Table of Revisions/Changes

Revision Number	Addition/ Revision	Issue Date	Effective Date	Measure	Description of Change	Location/Page in TRM
12-24-1	A	2/7/2025	2/7/2025	R/MF Cellular Window Shade	New measure to capture savings from installation of cellular window coverings.	Pg. x
12-24-3	C	2/7/2025	2/7/2025	R/MF Window – Low-E Storm	Correction to add NY TRM Residential Low-E Storm Window Supplement.xlsx reference and link to DMM.	Pg. 151
12-24-4	C	2/7/2025	2/7/2025	R/MF Heat Pump Water Heater (HPWH) – Air Source	Correction to address missing GPD term in kWh savings algorithm. Applied formatting changes. Updated default values as per Code.	Pg. 162
12-24-6	Removal	2/7/2025	2/7/2025	R/MF Shade Tree	Updated $hrs_{cooling}$ term to $EFLH_{cooling}$ and added references to $EFLH_{cooling}$ and CF; Added Example Calculation. Applied formatting changes.	Pg. x
12-24-12	A	2/7/2025	2/7/2025	Appendix S	New appendix containing list of and links to energy codes and standards referenced throughout TRM.	Pg. x
12-24-13	A	2/7/2025	2/7/2025	Appendix T	New appendix containing list of all NY State zip codes and associated weather city.	Pg. x

Note: Revisions, Additions, Corrections and Removals to the measures listed above were undertaken by the Joint Utilities Technical Resource Manual (TRM) Management Committee between October 23, 2024 – February 7, 2025.

Building Shell

Cellular Window Shade

Measure Description

This measure characterizes installation of cellular window coverings to provide greater window insulation for reduction of thermal losses through the building envelope, and optimizing solar gains added to the space. High efficiency window coverings can be considered part of a package of potential retrofits to cost effectively improve thermal performance of the building envelope. Cellular shades are designed to trap air inside pockets, acting as insulators, which can decrease the U-factor of the window covering and reduce thermal heat transfer through the window.[1]

While solar gain can be advantageous in the winter to offset heating system load, mitigating solar gain in the summer can result in reduced cooling loads and increased occupant comfort. Installing window coverings, particularly in south and west-facing windows, can have a significant impact on reducing the amount of heat entering a home.

Eligible cellular shade products shall be listed with the Attachments Energy Rating Council (AERC)[2] and certified with the following:

- Typical Use Warm Climate Rating (Cooling Energy Performance, EPc) ≥ 36
- Typical Use Cool Climate Rating (Heating Energy Performance, EPh) ≥ 6

There are two types of cellular window shades: manual shades, which are operated by a cord or cordless system for manual adjustment, and automatic shades, which feature motorized mechanisms for automatic adjustment. Automated shades can be programmed to open and close at specific times or based on environmental factors like sunlight or temperature, optimizing energy efficiency. By adjusting throughout the day, such as blocking heat in summer or retaining warmth in winter, they help reduce the need for heating or cooling, leading to energy savings. These shades can be controlled via a remote, smartphone app, or home automation system. If automated cellular shades are installed, the shades must meet the requirements above in addition to being programmable to operate according to a set schedule automatically.

Program Season	Northern Exposure	Southern Exposure	Eastern Exposure	Western Exposure
June 1 – August 31 (Cooling Season)	Closed all day	Closed all day	Closed all day	Closed all day
Sept 1 – May 31 (Heating Season)	Closed all day	Open 8am – 4pm	Open 8am – 12pm	Open 12pm – 4pm

[1] PNNL, Evaluation of Cellular Shades in the PNNL Lab Homes, November 2016

[2] AERC, Cellular Shades. Certified Product Search (Residential): https://aercenergyrating.org/product-search/residential-product-search/

The method for estimating savings presented below prescribes deemed per window savings associated with installation of cellular window shades based on the results of multiple permutations of prototype single-family detached home models. All models assumed a total of 16 windows; therefore, it is recommended that claimed savings per application not exceed 16 windows per home or customer.

Method for Calculating Annual Energy and Peak Coincident Demand Savings

Annual Electric Energy Savings

$$\Delta kWh = \Delta kWh_{cooling} + \Delta kWh_{heating}$$

$$\Delta kWh_{cooling} = units \times \frac{\Delta kWh_{cooling}}{unit} \times F_{ElecCool}$$

$$\Delta kWh_{heating} = units \times \frac{\Delta kWh_{heating}}{unit} \times F_{ElecHeat}$$

Summer Peak Coincident Demand Savings

$$\Delta kW = \frac{\Delta kWh_{cooling}}{EFLH_{cