4. Results Summary

Tab: Inputs

The latest version of the State-Wide Clean Heat Calculator also enables users to get a rough estimate of the savings and incentives for projects in the early stages to get a feasibility check on pursuing the project further.

Depending on the availability of appropriate required documentation, users can select options from the drop-down in cell E6 to submit a complete project application or get a rough estimate for the project by choosing the Demo Mode as shown below:

А	В	С	D	E F
	Project Information			
	Zip Code	10577		Select Mode
	Utility	Con Edison		Domo Mada
	Program	Multifamily	Demo	Mode (Rough Estimate)
	Building Type (If Custom, fill in Custom Information in cells G4:J37)	Multifamily	[110]ec	(Kough Estimate)
	# of dwellings > 2,000SF	100		
Building Characteristics	# of dwellings < 2,000SF	1		
building characteristics	Construction Type	New Construction		Noto
	Gross Building Area impacted by SOW (SF)	449,000		Project Application Mode is
	LMI Building	non-LMI		used for the application
	Floor to Floor Height (ft)	9		submission.
	Scope of work - Heat Pump installation - Bundle Set: Heat Pumps with Envelope Upgrades and/or ERVs	Bundle Set		Rought Estimate Mode is used only for feasibility studies.

SECTION 1:

A) Project Application Submission Mode- Heat Pump Upgrade

Follow this section if the project application involves replacing/upgrading the heat pump system only. It includes all heat pump categories (1,2,4,5,6) except Category 4A.

Please Note: For Category 4A (Heat Pump + Building Envelope Upgrade) and or ERV/HRV combined applications, follow Section 1 B) which comes after this section on Pg 17. of this document.

Building Characteristics

Zip Code – Enter the zip code pertaining to the weather station eligible for the facility/application submitted

<u>Utility</u> – Select the electric utility that services the project's territory from the drop-down menu.

Program- Select the appropriate program category based on the building type from the drop-down menu.

<u>Building Type</u> - Select the appropriate building type from the drop-down menu. Selection should correspond to the building type where heat pumps will be installed. Building profiles have been derived from ASHRAE 90.1 Typical Occupancy Schedule and the New York State Technical Reference Manual Appendix A for several building types.

If the listed building type is selected as Multifamily, it will prompt the user to choose whether it is an LMI or Non- LMI building

Suppose the listed building types do not align with the building type in the subject project. In that case, users may select custom from the drop-down and then use the custom HVAC schedule in cells G4-J37 to create a "custom" building profile, including HVAC schedule, temperature set points, and balance point temperatures closely align with their project application.

 <u>Creating a Custom HVAC Schedule</u> – Select "On" or "Off" from the drop-down menu to correspond to the hours when the building's HVAC system is expected to be operational. Periods designated "On" correlate to times when the building is occupied, while "Off" periods correlate to times when the building is unoccupied or lightly occupied.

Hour (Time of Day)	Custom HVAC Schedule							
Hour (Time of Day)	Weekday	Saturday	Sunday					
1:00 AM (12 to 1 AM)	Off							
3:00 AM (2 to 3 AM)	Off							
4:00 AM (3 to 4 AM)	Off							
5:00 AM (4 to 5 AM)	Off							
6:00 AM (5 to 6 AM)	Off							
7:00 AM (6 to 7 AM)	On							
8:00 AM (7 to 8 AM)	On							
9:00 AM (8 to 9 AM)	On							
10:00 AM (9 to 10 AM)	On							
11:00 AM (10 to 11 AM)	On							
12:00 PM (11 to 12 PM)								
1:00 PM (12 to 1 PM)								
2:00 PM (1 to 2 PM)								
3:00 PM (2 to 3 PM)								
4:00 PM (3 to 4 PM)								
5:00 PM (4 to 5 PM)								
6:00 PM (5 to 6 PM)								
7:00 PM (6 to 7 PM)								
8:00 PM (7 to 8 PM)								
9:00 PM (8 to 9 PM)								
10:00 PM (9 to 10 PM)								
11:00 PM (10 to 11 PM)								
12:00 PM (11 to 12 AM)								

- <u>Occupied / Unoccupied Heating and Cooling Temperature Set Points</u> Enter the building's heating and cooling thermostat temperature set points.
- <u>Occupied / Unoccupied Heating and Cooling Balance Point Temperatures</u> Enter the building's heating and cooling balance point temperatures.

If balance points are unknown, enter the following pre-set balance point temperatures into the blank table:

• Custom Profile - Existing Building Default Balance Point Temperatures:

	Occupied Hours	Unoccupied Hours	
Cooling Balance Point (deg F)	58	61	
Heating Balance Point (deg F)	54	51	

• Custom Profile - New Construction Default Balance Point Temperatures:

	Occupied Hours	Unoccupied Hours
Cooling Balance Point (deg F)	55	58
Heating Balance Point (deg F)	52	49

<u>Gross Building Area Impacted by SOW (Sf)-</u> Enter the appropriate sq.ft area impacted by the HVAC and/or building envelope upgrade.

Floor to Floor Height (ft)- Enter the appropriate ft measurement between 2 consecutive floors.

<u>Construction Type</u> – Select from the following drop-down options depending on the project facility application:

- 1) New Construction
- 2) Existing Building -Retrofit
- 3) Gut Renovation¹

¹Gut renovation is any work that could be considered an "Alteration" per the Energy Conservation Construction Code of New York State (ECCCNYS), as defined in Sections C202 and R202 of the code and as covered in Sections C503 and R503, which make alterations subject to new construction code requirements.

Construction Type: New Construction-

Selecting this option will prompt the user to fill in the following specific sections along with the other bold highlighted sections:

- Minimum Code Complaint Building Envelope- Heating & Cooling Load
- Minimum Code Complaint HVAC system type

Construction Type: Existing Building / Gut Renovation-

Selecting this option will prompt the user to fill in the following specific sections along with the other bold highlighted sections:

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- Existing Building Envelope Heating & Cooling Load
- Existing HVAC System Type

Design Temperatures:

<u>1% Dry Bulb Cooling Design Temperature:</u> Enter 1% Dry Bulb Cooling Design Temperature from the design load calculations.

For Reference-Below are typical 1% cooling design dry bulb temperatures based on various ASHRAE 2021 weather station locations. It is expected that the load calculations submitted with the user's application align with the below temperatures, $+/-5^{\circ}F$

City Name	ASHRAE 2021 1% Cooling Dry Bulb Temperature (deg F)
Albany	86.3
Binghamton	82.3
Buffalo	83.9
Central Long Island	86.4
Elmira	86.5
Fort Drum	83.8
Glens Falls	84.6
Islip	85.9
Jamestown	81.1
Massena	84.6
Monticello	83.5
New York City - Central Park	87.9
New York City - JFK	86.7
New York City - Laguardia	89.8
Niagara Falls	85.4
Poughkeepsie	88.4
Rochester	86.0
Saranac Lake	81.0
Syracuse	86.4
Utica	84.4
Watertown	83.3
Westhampton	84.2
White Plains	86.4

<u>99% dry bulb heating design temperature (°F)</u> - Enter 99% Dry Bulb Heating Design Temperature from the design load calculations.

For Reference: Below are typical 99% heating design dry bulb temperatures based on various ASHRAE 2021 weather station locations. It is expected that the load calculations submitted with the user's application align with the below temperatures, $+/-5 \ ^2F$

	ASHRAE 2021
City Name	99% Heating Dry Bulb Temperature (deg
	F)
Albany	4.3
Binghamton	3.9
Buffalo	6.8
Central Long Island	16.5
Elmira	4.1
Fort Drum	-4.9
Glens Falls	-2.1
Islip	15.7
Jamestown	4.5
Massena	-7.6
Monticello	4.7
New York City - Central Park	17.3
New York City - JFK	17.5
New York City – La guardia	17.9
Niagara Falls	6.5
Poughkeepsie	8.04
Rochester	6.6
Saranac Lake	-12.6
Syracuse	4.1
Utica	0.8
Watertown	-5.4
Westhampton	11.9
White Plains	12.9

Minimum Code Complaint/ Existing Building Envelope:

<u>Building Cooling Load (BCL) –</u> Enter the total design cooling load in British Thermal Units per hour (Btu/h) for the areas impacted by the clean heat project. BCL should be calculated following a code-approved methodology, including ACCA Manual J for residential buildings and ASHRAE/ACCA Standard 183 for commercial buildings. Calculating the building's design cooling load shall be at the 1% dry bulb cooling design temperature for the most relevant ASHRAE 2017 location. Below is an example of building load calculations, showing the building cooling load and cooling design temperature.

Cooling Load Calculations Example:



<u>Building Heating Load (BHL) –</u> Enter the total design heating load in British Thermal Units per hour (Btu/h) for the areas impacted by the clean heat project. BHL should be calculated following a code-approved methodology, such as ACCA Manual J for residential buildings and ASHRAE Standard 183 for commercial buildings. Calculating the building's design heating load shall be at the 99% dry bulb heating design temperature for the most relevant ASHRAE 2017 location. Below are examples of building load calculations, showing the building heating load and heating design temperature.

Heating Load Calculations Example:



In cases where an existing energy recovery ventilator also serves the bildign, the user should only enter the loads relating to the heat pump installation. Refer to the below heat load calculation:

	C	OOLING	COIL PEAK		(CLG SPAC	EPEAR	< C	F	EATING	COIL PEAK		TEMP	RATUR	ES
	Peaked	at Time: side Air:	Mo/H OADB/WB/H	R: 8/14 R: 88/72/	97	Mo/Hr: OADB	8 / 13 86	1		Mo/Hr: OADB:	Heating Design 2		SADB	Cooling 55.0	Heating 78.4
	s	Space Sens. + Lat.	Plenum Sens. + Lat	Net Total	Percent Of Total	Sensible	Percent Of Total			Space Peak Space Sens	Coil Peak Tot Sens	Percent Of Total	Return Ret/OA	76.1 76.1	65.3 65.4
		Btu/h	Btu/h	Btu/h	(%)	Btu/h	(%)	Envelope	Loads	Btu/h	Btu/h	(%)	Fn BidTD	0.0	0.0
Fo	or heat	pumps	s installed	l with a	an ER\	/, users	00	Skylite Roof Co	Cond	00	-1,874	0.00		0.0	0.0
						,	10	Glass S	olar	0	0	0.00		FLOWS	
l ch	nall ant	or tha l	ande ena	cific to	tho h	oot	0	Glass/E	oor Cond	-7,380	-7,380	5.48		Cooling	Heating
51			uaus spe	CIIIC LO		σαι	6	Wall Co	and	-7,982	-9,307	6.91	Diffusor	4 517	4 517
							0	Partition	n/Door	0	0	0.00	Terminal	4 517	4.517
l ni	Imn						00	Adiacen	at Eleon	0.00	0.00	0.00	Main Fan	4,517	4.517
	amp.						2	Infiltrati	IL FIOOF	-22 930	-22.930	17.03	Sec Fan	0	0
							10	Sub Tot		-38 292	-41.491	30.82	Nom Vont	1 301	1 301
													AHII Voot	1.301	1 301
1 1	41-1	DI	11 6	1		:- 04 0		Nnternal L	oads				Infil	308	308
1 IN	this ca	ase. B⊢	IL for the	neat p	umps	IS 64.3	13	Lights		0	0	0.00	MinStop/Rh	452	452
		,					54	People		õ	0	0.00	Return	6,125	6,125
N / 1	hh and	not 12		Thor	omoin	dorio	9	Misc		0	0	0.00	Exhaust	1,609	1,609
	un anu		94.0IVIDN.	THET	emair		76	Sub To	e/ ==>	0	0	0.00	Rm Exh	0	0
									1				Auxiliary	0	0
du 1	in to th						5	Ceiling L	oad	-3,199	0	0.00	Leakage Dwn	0	0
1 uu			•				0	Ventilatio	n Load	0	-31,364	23.30	Leakage Ups	0	0
1							0	Adj Air Tr	ans Heat	0	0	0			
								Ov/Undr	Sizing	0	2 00 4	0.00			
							0	CA Brobo	at Diff		65 570	-2.03	ENGINE	ERING	KS
Sup. Fa	an Heat			0	01			RA Prebe	at Diff.		-05,575	0.00		Cooling	Heating
Ret. Fa	n Heat		0	ő	ŏ			Additiona	Reheat		0	0.00	% OA	28.8	28.8
Duct He	eat Pkup		0	0	o								cfm/ft ²	0.97	0.97
Underfl	Ir Sup Ht P	kup		0	0			Underfir	Sup Ht Pkup		0	0.00	cfm/ton	314.47	
Supply	Air Leakag	e	0	0	0			Supply A	ir Leakage		0	0.00	ft²/ton	325.78	
Grand 1	Total ==>	141,075	19,101	160,177	100.00	98,986	100.00	Grand To	tal ==>	-41,491	-134,629	100.00	Btu/hr-ft ² No. People	36.84 216	-27.76
			COOLING	OIL SEL	ECTION					AREAS	5	HE	ATING COIL	SELECTI	ON
	tor	n MBh	Sens Cap. C MBh	cfm	°F	F gr/lb	°F	°F gr/lb	Gro	ss Total	ft ² (%)		MBh	cfm	°F °F
Main Cl	la 13.4	4 160.2	95.2	4.517	76.1 65	2 77.3	55.0 5	3.4 59.6	Floor	4.679		Main Htg	-64.3 V	RF4.517	65.4 78.4
Aux Clo	g 0.0	0.0	0.0	0	0.0 0.0	0.0	0.0	0.0 0.0	Part	0		Aux Htg	0.0	0	0.0 0.0
Opt Ver	nt 1.0	0 12.2	12.0	1,301	88.4 72	3 95.5	80.0 6	9.8 95.4	Int Door	1		Preheat	0.0	0	0.0 0.0
									ExFlr	0					
Total	14.4	4 172.4							Roof	1,355	0 0	Humidif	0.0	0	0.0 0.0
									wall	3,031	225 7	Opt Vent	-65.6 E	KV1,301	2.0 48.0
									Ext Door	46	0 0 1 1	Total	-129.9		

Minimum Code Required/ Existing HVAC System Type

New Construction Applications – a minimum code-compliant HVAC system will have to be selected:

Minimum Code Compliant HVAC System	Minimum Code Compliant Heating System Type	Natural Gas	r
		Natural Gas	
		Oil	
		Electric	
		District Steam	

Existing or Gut Renovation Applications- The existing HVAC system will have to be selected along with the option to choose from whether the system will be decommissioned, removed, or will remain in place (active):

Existing HVAC System	Existing Heating System Type	Natural Gas	•
	What Will Happen to the Existing Heating Systems?	Removed	

For New Construction, Existing-Retrofit and Gut Renovations applications, an NYCECC code minimum baseline will be used as a baseline for efficiency requirements as default, and users will not be required to make any specific selection in these scenarios for efficiency requirements.

Proposed Heat Pump System:

<u>Heating Controls</u> – Select heating controls strategy from the drop-down menu.

Proposed Heat Pumps			
	Heating Controls	Integrated Control	•
		Separate Control Integrated Control	

- Integrated Control This option covers two types of control strategies:
 - <u>Integrated/Modulating</u> The heat pump and backup heating system are on the same thermostat. The backup heater can modulate to meet the load without limiting the ASHP from delivering its maximum capacity.
 - Integrated/Fixed Capacity The ASHP and backup heating system are on the same thermostat. The backup heater has a fixed capacity to meet the load. The backup heater is larger than the ASHP, so the ASHP is not always able to deliver its maximum capacity (the backup heater supplies a larger share of the load when both are running).
- <u>Separate Control</u> The heat pump and backup heating system are on separate thermostats and controlled separately.

If there is no backup heating system in the proposed project, the user shall default to integrated control.

The following additional information is required for closed loop ground source systems:

Complete table below if G	Fround Source Heat Pump Type is selected:	
	Pumping Type	Sensorless Variable Speed
	Quantity of Duty Pumps	1
	Pump Horsepower	1
	Pump Motor Efficiency	82.5%
Closed Loop Ground	Pumping Design Power (kW)	1
Source Heat Pumps	Loop Туре	Closed Loop
	Average Ground Temp (F)	50
	Max Entering Water Temperature (EWT) (deg F) in Cooling	90
	Min Entering Water Temperature (EWT) (deg F) in Heating	30

- Pumping Type: Select pumping design methodology from drop down menu:
 - Constant Speed: Design does not incorporate variable speed pumping.
 - Traditional Variable Speed: Install a variable speed drive (VSD) to vary pump speed in 0 order to maintain the required pressure difference across all the heat pumps
 - Two Stage Speed: Install a two-speed motor that can operate at a lower speed (usually 0 60% of full speed). Usually, the change in speed is driven by a pressure difference measurement in building loop.
 - Sensor less Variable Speed: Uses a variable speed pump with internal controls to 0 modulate speed to maintain a constant pressure difference across a range of flows. These controllers use a sensor less control approach that attempts to mimic differentialpressure control without requiring a pressure sensor out in the building loop. The controller infers the pressure difference (at the pump) from measured current and speed. These pumps are common in small and medium applications up to 300-400 gpm.
- Quantity of Duty Pumps: Enter pump quantity
- Pump Horsepower: Enter pump horsepower
- Pump Motor Efficiency: Pump motor efficiency auto-populates based on horsepower of pump entered in field above. Motor efficiencies are based on NEMA premium motor efficiencies.
- Pumping Design Power (kW): Pumping design power auto-populates based on the entered quantity, pumping horsepower, motor efficiency, as well as an assumed load factor of 1:

Pumping Design Power (kW) = $\frac{Quantity \ x \ Horsepower \ x \ Load \ Factor$ *Motor Efficiency*

- Average Ground Temp (F): Enter average ground temperature
- Max Entering Water Temperature (EWT) (deg F) in Cooling: Enter the maximum temperature of the water entering the heat pump from the ground source system when operating in cooling mode.
- Min Entering Water Temperature (EWT) (deg F) in Heating: Enter the temperature of the water entering the heat pump from the ground source system when operating in heating mode.

Permits

For New Construction Applications, users will be prompted to fill in the code permit requirements as required:

	Energy Code Compliance Method		•
Permits	Section C406 Additional Efficiency Package Compliance	Prescriptive - Tabular Analysis Prescriptive - REScheck/COMcheck Total Building Performance - Energy Modeling	
	Baseline Efficiency as the basis from which to calculate savings	Minimum Code Efficiency + 10%	

<u>Energy Code Compliance Method</u> – Select the applicable energy code compliance path from the dropdown menu. According to the 2020 New York City / New York State Commercial (NYC/NYS) Energy Codes, projects may comply in the following ways:

- 1. Prescriptive Tabular Analysis:
- 2. Prescriptive REScheck/ COMcheck
- 3. Total Building Performance Energy Modeling

The prescriptive compliance path requires each building element to meet a minimum acceptable value listed by the referred energy code. In contrast, the total building performance involves building the virtual model of the project to predict energy usage against an acceptable baseline. The performance path allows the designers to make trade-offs between various components of the building envelope and the systems used for heating, cooling, and lighting. The existing building typically complies with the prescriptive path by submitting a tabular analysis or COM check. Refer to examples of a tabular analysis and COM check below.

<u>Section C406 Additional Efficiency Package Compliance (Commercial Code Only)</u> – The 2020 NYC/NYS Commercial Energy Codes require all projects following the prescriptive path to incorporate one of eight additional efficiency package options within their design. Users shall select which additional efficiency package option was used to comply with the code from the drop-down menu. Users may select "Not Applicable" if this requirement doesn't apply to the project (e.g., the project is a single-family or low-rise multi-family building that complies with the residential energy code). Users can determine which energy efficiency package the design complies with by consulting with the project's COMcheck or tabular analysis. See below.

COMcheck Example:



Tabular Analysis Example:

NYCECC Citation	Provision	Item Description	Code Prescriptive Value (ECC)	Proposed Design Value	Supporting Documentation
C406.1	Requirements (for ADDITIONAL EFFICIENCY PACKAGE OPTIONS)	Sample text: Choose one of six additional efficiency options	Buildings shall comply with at least one of the following: 1. More efficient HVAC performance in accordance with Section C406.2. 2. Reduced lighting power density system in accordance with Section C406.3. 3. Enhanced digital lighting controls in accordance with Section C406.4. 4. Provision of a dedicated outdoor air system with energy recovery ventilation for certain HVAC equipment in accordance with Section C406.5. 5. High-efficiency service water heating in accordance with Section C405.6. 6. Enhanced envelope performance in accordance with Section C406.7	Sample text: Reduced lighting power density system in accordance with Section C406:3.	Sample text: See note on EN-XXX
C406.2	More efficient HVAC	More efficient HVAC equipment	Sample text:	Sample text:	Sample text: See Mechanical
	equipment performance	performance	Equipment exceeds code min. by 10%:	1000 MBH gas-fired, hot water boiler @	schedule, drawing M-XXX
			1 MBTU/hr gas-fired, hot water boiler @ 80%	96% Et,	
			Et,	300 ton air-cooled chiller @ 12 EER, 16	
			300 ton air-cooled chiller @ 10.1 EER, 14 IPLV	IPLV	
C406.3	Reduced lighting power	Reduced lighting power density	Sample text:	Sample text:	Sample text: See RCPs, Lighting
	density		Lighting exceeds code min. by 10%:	Building Area Method	Schedule, LPD calculation, drawing A-
			Building Area Method	Office: 0.50 W/SF	XXX, EN-XXX
			Office: 0.69 W/SF		
C406.4	Enhanced digital lighting	Enhanced digital lighting	Interior lighting in the building shall have	Sample text:	Sample text: See RCPs, Lighting
	controls	controls	enhanced lighting controls that shall be	Office and lobby lighting provided as	Schedule, LPD calculation, drawing A-
			located, scheduled and operated in	per requirements	XXX, EN-XXX
	De disete des de se de	Dedicated and dealers in materia	accordance with Section C405.2.2 & C406.4	0 mm la hauta	One of the test of the barriers
C406.5	Dedicated outdoor air	Dedicated outdoor air system	Buildings covered by Section C403.4 shall be	Sample text:	Sample text: See Mechanical
	system	with energy recovery	equipped with an independent ventilation	nravidad to all accupied appear and in	schedule, arawing M-XXX
			minimum 100 percent outdoor air to cach	equipped with an Energy Recovery	
			individual occupied space, as specified by the	device	
			New York City Mechanical Code, and be	WE VILE	
			equipped with an energy recovery system		
			equipped with an energy recovery system.		1

2020 NYCECC Commercial Additional Efficencies Tabular Analysis

<u>Baseline Efficiency</u> – cells auto-populate based on construction type, Energy Code compliance pathway, and Section C406 compliance user inputs. Suppose a new construction project complies with the 2020 NYC/NYS Commercial by providing more efficient HVAC. In that case, baseline efficiencies will be set as the minimum code efficiency for the selected baseline equipment + 10%. This field should yield 'Minimum Code Efficiency' in all other cases.

s	Energy Code Compliance Method	Prescriptive - REScheck/COMcheck	
nit	Section C406 Additional Efficiency Package Compliance		
eri	(New Construction - 2020 Commercial Energy Code Only)	Not Applicable	
-	Baseline Efficiency	Minimum Code Efficiency	
	Indicates that baseline equipment efficiencies will be equivalent to the minimum code efficient for that equipment + 10%. E.g. if minimum boiler efficiency in code is 80%, the baseline boiler efficiency used in code will be 88%.		

SECTION 1

B) Project Application Submission- Heat Pump + Building Envelope Upgrade and/or Energy Recovery Ventilator (ERV)

Based on the type of application as discussed in detail under Section 1 A), the following sections will also have to be filled in for applications under Cat 4A as applicable:

- 1) Building Characteristics
- 2) Design Temperatures
- 3) Minimum Code/ Existing Building Loads
- 4) Minimum Code Complaint/ Existing HVAC System Type
- 5) Permits
- 6) Proposed Heat Pump
- 7) Existing HVAC System Efficiency

Refer to Section 1A for detailed guidance and steps to complete fields (1-5) listed above

Under the Building Characteristics section, select the specific type of technology

1		Project Information	
2		Zip Code	10577
4		Utility	Con Edison
7		Program	Multifamily
8		Building Type (If Custom, fill in Custom Information in cells G4:J37)	Multifamily
9		# of dwellings > 2,000SF	100
10	Building Channets dation	# of dwellings < 2,000SF	1
11	Building Characteristics	Construction Type	New Construction
13		Gross Building Area impacted by SOW (SF)	449,000
14		LMI Building	non-LMI
15		Floor to Floor Height (ft)	9
17	7	Scope of work - Heat Pump installation - Bundle Set: Heat Pumps with Envelope Ungrades and/or ERVs	Bundle Set
28		bundle set. Heat Fullips with Envelope opgrades and/or Envis	Heat Pumps
			Bundle Set

Please Note: For Applications installing Heat Pump +ERV- (Cat 4) – users are still prompted to select Bundle Set from the drop-down shown in the above snippet. However, they will be prompted to enter the same building heating and cooling loads in the baseline and the proposed case scenario.

Users should select 'Yes' under the Cat 4A Inputs for ERV selection. However, enter the same loads in the proposed case as in the pre or existing case scenario before installation.

6) Proposed Building Envelope Upgrade

Category 4 A Inputs			
	Building Loads source:	Manual J or ACCA 183 calculations	
Loads Served by Heat Pumps and ERVs after Envelope	Insert Building Loads from Manual J or ACCA 183	Data per Manual J or ACCA 183 load calculations	
Improvements	BCL Building Cooling Load (Btu/hr) [Eligible Loads Only]	750,215	
	BHL Building Heating Load (Btu/hr) [Eligible Loads Only]	714,600	
ERV	Proposed Heat Pump system design includes ERV or HRV	Yes	
	Select Heat Pump system that uses ERV or HRV	Air Source, not NEEP listed	

Based on the building & the construction type, users will be prompted to select load calculations submitted through Manual J or ACCA 183 submissions. Enter the BCL & BHL values from the load calculations in the yellow input cells- C62,63

If the heat pump design application also involves Energy Recovery or Heat Recovery Ventilators, select Yes from the drop-down in cell C64. Users will also be filling out the information specific to the Energy Recovery Ventilation/ Heat Recovery Ventilation system by completing the Tab 'ERV'.

Refer pg. 32 for guidance on how to complete the ERV tab

7) Existing HVAC System Efficiency

For Existing or Gut Renovation Applications, users will also be prompted to fill in the cooling and heating efficiency. Users will be prompted to select a default option of the Existing Equipment select 'Custom' option from the yellow input drop downs from cell C71-73

Existing HVAC system efficiency			
Existing UVAC system	Existing HVAC System Cooling Efficiency (EER)	Existing Equipment	
Existing HVAC system	Existing HVAC System Heating Efficiency (%)	Existing Equipment	

And fill in values for cooling & heating capacity and efficiency for existing HVAC units cell G71-L91

Complete table below if Existing Equipment Custom Efficiency is selected:					
Unit #	Cooling capacity	Heating capacity	Cooling efficiency EER	Cooling efficiency SEER (if available)	Heating efficiency COP
1	100	100	9	12	0.78
2					
3					
4					
5					
6					
7					
9					
10					
11					
12					
13					
14					
15					
Total	100	100			
		Weighted avg Efficiency	9	0	0.78

Existing heating efficiencies can be confirmed after performing combustion testing results on the existing boilers and cooling efficiencies can be confirmed from the type of cooling equipment and name plate data.

SECTION 2

A) Rough Estimate Submission- Heat Pump Upgrade

Follow this section if the project application involves replacing/upgrading the heat pump system only. It includes all heat pump categories (1,2,4,5,6) except Category 4A.

Please Note: For Category 4A (Heat Pump + Building Envelope Upgrade) and /or ERV/HRV combined project application, follow Section 2 B) which comes after this section on Pg 21. of this document.

Depending on the availability of appropriate required documentation, users can select options from the drop-down in cell E6 to submit a complete project application or get a rough estimate for the project by choosing the Demo Mode as shown below:

	Utility	Con Edison
	Program	Multifamily
	Building Type (If Custom, fill in Custom Information in cells G4:J37)	Multifamily
	# of dwellings > 2,000SF	100
Building Characteristics	# of dwellings < 2,000SF	1
	Construction Type	Existing Building - Retrofit
	Gross Building Area impacted by SOW (SF)	449,000
	LMI Building	non-LMI
	Floor to Floor Height (ft)	9
	Scope of work	
	- Heat Pump installation	Bundle Set
	- Bundle Set: Heat Pumps with Envelope Upgrades and/or ERVs	



submission.

Rought Estimate Mode is used only for feasibility studies.

Users will be required to input fewer mandatory sections compared to the project application submission mode, which enables them to get a rough estimate of the overall savings and incentive. This rough estimate should aid users in making further feasibility decisions to pursue the project.

Following fields will have to be completed depending on the building and/or construction type:

- 1) Building Characteristics
- 2) Design Temperatures
- 3) Minimum Code Complaint/ Existing HVCA System type
- 4) Permits
- 5) Proposed Heat Pumps

For detailed description on 1-4, refer Section 1A listed on page 7

5)Proposed Heat Pump System

This section will only be prompted for Demo or Rough Estimate Selection

Heat Pump Type- Select the type of heat pump system from the following options:

- Air Source
- Ground Source
- <u>Mini-Split Air Source</u>

Air Source Heat Pumps for Space Heating application include:

- a. Cold Climate Air-to-Air Single Packaged Heat Pumps
- b. Air-to-Air Large Commercial Unitary heat pumps (single packaged or split system)
- c. Air Source Variable Refrigerant Flow heat pumps; and
- d. Packaged Terminal Heat Pumps

SECTION 2

B) Rough Estimate Submission- Heat Pump + Building Envelope Upgrade and /or ERV/HRV

Users will be required to input fewer mandatory sections compared to the project application submission mode, which enables them to get a rough estimate of the overall savings and incentive. This rough estimate should aid users in making further feasibility decisions to pursue the project.

The Following fields will have to be completed depending on the building and/or construction type

- 1) Building Characteristics
- 2) Design Temperatures
- 3) Minimum Code Complaint/ Existing HVCA System type
- 4) Permits
- 5) *Existing HVAC System Efficiency
- 6) Proposed Building Envelope Upgrades

Refer to Section 1A for detailed guidance and steps to complete the numbered fields listed above (1-4)

Under the Building Characteristics section, select the specific option based on the scope of work. For Heat Pump + Envelope Upgrade and /or ERV, select Bundle Set from the below drop-down option:

1		Project Information		
2		Zip Code	11201	
4		Utility	Con Edison	
7		Program	Multifamily	
8		Building Type (If Custom, fill in Custom Information in cells G4:J37)	Multifamily	
9		Construction Type	Existing Building - Retrofit	
10		Year of construction if renovation	Old (before 1950)	
11	Building Characteristics	Gross Building Area impacted by SOW (SF)	20,000	
12		LMI Building	non-LMI	
13		Floor to Floor Height (ft)	9	
		Scope of work - Heat Pump installation - Bundle Set: Heat Pumps with Envelope Upgrades and/or ERVs	Bundle Set	
15				*
26			Heat Pumps	
		I	Bundle Set	

5)* *Existing HVAC System Efficiency*- Applicable only for Existing Building Retrofit/ Gut Renovations applications.

Select appropriate existing HVAC system cooling efficiency from the drop-down options based on the system type:

Existing HVAC system efficiency						
Existi	ting HVAC System Cooling Efficiency (EER)	Central Cooling System Efficiency,Eff. >12EER				
Existing HVAC system	ting HVAC System Heating Efficiency (%)	No Cooling Central Cooling System Efficiency,Eff. > 12EER Central Cooling System Efficiency, Eff. < 12EER Window AC Units				
		WINDOW AC UNITS				

Existing HVAC Cooling Efficiencies can be confirmed based on the type of cooling equipment and from the name /model plate

Select appropriate existing HVAC system heating efficiency from the drop-down options based on the heating system type

Existing HVAC system efficiency							
	Existing HVAC System Cooling Efficiency (EER)	Central Cooling System Efficiency,Eff. >12EER					
Existing HVAC system	Existing HVAC System Heating Efficiency (%)	Gas/Oil Equipment Efficiency, Eff. = 70%-80%					
		Gas/Oil equipment (unknown efficiency) Gas/Oil Equipment Efficiency, Eff 80% Gas/Oil Equipment Efficiency, Eff 70%-80% Gas/Oil Equipment Efficiency , Eff. <70%					

Existing HVAC heating efficiencies can be confirmed after the boiler testing and combustion testing results done before demolition or removal of the equipment

New Construction applications will consider a minimum code compliant HVAC system baseline efficiency based on selected code complaint HVAC system type. Users do not have to input baseline efficiencies for new construction projects, as the calculator defaults to the code minimum efficiencies.

Please Note: For Applications installing Heat Pump +ERV- (Cat 4) – users are still prompted to select Bundle Set from the drop-down shown in the above snippet. However, they will be prompted to enter the same building heating and cooling loads in the baseline and the proposed case scenario.

Users should select 'Yes' under the Cat 4A Inputs for ERV selection. However, enter the same loads in the proposed case as in the pre or existing case scenario before installation.

6) Proposed Building Envelope Upgrades-

Users will be asked to enter loads specific to the project type generated by the load calculations.

As this is a rough estimate, an analysis is based on a reduction in the building loads due to building envelope upgrades. Users will be prompted to select options from the drop-down based on their estimate of potential decreases in the BHL & BCL.

The following selection is recommended for New Construction Facilities:

- Tier 1A- (3% reduction in BHL/BCL)
- Tier 1B- (5% reduction in BHL/BCL)
- Tier 2-(10% reduction in BHL/BCL)-



****Note:** Heating and cooling loads added to the category 4A inputs shall be adjusted to account for load reductions that are achieved where Energy Recovery Systems are utilized in the HVAC system in accordance with 'ASHRAE HVAC Systems & Equipment Handbook' or an approved equivalent computational procedure. Load shall be calculated as such when ERV/HRV are present.

The following selection is recommended for the Existing Facilities and Gut Renovation:

- Tier 1A- (15% reduction in BHL/BCL)
- Tier 1B- (25% reduction in BHL/BCL)
- Tier 2-(35% reduction in BHL/BCL)

56	Category 4 A Inputs									
57										
58		Building Loads source:	Rough Estimate							
59	Loads Served by Heat Pumps and ERVs after Envelope	Choose Building Envelope upgrade level, % reduction in BHL or BCL: - Tier 1A: 15% - Tier 1B: 25% - Tier 2: 35% reduction in BHL or BCL	Rough Estimate: Tier 1A	F						
60	Improvements	BCL Building Cooling Load (Btu/hr) [Eligible Loads Only]	Rough Estimate: Tier 1A Rough Estimate: Tier 1B Rough Estimate: Tier 2							
61		BHL Building Heating Load (Btu/hr) [Eligible Loads Only]		_						
62	2 ERV	Proposed Heat Pump system design includes ERV or HRV								
63		Select Heat Pump system that uses ERV or HRV								

Tab: Eqpt Sched & Eligibility

Overall layout of this tab has been modified

to accommodate all the essential inputs pertaining to the heat pump system and have a clear understanding to the users to make the inputs.

Tab is rearranged to collect information pertaining to General Data for the Heat Pumps, Air Sourced Heat pumps, NEEP listed equipment and Ground Source Heat Pump.

General data:

		General Data								
Heat Pump Technology	Outdoor Unit Tag(s) (OPTIONAL)	Outdoor Unit Quantity	Application	Ducted / Non- Ducted / Mix	Heating Section Type	Heat Recovery	Make	Model	Total Heating Capacity at Design Temperature (OPTIONAL)	AHRI Certific No. (OPTIONAL
Single Package Vertical Heat Pump		1	Cooling and Heating	Non-Ducted	All		Daikin	RXTQ36TAVJ9 A		
NEEP Listed Centralized Air Source Heat Pump (<65kbtu cooling)		371	Cooling and Heating	Non-Ducted	All		de minimum	Code		
Large Unitary Air Source Heat Pump		1	Cooling and Heating	Non-Ducted	Electric Resistance (or None)		LG	ARUM096		

<u>Heat Pump Technology</u> – Select applicable heat pump technology proposed for installation from the dropdown menu:

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- NEEP-listed Cold Climate Single Package Air Source Heat Pump
- NEEP-listed Cold Climate Mini-Split Heat Pump
- Air Source Variable Refrigerant Flow Heat Pump
- Large Unitary Air Source Heat Pump
- Package Terminal Heat Pump
- Single Package Vertical Heat Pump
- Large Unitary Ground Source Heat Pump, Brine to Water Ground Loop
- Large Unitary Ground Source Heat Pump, Brine to Air Ground Loop
- Ground Source Variable Refrigerant Flow Heat Pump

Tab utilizes conditional formatting; Once a heat pump technology is selected from the drop-down menu, cells that are not applicable to the technology selected will be shaded using a hatching pattern. **Users should not fill information into hatched cells.**

Heat Pump Technology	Heating Section Type	Heat Recovery	
Conditional formatting is enabl using a hatching pattern that are heat pump technology selected	led to shade cells e not related to the . Users should not		
NEEP Listed Cold C enter information into ha	tched cells.		
NEEP Listed Cold (
NEEP Listed Cold Climate Mini-Split Heat Pump	All		
NEEP Listed Cold Climate Mini-Split Heat Pump	All		
NEEP Listed Cold Climate Mini-Split Heat Pump	All		
Air Source Variable Refrigerant Flow Heat Pump	Electric Resistance (or None)	With Heat Recovery	

<u>Outdoor Unit Tag(s)</u> – Enter equipment name tag or identifier. This is an optional cell.

Outdoor Unit Quantity – Enter quantity of outdoor condensers.

<u>Application –</u> Select application of heating pump installation from drop-down menu. Only heat pumps providing heating and cooling <u>**OR**</u> heating only are eligible for program incentives. If user selects 'cooling only' from drop down, row will highlight red to flag that equipment is not eligible for clean heat incentives.

		Du
Heat Pump Technology	Application	
Cooling only heat pumps are not eligible for clean heat. Red conditional formatting indicates an eligibility issue.		
NEEP LISTED COID CIIMATE MINI-Split Heat Pump	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump	Cooling Only	
NEEP Listed Cold Climate Mini-Split Heat Pump	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump	Cooling and Heating	
NEEP Listed Cold Climate Mini-Split Heat Pump	Cooling and Heating	
Air Source Variable Refrigerant Flow Heat Pump	Cooling and Heating	

<u>Ducted / Non-Ducted / Mix</u> – Select the ducting configuration.

<u>Heating Section Type</u> – Some heat pumps may have an integrated supplemental heating source such an electric resistance strip or gas furnace to assist with providing heating at low outdoor air temperatures. Select from available options in the drop-down menu. Note that only one option is available for selection for all heat pump technologies other than 'Large Unitary Air Source Heat Pumps'. For these technologies, the user shall select the one available option. For 'Large Unitary Air Source Heat Pump' user's may select from 'Electric Resistance Heating (or None)' or 'All Other'. In other words, if the Large

Unitary Air Source Heat Pump has an integrated electric resistance strip or has no supplemental heating source, select 'Electric Resistance (or None)'. In all other cases, select 'All Other'.

Heat Pump Technology	Heating Section Type	Heat
Large Unitary Air Source Heat Pump		•
Electric Resistance (or None)		
All Other		

<u>Heat Recovery</u> – Select whether units have heat recovery. Cell applies to VRF systems only. For all other technologies, cell will be hatched.

Make - Enter manufacturer of proposed equipment.

Model – Enter proposed equipment model.

<u>Total Heating Capacity at Design Temperature:</u> If known, user shall enter the manufacturer heating output for heat pump appliance at the heating design temperature. Note this is NOT the same as the rated heating capacity. If unknown, leave this cell blank.

AHRI Certificate Number: This is an optional field. Enter the AHRI Certified Reference number.

Certificate of F	Product	Ratings
AHRI Certified Reference Number : 204717989	Date : 03-01-2021	Model Status : Active
AHRI Type : HRCU-A-CB-O (Mini-Split Heat Pump, v	vith Remote Outdoor Unit Air-Sou	urce, Free Delivery)
Outdoor Unit Brand Name : DAIKIN		
Outdoor Unit Model Number : RXL12QMVJU9		
Indoor Type : Mini-Splits (Non-Ducted)		
Indoor Model Number(s) : FVXS12NVJU		
Rated as follows in accordance with the latest edition Air-Conditioning & Air-Source Heat Pump Equipment	of AHRI 210/240 with Addendur and subject to rating accuracy b	n 1, Performance Rating of Unitary y AHRI-sponsored, independent, third party testing:
Cooling Capacity (95F) : 10200		
EER (95F) : 12.00		
SEER : 20.00		
High Heat (47F) : 13000		
Low Heat (17F) : 8300		
HSPF : 11.40 Sold in? : USA, Canada		

Air Sourced Heat Pump- AHRI Specific Information:

Statewide Clean Heat Program Savings Calculator v2.2.2-User Guide

ASHP										
	ASHP Heating Efficiency Characteristics							P Cooling Efficie	ency Characteri	stics
Proposed Heating Efficiency from AHRI Certificate (HSPF)	Proposed Heating Efficiency from AHRI Certificate (HSPF2)	ASHP: Rated Heating Capacity from AHRI Certificate at 17 °F (Btu/h)	ASHP: Rated Heating Capacity from AHRI Certificate at 47 °F (Btu/h)	ASHP: Rated Cooling Capacity at 95 F from AHRI Certificate (Btu/h)	ASHP: Rated Proposed Heating Efficiency at 17 °F from AHRI Certificate (COP17)	ASHP: Rated Proposed Heating Efficiency at 47 °F from AHRI Certificate (COP47)	Proposed Cooling Efficiency from AHRI Certificate (SEER)	Proposed Cooling Efficiency from AHRI Certificate (SEER2)	ASHP: Proposed Cooling Efficiency from AHRI Certificate (EER)	ASHP: Proposed Cooling Efficiency fron AHRI Certificate (IEER)
8.00	9.00	23,600	37,000	34,200				15	12	
8.20		37,000	57,000	46,250			0	15	9.8	
		67.000	102.000	02.000	2.05	4.00			11.1	22

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The following cells should be filled out based on the proposed equipment's AHRI certificate; Only fill in cells related to the selected heat pump technology (i.e. cells not formatted with pattern hatching):

ASHP Heating Efficiency Characteristics:

- Rated Proposed Heating Efficiency at 17 °F from AHRI Certificate (COP17): Applies to air source VRFs (tested under AHRI 1230) and AHRI certified large air source heat pumps (tested under AHRI 340/360)
- Rated Proposed Heating Efficiency at 47 °F from AHRI Certificate (COP47)
- Proposed Heating Efficiency from AHRI Certificate (HPSF): Applies to cold climate air source heat pumps only (tested under AHRI 210/240)
- Proposed Rated Heating Capacities at 17 and 47 deg F: Applies to Air Sourced VRFs and certified large air sourced heat pump

Certificate of Pro	duct R	atings
AHRI Certified Reference Number : 204717989 Da	ate : 03-01-2021	Model Status : Active
AHRI Type : HRCU-A-CB-O (Mini-Split Heat Pump, with Remote	Outdoor Unit Air-Source,	Free Delivery)
Outdoor Unit Brand Name : DAIKIN		
Outdoor Unit Model Number : RXL12QMVJU9		
Indoor Type : Mini-Splits (Non-Ducted)		
Indoor Model Number(s) : FVXS12NVJU		
Rated as follows in accordance with the latest edition of AHRI 210 Air-Conditioning & Air-Source Heat Pump Equipment and subject	0/240 with Addendum 1, F t to rating accuracy by AHI	erformance Rating of Unitary RI-sponsored, independent, third party testing:
Cooling Capacity (95F) : 10200		
EER (95F) : 12.00		
SEER : 20.00	Rated Heat	ing
High Heat (47F) : 13000	Capacities at 4	7 deg
Low Heat (17F) : 8300	F and 17 de	g F
HSPF : 11.40 Sold in? : USA, Canada		TIFIFN®

See Examples Below:

AHRP CERTIFIED® www.ahridirectory.org Certificate of Pr	roduct R	atings
AHRI Certified Reference Number : 205281459	Date : 09-16-2020	Model Status : Active
Brand Name : LG		
AHRI Type : HMSR-A-CB		
Indoor Type : Ducted Indoor Units		
System Model Number :ARUM096BTE5		
Module Model Number 1 : ARUM096BTE5		
Rated as follows in accordance with the latest edition of Al subject to rating accuracy by AHRI-sponsored, independe	HRI Standard 1230 for VRF Aiı nt, third party testing:	-Conditioning and Heat Pump Equipment and
Cooling Capacity (95F) : 92000		
EER (95F) : 13.50		
IEER : 25.10		
SCHE : 27.00		
High Heating Capacity (47F) : 103000 High COP (47F) : 3.66 Low Heating Capacity (17F) : 67000 Low COP (17F) : 2.73	Rated Heating COP at 47 deg F and 17 deg F	TIFIED®

ASHP Cooling Efficiency Characteristics:

- Rated Cooling Capacity at 95 F from AHRI Certificate (Btu/h): Applies to cold climate NEEP-listed air source heat pumps and mini-splits (tested under AHRI 210/240), air source VRFs (tested under AHRI 1230) and AHRI certified large air source heat pumps (tested under AHRI 340/360)
- Proposed Cooling Efficiency from AHRI Certificate (SEER): Applies to cold climate NEEP-listed air source heat pumps and mini-splits (tested under AHRI 210/240)
- Proposed Cooling Efficiency from AHRI Certificate (EER): Applies to cold climate NEEP-listed air source heat pumps and mini-splits (tested under AHRI 210/240), air source VRFs (tested under AHRI 1230) and AHRI certified large air source heat pumps (tested under AHRI 340/360)
- Proposed Cooling Efficiency from AHRI Certificate (IEER): Applies to air source VRFs (tested under AHRI 1230) and AHRI certified large air source heat pumps (tested under AHRI 340/360)

Statewide Clean Heat Program Savings Calculator v2.2.2-User Guide

Example:

Certificate of F	Product I	Ratings
AHRI Certified Reference Number : 205281459	Date : 09-16-2020	Model Status : Active
Brand Name : LG		
AHRI Type : HMSR-A-CB		
Indoor Type : Ducted Indoor Units		
System Model Number :ARUM096BTE5		
Module Model Number 1 : ARUM096BTE5		
Rated as follows in accordance with the latest edition of subject to rating accuracy by AHRI-sponsored, indepe	of AHRI Standard 1230 for VRF ndent, third <u>party testing:</u>	Air-Conditioning and Heat Pump Equipment and
Cooling Capacity (95F) : 92000	Rated Coo	bling
EER (95F) : 13.50	Capacity 95	deg F
JEER : 25.10	Proposed Cooling	
SCHE : 27.00	Efficiency EER and	
High Heating Capacity (47F) : 103000	IEER	
High COP (47F) : 3.66		
Low Heating Capacity (17F) : 67000		
Low COP (17F) : 2.73		

NEEP Listed Equipment:

<u>Is Equipment NEEP-listed –</u> Cell applies to 'Cold Climate Air Source Heat Pump' and 'Cold Climate Mini-Split Heat Pump' technology types only. If 'No' is selected, row will conditionally format in red, indicating the unit may not be eligible for program incentives. Users should continue to fill in performance data for this technology, despite the unit potentially being ineligible. Data should be entered into any cells that are not hatched.

Note that per the Statewide Program Manual, air source heat pumps and mini-splits that are tested under AHRI Standard 210/240 but are not NEEP-listed are eligible for program incentives under Category 4 Custom Space Heating Applications if the Participating Contractor submits manufacturer performance data showing the units meet or exceed the NEEP ccASHP specification. This calculator, however, is not programmed to calculate savings for Non-NEEP-listed ccASHP and ccMSHPs. Therefore, if the non-NEEP-listed unit is eligible, the Participating Contractor should submit separate custom calculations for this technology.

ls Equipment NEEP Listed	Minimum Heating Capacity at 5 °F (From NEEP list, Btu/h)	Maximum Heating Capacity at 5 °F (From NEEP list, Btu/h)	Minimum Heating Capacity at 17 °F (From NEEP list, Btu/h)	Maximum Heating Capacity at 17 °F (From NEEP list Btu/h)
No				23.6000
Yes	26,000	31,000	33,000	37,000

NEEP Heating Efficiency Characteristics:

The following cells should be completed for NEEP-listed cold climate air source heat pumps and minisplits only; for all other technologies, cells will be hatched-out.

- Minimum Heating Capacity at 5 °F
- Maximum Heating Capacity at 5 °F
- Minimum Heating Capacity at 17 °F
- Maximum Heating Capacity at 17 °F
- Minimum Heating Capacity at 47 °F
- Maximum Heating Capacity at 47 °F
- Minimum Cooling Capacity at 82 °F
- Maximum Cooling Capacity at 82 °F
- Minimum Cooling Capacity at 95 °F
- Maximum Cooling Capacity at 95 °F
- Minimum Proposed Heating Efficiency at 5 °F from NEEP list (COP5 Min)
- Maximum Proposed Heating Efficiency at 5 °F from NEEP list (COP5 Max)
- Minimum Proposed Heating Efficiency at 17 °F from NEEP list (COP17 Min)
- Rated Proposed Heating Efficiency at 17 °F from NEEP list (COP17)
- Maximum Proposed Heating Efficiency at 17 °F from NEEP list (COP17 Max)
- Minimum Proposed Heating Efficiency at 47 °F from NEEP list (COP47 Min)
- Rated Proposed Heating Efficiency at 47 °F from NEEP list (COP47)
- Maximum Proposed Heating Efficiency at 47 °F from NEEP list (COP47 Max)

Example for Heating Capacities:

Locate the Minimum, Rated, and Max Heating Capacities at 5 deg F, 17 deg F, and 47 deg F respectively for the specific make/model heat pump.

Mits Multiz AHRI (Outdo Indoo Maa Rat	ubishi Electric S-Series one All Ducted Eart #: 201754639 or Unit #: PUMY-P60NKMU* Unit #: imum Heating Capacity (Btu/hr) ed Heating Capacity (Btu/hr) @9) @5°F: 42,000 17°F: 66,000 95°F: 60,000				·		
Information lables		Performa	ince Specs	5				
Brand	Mitsubishi Electric	Heating /	Outdoor	Indoor Dry				
Series	S-Series	Cooling	Dry Bulb	Bulb	Unit	Min	Rated	Max
Ducting Configuration	Multizone All	Heating	5°F	70°F	Btu/h	9,808	-	42,000
	Ducted				kW	0.99		6.75
AHRI Certificate No.	201754639				COP	2.9		1.82
Outdoor Unit #	PUMY-	Heating	17°F	70°F	Btu/h	14,121	41,500	41,500
	P60NKMU*				kW	1.2	4.95	4.68
Indoor Unit Type	Ducted Indoor Units				COP	3.45	2.46	2.6
Indoor Unit #		Heating	47°F	70°F	Btu/h	19,526	66,000	66,000
Euroace Unit #					kW	1.03	5.23	5.23
					COP	5.56	3.7	3.7

Example for Cooling Capacities:

FUJITSU Multizone A AHRI Cert # Outdoor Unit Indoor Unit A Raximum & Rated He & Rated Co	J-Series II Non-ducted : 8693480 iit #: AOU3GRLAVM #: h Heating Capacity (B ating Capacity (Btu/h oling Capacity (Btu/h	tu/hr) @5°F: r) @47°F: 42 r) @95*F: 36	37,900 .000 ,000			Minimum, and Max Cooling Capacities at 82 deg F and 95 deg F respectively for the specific make/model heat pump.		
nformation Tables		Perform	ance Sp	ecs				
Brand	FUJITSU	Heating	Outdoor	Indoor				
Series	J-Series	/Cooling	Dry Bulb	Dry Bulb	Unit	Min	Rated	Max
Ducting Configuration	Multizone All	Heating	-4°F	70°F	Btu/h	12,960	-	33,600
	Non-ducted				kW	1.13	-	3.74
AHRI Certificate No.	8693480				COP	3.36	-	2.63
Outdoor Unit #	AOU36RLAVM	Heating	5°F	70°F	Btu/h	14,860	-	37,900
Indoor Unit Type	Non-Ducted Indoor Units				kW COP	1.1	-	4.06
Indoor Unit #		Heating	17°E	70°E	Rtu/b	16.460	25 900	42 00
Furnace Unit #		meaning	17.1	701	LAN/	1.3	23,300	42 00
SEER	19				COD	1.2	2.7	
EER	13.3		1705	2015	COP	4.	2.0	12.1
HSPF Region IV	11.4	Heating	4/ 1	70 F	Btu/h	00	42,000	42 00
Energy Star	~				KVV	0.	3.2	3.4
Variable Capacity	~				COP	5.	3.85	3.2
Turndown Ratio (Max 5°F/Min 47°F)	ax 5°F/Min 2.3		82"F	80°F	kW	0.2	-	2.37
Capacity Maintenance (Max	90%				COP	5.	-	4.45
5°F/Max 47°F)		Cooling	95°F	80°F	Btu/h	18,190	36,000	36,000
Capacity Maintenance (Rated	61%				kW	1.09	2.71	2.71

	Mitsubishi Electric S-Series Multizone All Ducted AHRI Cert #: 201754639 Outdoor Unit #: PUMY-P60NKMU* Indoor Unit #: Maximum Heating Capacity (Btu/hr) Rated Heating Capacity (Btu/hr) @ Rated Cooling Capacity (Btu/hr) @	r) @5°F: 42,000 47°F: 66,000 95°F: 60,000	Locate and Ma deg F deg F specif
Information Tables		Performance Specs	

Locate the Minimum, Rated, and Max Heating COPs at 5 deg F, 17 deg F, and 47 deg F respectively for the specific make/model heat pump.

		renormance opecs								
Brand	Mitsubishi Electric	Heating /	Outdoor	Indoor Dry	1114	Min	Datad	Mary		
Series	S-Series	Cooling	Dry buib	Buib	Unit	wiin	Rated	IVIAX		
Ducting Configuration	Multizone All	Heating	5°F	70°F	Btu/h	9,808	-	42,000		
	Ducted				kW	0.99	-	6.75		
AHRI Certificate No.	201754639				COP	2.9	-	1.82		
Outdoor Unit #	PUMY-	Heating	17°F	70°F	Btu/h	14,121	41,500	41,500		
	P60NKMU*				kW	1.2	4.95	4.68		
Indoor Unit Type	Ducted Indoor Units				COP	3.45	2.46	2.6		
Indoor Unit #		Heating	47°F	70°F	Btu/h	19,526	66,000	66,000		
Eurnace Unit #					kW	1.03	5.23	5.23		
	17				COP	5.56	3.7	3.7		

NEEP Cooling Efficiency Characteristics:

The following cells should be completed for NEEP-listed cold climate single package air source heat pumps and mini-splits only; for all other technologies, cells will be hatched-out.

• Minimum Proposed Cooling Efficiency at 82 °F from NEEP list (COP82 Min)

Statewide Clean Heat Program Savings Calculator v2.2.2-User Guide

- Maximum Proposed Cooling Efficiency at 82°F from NEEP list (COP82 Max) •
- Minimum Proposed Cooling Efficiency at 95 °F from NEEP list (COP95 Min) •
- Rated Proposed Cooling Efficiency at 95°F from NEEP list (COP95) •
- Maximum Proposed Cooling Efficiency at 95°F from NEEP list (COP95 Max) •

Example:



FUJITSU J-Series Multizone All Non-ducted AHRI Cert #: 8693480 Outdoor Unit #: AOU36RLAVM Indoor Unit #:

INFINITE COMFORT & 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

Locate the Minimum, Rated, and Max Cooling COPs at 82 deg F and 95 deg F respectively for the specific make/model heat pump.

Information Tables			Perform	ance Sp	ecs				
Brand	FUJITSU		Heating	Outdoor	Indoor				
Series	J-Series		/Cooling	Dry Bulb	Dry Bulb	Unit	Min	Rated	Max
Ducting Configuration	Multizone All		Heating	-4°F	70°F	Btu/h	12,960	-	33,600
	Non-ducted					kW	1.13	-	3.74
AHRI Certificate No.	8693480					COP	3.36	-	2.63
Outdoor Unit #	AOU36RLAVM		Heating	5°F	70°F	Btu/h	14,860	-	37,900
Indoor Unit Type	Non-Ducted					kW	1.1	-	4.06
	Indoor Units					COP	3.96	-	2.74
Indoor Unit #			Heating	17°F	70°F	Btu/h	16,460	25,800	42,000
Furnace Unit #						kW	1.2	2.7	4.43
SEER	19					COP	4.02	2.8	2.78
EER	13.3		Heating	47°F	70°F	Btu/h	16,460	42,000	42,000
HSPF Region IV	11.4		5			kW	0.87	3.2	3.2
Energy Star	×					COP	5 54	3.85	3.85
Variable Capacity	 Image: A second s		Cooling	0.0°E	00°E	P+u/b	10 100	5.05	26.000
Turndown Ratio (Max 5°F/Min	2.3		cooning	02 F	00 F	Lan(0.05	-	30,000
47°F)						KVV	0.95	-	2.37
Capacity Maintenance (Max	90%					COP	5.61	-	4.45
5°F/Max 47°F)			Cooling	95°F	80°F	Btu/h	18,190	36,000	36,000
Capacity Maintenance (Rated	61%	_				kW	1.09	2.71	2.71
1/ F/Rated 4/ F)						COP	4.89	3.89	3.89
	0.04/								

Ground Sourced Heat Pump:

For heat pump technologies other than the Ground Sourced- Brine to Air or Brine to water & Variable Refrigerant Sourced, the cells underneath GSHP will be hatched out.

		GSHP Coolir	GSHP Cooling Efficiency Characteristics						
Closed Loop GSHP: Rated Heating Capacity from AHRI Certificate at 41 F (Btu/h)	Closed Loop GSHP: Rated Part Load Heating Capacity from AHRI Certificate at 41 F (Btu/h)	Open Loop GSHP: Rated Cooling capacity from AHRI Certificate at 59 F (Btu/h)	Closed Loop GSHP: Rated Full Load Cooling Capacity from AHRI Certificate at 68 F (Btu/h)	Closed Loop GSHP: Rated Part Load Cooling Capacity from AHRI Certificate at 68 F (Btu/h)	Closed Loop GSHP: Proposed Rated Heating <u>Full Load</u> Efficiency at 41 F from AHRI Certificate	Closed Loop GSHP: Proposed Rated Heating <u>Part Load</u> Efficiency at 41 F from AHRI Certificate	Open Loop GSHP: Prposed Cooling Efficiency at 59 F from AHRI Certifiate (EER)	Closed Loop GSHP: Proposed Cooling Full Load Efficiency at 68F from AHRI Certificate (EER)	Closed Loop GSHP: Proposed Cooling Part Load Efficiency at 68F from AHRI Certificate (EER)

For Eligible Technologies users will be prompted to fill in following cells:

- Rated Heating Capacity from AHRI certificate at 41 deg F
- Rated Heating Full Load and Part Load Efficiency at 41 deg F from AHRI certificate
- Rated Part Load Heating Capacity from AHRI certificate at 41 deg F
- Rated Cooling capacity from AHRI certificate at 59 deg F
- Rated Full Load Cooling Capacity from AHRI certificate at 68 deg F
- Rated Part Load Cooling Capacity from AHRI certificate at 68 deg F
- Proposed Cooling Efficiency at 59 F from AHRI Certificate (EER)
- Proposed Cooling Full and Part Load Efficiency at 68 F from AHRI Certificate (EER)

Example:

Certificate	of Pro	duct F	Rating	js	
AHRI Certified Reference Number : 205 Old AHRI Reference Number : Product : Water-to-Air and Brine-to-A Model Number : TYV/H048 Brand Name : ClimateMaster Rated as follows in accordance with A	5767472 D: ir NSVAHRVASHARE/IS	ate : 11-15-2020 O Standard 13256-1 V	Mc	odel Status: Active	and subject to
verification of rating accuracy by AHR	-sponsored, indepen	dent third party testin	ng: Part Load?	Part Load3	
Air Flow Rate - Cooling: Air Flow Rate - Heating:	1500	1250 1250	Fart Loadz	Part Loads	
WLHP (Water-Loop Heat Pumps) Cooling Capacity (Btuh) Cooling EER Rating (Btuh/watt) Cooling Fluid Flow Rate (gpm) Heating Capacity (Btuh)	45900/45900 14.00/14.00 12.00 53800/53800	34100/34100 15.20/15.20 11.00 39500/39500			
Heating Cop (watt/watt) Heating Fluid Flow Rate (gpm)	4.90/4.90 12.00	5.50/5.50 11.00			
GWHP (Ground Water-Heat Pumps) Cooling Capacity (Btuh) Cooling EER Rating (Btuh/Watt) Cooling Fluid Flow Rate (gpm) Heating Capacity (Btuh) Heating COP (watt/watt) Heating Fluid Flow Rate (gpm)	51800/51800 20.90/20.90 12.00 45000/45000 4.40/4.40 12.00	39200/39200 26.80/26.80 11.00 32600/32600 4.60/4.60 11.00			
GLHP (Ground -Loop Heat Pumps) Cooling Capacity (Btuh) Cooling EER Rating (Btuh/Watt) Cooling Fluid Flow Rate (gpm) Heating Capacity (Btuh) Heating COP (watt/watt) Heating Fluid Flow Rate (gpm)	48100/48100 15.50/15.50 12.00 35600/35600 3.70/3.70 12.00	W 2 37600/37600 21.20/21.20 11.00 29200/29200 4.10/4.10 11.00			

Baseline System:

<u>Heating System Type</u> – Select a baseline heating equipment type from drop-down menu. For existing facilities, users should select the equipment type that most closely aligns with the equipment type installed at the site currently. If none of the options in the drop-down align with the existing heating equipment, the user shall select a counterfactual baseline or may opt to submit their own custom calculations for the project. For new construction projects, users shall select a counterfactual natural gas heating baseline from the drop-down menu.



<u>Cooling System Type</u> – Select a baseline cooling equipment type from drop-down menu. For existing facilities, users should select the equipment type that most closely aligns with the equipment type installed at the site currently. If none of the options in the drop-down align with the existing cooling equipment, the user shall select a counterfactual baseline or may opt to submit their own custom calculations for the project.

		System Characteristics			
		Cooling System Type		A: E	SH Pri H :ffid 17 Ce (C
				•	
	Air c	onditioner, air-cooled, < 65,000 Btuh, Any heating, Split system	~	、	
	Air o	onditioner, air cooled, < 65,000 Btuh, Any heating, Single package			
	Air c	onditioner, air cooled, >= 65,000 Btuh and < 135,000 Btuh, Electric resistance or no heating		ľ	
	Air c	onditioner, air cooled, >= 65,000 Btuh and < 135,000 Btuh, All other heating			_
_	Air c	onditioner, air cooled, >= 135,000 Btuh and < 240,000 Btuh, Electric resistance or no heating			
_	AIT C	onditioner, air cooled, $>= 135,000$ Btuh and $< 240,000$ Btuh. All other heating		-	_
_		onditioner, air cooled, $> = 240,000$ blun and $< 760,000$ Blun, Electric resistance of no neating	~	,	_
_		onditioner, an coolea, >= 240,000 bran and < 700,000 bran, All other heating	_		

Tab: Energy/Heat Recovery Ventilator (ERV/HRV)

For Heat Pump or Heat Pump + Envelope Upgrade applications coupled with installation of Energy Recovery and Heat Recovery Ventilator, users will be required to complete this Tab.

ERV or HRV	Units	Tag	Make	Model #	Is ERV/HRV Required by	CFM	Supply and Exhau installe (provide in	ist Fan for newly- id ERV HP or kW)	Baseline Exhaust Fan	Winter Heat Exchanger Sensible Efficiency	Summer Heat Exchanger Total Efficiency % for ERV, or Heat Exchanger	Typical Operating	
					Code Y/N?	?	[HP]	[kW]	HP (Optional)	%	Sensible Efficiency % for HRV	onedule	
ERV	•				No	15000	10		2.5	65.0%	62.0%	Mon-Sun 6AM-10PM	
ERV					Yes	10000	8		2	70.0%	57.0%	Mon-Sun 6AM-12AM	
ERV					Yes	10000	8		2	50.0%	50.0%	Mon-Sun 6AM-12AM	
ERV	1				No	13000	7.5		5				
												Fill in Y	ellow Cell

Basic information about the type of ventilation system and the specifications of the proposed model can be entered from columns A-E.

This measure only applies in cases where ERV/HRV functionality is not required by federal, state, local or municipal codes or standards. Hence in event of for a new construction application, claiming additional savings through ERV/HRV installation is not eligible under the Clean Heat Program.

Product specific information like the CFM, Supply and Exhaust fan HP or demand, Efficiency can be found in the specification sheet for the ERV/HRV.

1	А	В	D	E	F	G	н	I. I.	J	К	Р	Q	Y
1	ERV or HRV	Units	Tag	Make	Model #	Is ERV/HRV Required by	CFM	Supply and Exhau installe (provide in	st Fan for newly- d ERV HP or KW)	Baseline Exhaust Fan	Winter Heat Exchanger Sensible Efficiency	Summer Heat Exchanger Total Efficiency % for ERV, or Heat Exchanger	Typical Operating
2						Code Y/N?		[HP]	[kW]	HP (Optional)	%	Sensible Efficiency % for HRV	
3	ERV	1				No	15000	10		2.5	65.0%	62.0%	Mon-Sun 6AM-10PM
4	ERV					Yes	10000	8		2	70.0%	57.0%	24/7 - 365
5	ERV					Yes	10000	8		2	50.0%	50.0%	Mon-Sun 6AM-12AM Mon-Sun 6AM-10PM
6	ERV	1				No	13000	7.5		5			Mon-Fri 7AM-7PM Sun 11AM-6PM
7													Mon-Fri 7AM-7PM Mon-Fri 7AM-5PM
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													

Colum Y can be used to select the appropriate schedule for which the ERV/HRV is operating.

Green Columns AI-AK will be auto populated displaying the estimated electric, demand and therms savings.

∆kWh	∆kW	∆therms	 Green Cells will be auto populated
18737.51664	1.55	-	
153,591.40	9.12	-	
(29,824.14)	(5.23)	-	
(32,157.47)	(14.04)	-	

Tab: Results Summary

This tab displays the anticipated energy savings and incentive for the proposed project based on inputs entered by the user on the previous tabs.

Depending on the type of application and upgrade category selection, results will be displayed in the following summary fields:

- Heat Pump Complementary Summary
- Heat Pumps Summary
- Project Summary

Heat Pump Complementary Summary

This summary field should get populated in any scenario based on application and/or incentive category selection

<u>Material & Labor Costs</u> – Enter the material and labor costs related to all eligible equipment. **Non**eligible equipment should not be included in the project costs.

					Heat Pumps Complementary Products Summary					
Category	Material Cost	Labor Cost	Total Cost	Net MMBtu Savings	Heating Electrification Savings (kWh)	Cooling Savings (kWh)	Net kWh savings	kW Savings	Therms savings	CO ₂ emissions reduction (Metric Tons/yr)
Eligible Envelope Upgrades	300,000	350,000	\$ 30,000	-	#N/A	-	#N/A		-	-
ERV/HRV	10,000	50,000		-	-	-	-	-	-	-



The following cells will populate automatically:

- <u>Total Cost:</u> Cell will auto-populate as the sum of the material and labor cost entered by the user.
- <u>Net MMBtu Savings:</u> Estimation of first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the site.
- <u>Heating Electrification Savings (kWh):</u> Estimate of energy savings due to electrification of a fossil fuel heating system. Value is negative.
- <u>Cooling Savings (kWh):</u> Estimate of energy savings yielded by installing a heat pump with a higher efficiency than the cooling baseline. Value is positive.
- <u>Net kWh Savings:</u> Sum of the heating electrification savings and cooling savings in kWh. Value is typically negative.
- <u>Total KW Savings-</u>Estimate of the peak electric demand savings
- <u>Therms Savings:</u> Estimate of energy savings due to decreased fuel consumption.
- <u>Co2 Emission Reduction:</u> Net Co2 reduction based on increased efficiency of the system
- <u>Category Incentive Rate:</u> Depending on incentive category
- <u>Max reduction in Dominant Load BHL/BCL:</u> Depending on the type of Tier selection- the appropriate % is applied for reduction from the base building load
- <u>Uncapped Measure Incentive:</u> Calculated incentive for the proposed project measure.
- <u>Incentive Capping based on Installation Costs:</u> Individual measure incentives are capped at 100% of each measure cost.

All costs, savings, and incentives for individual measures are totaled in the 'TOTAL' row. The sum of the measure installation incentive capped cannot be greater than 70% of the total project cost (i.e. cost of all measures combined).



Heat Pump Summary

Applications involving Heat Pump Upgrade only can fill in the material and labor costs associated with the technologies. It is recommended that users carefully review and verify the upgrades to get to the EUL value. Examples: Weighted average EUL: Windows 20, Wall insulation 30, Infiltration 5, etc.

									Heat Pumps St	ummary
Technology	Material Cost	Labor Cost	Total Cost	Net MMBtu Savings	Heating Electrification Savings	Cooling Savings (k₩h)	Net k₩h savings	k₩ Savings	Therms savings (Natural Gas)	CO2 emissions reduction (Metric Tonslyr)
NEEP Listed Cold Climate Air Source Heat Pumps	\$ 14,000	\$ 7,000	\$ 21,000	147.000	(17,663.392)	1,392.748	(16,270.644)	0.614	2,025.158	6.7
SPVHP's, PTHP's	\$ 30,567	\$ 7,000	\$ 37,567	130.931	(23,213.586)	(1,895.945)	(25,109.531)	(0.844)	2,166.051	4.7
AHRI Hated Air Source Heat Pumps (VRFs, Large Unitary ASHPs)	\$ 76,667	\$ 38,333	\$ 115,000	473.161	(39,183.937)	9,748.171	(29,435.766)	11.022	5,735.963	24.4
Closed Loop Ground Source Heat Pumps	\$ 18,100	\$ 9,050	\$ 27,150	145.547	(14,453.269)	3,503.064	(10,950.204)	3.123	1,829.089	7.3

Fill in Yellow Cells and the White cells will already be auto populated

The following cells will populate automatically:

- <u>Total Cost:</u> Cell will auto-populate as the sum of the material and labor cost entered by the user.
- <u>Net MMBtu Savings</u>: Estimation of first-year site energy savings, which accounts for both the decreased fuel and the change in electricity consumed at the site.
- <u>Heating Electrification Savings (kWh):</u> Estimate of energy savings due to electrification of a fossil fuel heating system. Value is negative.
- <u>Cooling Savings (kWh)</u>: Estimate of energy savings yielded by installing a heat pump with a higher efficiency than the cooling baseline. Value is positive.
- <u>Net kWh Savings:</u> Sum of the heating electrification savings and cooling savings in kWh. Value is typically negative.
- Total KW Savings- Estimate of the peak electric demand savings
- <u>Therms Savings:</u> Estimate of energy savings due to decreased fuel consumption.
- Co2 Emission Reduction: Net Co2 reduction based on increased efficiency of the system
- <u>Lifetime Net MMBTU Savings:</u> Net savings resulting during the effective useful life of the measure upgrade. Lifetime or LMMBTU savings are calculated by multiplying the EUL years to the net annual MMBTU savings resulting from the measure
- <u>Oversizing Measure Incentive Cap:</u> Penalty applies to over-sized category 2 cold climate air source heat pumps and mini-splits projects only. If the calculated heating sizing ratio for a ccASHP or ccMSHP system on the 'Eqpt Sched & Eligibility' tab is greater than 120%, the measure incentive will be capped as follows:



- <u>Category Incentive Rate:</u> Depending on incentive category
- <u>Uncapped Measure Incentive:</u> Calculated incentive for the proposed project measure.

Project Summary

This summary field will auto populate for projects with different incentive category selection and submission.

Appendices

A. Definitions

- Air-Conditioning, Heating, and Refrigeration Institute (AHRI): A trade association representing manufacturers of heating, ventilation, air-conditioning, refrigeration, and water heating equipment. AHRI provides the database of equipment performance specifications, which is used in this program to determine the rebate amount.
- Air Source Heat Pump (ASHP): An HVAC system that provides space heating using electricity through vapor-compression refrigeration cycle. An ASHP extracts heat from outdoor air and transfers the extracted heat into the conditioned spaces via various means. ASHPs are also used to provide space cooling by reversing the cycle to extract heat from a building and transfer the heat to the outside air.
- Air-to-Air Variable Refrigerant Flow (VRF) Heat Pumps: Heat Pump systems that circulate refrigerant between a variable capacity compressor and multiple indoor air handlers, each capable of individual zone temperature control. VRF systems can be built with heat recovery and cooling capabilities that allow simultaneously heating to some zones and cooling to other zones.
- Building Heating Load (BHL): Building heat loss in British Thermal Units per hour (Btu/h). For residential buildings, BHL shall be calculated using ACCA Manual J or another code-approved methodology. For commercial buildings, BHL shall be calculated following ANSI/ASHRAE/ACCA Standard 183-2007(RA2017), or other code-approved equivalent computational procedure. Calculation of the building's design heating load shall be at the 99% dry bulb heating design temperature for the most relevant ASHRAE 2017 location.
- 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.
- **Closed Loop:** A ground heat exchange method in which the heat transfer fluid is permanently contained in a closed piping system.
- **Cold climate air source heat pump:** A heat pump product listed on the Northeast Energy Efficiency Partnership (NEEP) Cold Climate Air Source Heat Pump (ccASHP) Specification and Product List ("<u>NEEP Product List</u>"), designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher).
- **Cold climate single package air source heat pump:** A NEEP-listed cold climate air source heat pump, in which all the essential components are housed inside a single cabinet or "package."
- **Cooling Balance Point Temperature:** The outdoor temperature above which the building's cooling system begins to operate.
- **Coefficient of performance (COP)**: COP is the ratio of work or useful energy output of a system versus the work or energy input, measured in the same units. It is a measure of performance often used for electrically-powered heating and cooling equipment, with the higher the system COP corresponding to the more efficient operation.
- Energy Efficiency Ratio (EER): A measure of how efficiently a cooling system will operate when the outdoor temperature is 95 degrees Fahrenheit. It is calculated by dividing the rated cooling output at 95 degrees Fahrenheit by the watts used by the AC/HP system. A higher EER means the system is more efficient. It is an instantaneous measure of electrical efficiency, unlike SEER (Seasonal Energy Efficiency Rating), which is an averaged value of efficiency. This is a term applied to air conditioning equipment.
- **Full Load Heating System**: A system installed as a building's primary heating source, with a total system heating capacity that satisfies a minimum of 90% of building heating load (BHL).

- **Ground Source Closed-Loop Heat Pump.** A ground source closed-loop heat pump typically uses fluid circulated through a subsurface piping loop as a heat source/heat sink. The heat exchange loop may be placed in horizontal trenches or vertical bores, or submerged in a body of surface water. The temperature of the fluid is related to climatic and operating history conditions and usually varies from 25°F to 100°F [-3.9°C to 37.7°C]. Rated efficiencies include an allowance for power to circulate the fluid. A ground source closed-loop heat pump consists of one or more factory-made assemblies which normally include an indoor conditioning coil with air moving means, compressor(s) and refrigerant-to-fluid heat exchanger(s), including means to provide both cooling and heating, cooling only or heating only functions. When such equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together, and the requirements of rating outlined in the standard are based upon the use of matched assemblies.
- **Heating Balance Point Temperature:** The outdoor temperature below which the building's heating system begins to operate.
- Large Air-to-Air Heat Pumps: Large commercial heat pump systems that include individual heat pump appliances that are powered by three-phase electricity or have rated cooling capacities ≥65,000 Btu/h for the individual appliance. Systems are tested under AHRI 340/360.
- **Ground Loop Heat Pump Application:** Brine-to-air or brine-to-water ground source heat pump using a brine solution circulating through a subsurface piping loop function as a heat source / heat sink.
- **Mini-Split Heat Pump (MSHP):** A type of ccASHP that can circulate refrigerant between an outdoor unit containing a variable capacity compressor and one or more indoor air handlers. MSHPs are often referred to as "ductless mini-splits" because they are typically ductless. These units can also be installed with short duct runs that enable single air handlers to serve more than one room at a time. Systems are tested under AHRI 210/240.
- North East Energy Partnership (NEEP): *NEEP* was founded in 1996 as a non-profit accelerating energy efficiency in the Northeast and Mid-Atlantic states. Today, it is one of six Regional Energy Efficiency Organizations (REEOs) funded, in part, by US Department of Energy to support state efficiency policies and programs.
- **Partial Load Heating System**: A partial load heating system is a system installed in addition to an existing heating system, and which has a total heat pump system heating capacity that satisfies <90% of BHL.

B. Building Profiles

The following building profiles have been programmed into the heat pump savings calculator. Profiles are derived from the following sources:

- HVAC Schedules: ASHRAE 90.1
- Temperature Set Points: Appendix A of the New York State Technical Reference Manual (v8)
- Balance Point Temperatures: ARUP Carbon Neutral Building Road Map Analysis prepared for NYSERDA

Office Building

	Office									
Hour (Time of Day)	HVAC	Schedule								
Hour (Time of Day)	Weekday	Sat	Sunday							
1:00	Off	Off	Off							
2:00	Off	Off	Off							
3:00	Off	Off	Off							
4:00	Off	Off	Off							
5:00	Off	Off	Off							
6:00	On	On	Off							
7:00	On	On	Off							
8:00	On	On	Off							
9:00	On	On	Off							
10:00	On	On	Off							
11:00	On	On	Off							
12:00	On	On	Off							
13:00	On	On	Off							
14:00	On	On	Off							
15:00	On	On	Off							
16:00	On	On	Off							
17:00	On	On	Off							
18:00	On	Off	Off							
19:00	On	Off	Off							
20:00	On	Off	Off							
21:00	On	Off	Off							
22:00	Off	Off	Off							
23:00	Off	Off	Off							
0:00	Off	Off	Off							

									Balance Po	oint (deg F)				
			Setpoin	ts (deg F)		Existing Building New Construction								
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours	
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	
Office	1	75	70	78	67	57	53	60	50	54	51	57	48	

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Assembly

	Assembly								
	H\	/AC Schedu	ıle						
Hour (Time of Day)	Weekday	Sat	Sunday						
1:00	Off	Off	Off						
2:00	Off	Off	Off						
3:00	Off	Off	Off						
4:00	Off	Off	Off						
5:00	Off	Off	Off						
6:00	On	Off	Off						
7:00	On	On	On						
8:00	On	On	On						
9:00	On	On	On						
10:00	On	On	On						
11:00	On	On	On						
12:00	On	On	On						
13:00	On	On	On						
14:00	On	On	On						
15:00	On	On	On						
16:00	On	On	On						
17:00	On	On	On						
18:00	On	On	On						
19:00	On	On	On						
20:00	On	On	On						
21:00	On	On	On						
22:00	On	On	On						
23:00	On	On	On						
0:00	Off	Off	Off						

									Balance Po	oint (deg F)			
			Setpoin	ts (deg F)			Existing	Building			New Con	struction	
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Assembly	2	76	72	79	69	58	54	61	51	55	52	58	49

Health

	Health								
	H\	/AC Schedu	ıle						
Hour (Time of Day)	Weekday	Sat	Sunday						
1:00	On	On	On						
2:00	On	On	On						
3:00	On	On	On						
4:00	On	On	On						
5:00	On	On	On						
6:00	On	On	On						
7:00	On	On	On						
8:00	On	On	On						
9:00	On	On	On						
10:00	On	On	On						
11:00	On	On	On						
12:00	On	On	On						
13:00	On	On	On						
14:00	On	On	On						
15:00	On	On	On						
16:00	On	On	On						
17:00	On	On	On						
18:00	On	On	On						
19:00	On	On	On						
20:00	On	On	On						
21:00	On	On	On						
22:00	On	On	On						
23:00	On	On	On						
0:00	On	On	On						

						Balance Point (deg F)							
			Setpoint	:s (deg F)		Existing Building New Construction							
Building Profiles		Occupie	ed Hours	Unoccup	ied Hours	Occupie	d Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Health	3	76	72	79	69	58	54	61	51	55	52	58	49

Light Manufacturing

	Light Manufacturing								
Hour (Time of Dou)	н\	/AC Schedu	ıle						
Hour (Time of Day)	Weekday	Sat	Sunday						
1:00	Off	Off	Off						
2:00	Off	Off	Off						
3:00	Off	Off	Off						
4:00	Off	Off	Off						
5:00	Off	Off	Off						
6:00	Off	Off	Off						
7:00	On	On	Off						
8:00	On	On	Off						
9:00	On	On	Off						
10:00	On	On	Off						
11:00	On	On	Off						
12:00	On	On	Off						
13:00	On	On	Off						
14:00	On	On	Off						
15:00	On	On	Off						
16:00	On	On	Off						
17:00	On	On	Off						
18:00	On	On	Off						
19:00	On	Off	Off						
20:00	On	Off	Off						
21:00	On	Off	Off						
22:00	On	Off	Off						
23:00	Off	Off	Off						
0:00	Off	Off	Off						

						Balance Point (deg F)							
			Setpoint	:s (deg F)		Existing Building New Construction							
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccupi	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Light Manufacturing	4	78	70	81	67	58	54	61	51	55	52	58	49

Restaurant

	Restaurant								
	н\	/AC Schedu	ıle						
Hour (Time of Day)	Weekday	Sat	Sunday						
1:00	On	On	On						
2:00	On	On	On						
3:00	On	On	On						
4:00	Off	Off	Off						
5:00	Off	Off	Off						
6:00	Off	Off	Off						
7:00	Off	Off	Off						
8:00	On	Off	Off						
9:00	On	Off	Off						
10:00	On	On	Off						
11:00	On	On	On						
12:00	On	On	On						
13:00	On	On	On						
14:00	On	On	On						
15:00	On	On	On						
16:00	On	On	On						
17:00	On	On	On						
18:00	On	On	On						
19:00	On	On	On						
20:00	On	On	On						
21:00	On	On	On						
22:00	On	On	On						
23:00	On	On	On						
0:00	On	On	On						

									Balance Po	oint (deg F)			
			Setpoint	ts (deg F)			Existing	Building			New Con	struction	
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	Occupie	d Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Restaurant	5	77	72	80	69	61	58	64	55	59	52	62	49

Retail

	Retail							
Hour (Time of Dou)	H\	/AC Schedu	ıle					
Hour (Time of Day)	Weekday	Sat	Sunday					
1:00	Off	Off	Off					
2:00	Off	Off	Off					
3:00	Off	Off	Off					
4:00	Off	Off	Off					
5:00	Off	Off	Off					
6:00	Off	Off	Off					
7:00	On	On	Off					
8:00	On	On	Off					
9:00	On	On	On					
10:00	On	On	On					
11:00	On	On	On					
12:00	On	On	On					
13:00	On	On	On					
14:00	On	On	On					
15:00	On	On	On					
16:00	On	On	On					
17:00	On	On	On					
18:00	On	On	Off					
19:00	On	On	Off					
20:00	On	On	Off					
21:00	On	On	Off					
22:00	Off	On	Off					
23:00	Off	Off	Off					
0:00	Off	Off	Off					

						Balance Point (deg F)									
			Setpoint	ts (deg F)			Existing Building					New Construction			
Building	Profiles	Occupie	d Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccupi	ied Hours	Occupie	ed Hours	Unoccupi	ed Hours		
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating		
Retail	6	76	72	79	69	61	54	64	51	59	52	62	49		

School

	School							
	H/	/AC Schedı	ıle					
Hour (Time of Day)	Weekday	Sat	Sunday					
1:00	Off	Off	Off					
2:00	Off	Off	Off					
3:00	Off	Off	Off					
4:00	Off	Off	Off					
5:00	Off	Off	Off					
6:00	Off	Off	Off					
7:00	Off	Off	Off					
8:00	On	Off	Off					
9:00	On	On	Off					
10:00	On	On	Off					
11:00	On	On	Off					
12:00	On	On	Off					
13:00	On	On	Off					
14:00	On	Off	Off					
15:00	On	Off	Off					
16:00	On	Off	Off					
17:00	On	Off	Off					
18:00	On	Off	Off					
19:00	On	Off	Off					
20:00	On	Off	Off					
21:00	On	Off	Off					
22:00	On	Off	Off					
23:00	Off	Off	Off					
0:00	Off	Off	Off					

									Balance Po	oint (deg F)			
			Setpoint	ts (deg F)		Existing Building New Construction							
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	urs Occupied Hours Unoccupied Hours Occupied Hours Unoccupied			ied Hours				
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
School	7	76	72	81	67	58	56	61	53	49	48	52	4.

Warehouse

	Warehouse							
	H/	/AC Schedu	ıle					
Hour (Time of Day)	Weekday	Sat	Sunday					
1:00	Off	Off	Off					
2:00	Off	Off	Off					
3:00	Off	Off	Off					
4:00	Off	Off	Off					
5:00	Off	Off	Off					
6:00	Off	Off	Off					
7:00	Off	Off	Off					
8:00	On	Off	Off					
9:00	On	On	Off					
10:00	On	On	Off					
11:00	On	On	Off					
12:00	On	On	Off					
13:00	On	On	Off					
14:00	On	On	Off					
15:00	On	On	Off					
16:00	On	On	Off					
17:00	On	Off	Off					
18:00	Off	Off	Off					
19:00	Off	Off	Off					
20:00	Off	Off	Off					
21:00	Off	Off	Off					
22:00	Off	Off	Off					
23:00	Off	Off	Off					
0:00	Off	Off	Off					

						Balance Poi				oint (deg F)		1	
			Setpoint	ts (deg F)		Existing Building				New Construction			
Building	Profiles	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Warehouse	8	80	68	85	63	65	51	68	48	62	49	65	46

Laboratory

	Laboratory							
	н\	/AC Schedu	ıle					
Hour (Time of Day)	Weekday	Sat	Sunday					
1:00	On	On	On					
2:00	On	On	On					
3:00	On	On	On					
4:00	On	On	On					
5:00	On	On	On					
6:00	On	On	On					
7:00	On	On	On					
8:00	On	On	On					
9:00	On	On	On					
10:00	On	On	On					
11:00	On	On	On					
12:00	On	On	On					
13:00	On	On	On					
14:00	On	On	On					
15:00	On	On	On					
16:00	On	On	On					
17:00	On	On	On					
18:00	On	On	On					
19:00	On	On	On					
20:00	On	On	On					
21:00	On	On	On					
22:00	On	On	On					
23:00	On	On	On					
0:00	On	On	On					

						Balance Point (deg F)							
			Setpoint	s (deg F)		Existing Building New Construction							
Building Prof	files	Occupie	ed Hours	Unoccup	ied Hours	Occupie	d Hours	Unoccup	ied Hours	Occupie	ed Hours	Unoccup	ied Hours
Building Type		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Laboratory	9	76	72	79	69	58	54	61	51	55	52	58	49

Hotel

	Hotel							
Hour (Time of Dou)	Η\	/AC Schedu	ıle					
Hour (Time of Day)	Weekday	Sat	Sunday					
1:00	On	On	On					
2:00	On	On	On					
3:00	On	On	On					
4:00	On	On	On					
5:00	On	On	On					
6:00	On	On	On					
7:00	On	On	On					
8:00	On	On	On					
9:00	On	On	On					
10:00	On	On	On					
11:00	On	On	On					
12:00	On	On	On					
13:00	On	On	On					
14:00	On	On	On					
15:00	On	On	On					
16:00	On	On	On					
17:00	On	On	On					
18:00	On	On	On					
19:00	On	On	On					
20:00	On	On	On					
21:00	On	On	On					
22:00	On	On	On					
23:00	On	On	On					
0:00	On	On	On					

						Balance Point (deg F)							
			Setpoint	ts (deg F)		Existing Building					New Con	struction	
Building	Profiles	Occupie	d Hours	Unoccupi	ed Hours	Occupie	d Hours	Unoccupi	ed Hours	Occupie	d Hours	Unoccupi	ed Hours
Hotel	10	76	72	81	67	52	51	55	48	52	50	55	47

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Residential

	Residential							
	н\	/AC Schedu	ıle					
Hour (Time of Day)	Weekday	Sat	Sun					
1:00	On	On	On					
2:00	On	On	On					
3:00	On	On	On					
4:00	On	On	On					
5:00	On	On	On					
6:00	On	On	On					
7:00	On	On	On					
8:00	On	On	On					
9:00	Off	On	On					
10:00	Off	On	On					
11:00	Off	On	On					
12:00	Off	On	On					
13:00	Off	On	On					
14:00	Off	On	On					
15:00	Off	On	On					
16:00	On	On	On					
17:00	On	On	On					
18:00	On	On	On					
19:00	On	On	On					
20:00	On	On	On					
21:00	On	On	On					
22:00	On	On	On					
23:00	On	On	On					
0:00	On	On	On					

							Balance Point (deg F)							
			Setpoints (deg F)			Existing Building				New Construction				
Building Profiles		Occupie	d Hours	ours Unoccupied Hours		Occupied Hours		Unoccupied Hours		Occupied Hours		Unoccupied Hours		
Residential		11	75	73	78	70	58	60	61	57	63	55	66	52

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Multi-Family

	Multi-Family							
	HVAC Schedule							
Hour (Time of Day)	Weekday	Sat	Sun					
1:00	On	On	On					
2:00	On	On	On					
3:00	On	On	On					
4:00	On	On	On					
5:00	On	On	On					
6:00	On	On	On					
7:00	On	On	On					
8:00	On	On	On					
9:00	Off	On	On					
10:00	Off	On	On					
11:00	Off	On	On					
12:00	Off	On	On					
13:00	Off	On	On					
14:00	Off	On	On					
15:00	Off	On	On					
16:00	On	On	On					
17:00	On	On	On					
18:00	On	On	On					
19:00	On	On	On					
20:00	On	On	On					
21:00	On	On	On					
22:00	On	On	On					
23:00	On	On	On					
0:00	On	On	On					

						Balance Point (deg F)								
	Setpoints (deg F)				Existing Building				New Construction					
Building Profiles		Occupie	ied Hours Unoccupied Hours		Occupied Hours		Unoccupied Hours		Occupied Hours		Unoccupied Hours			
Multi-Family	12	75	70	78	67	58	60	61	57	63	55	66	52	
Custom	13	0	0	0	0	0	0	0	0	0	0	0	0	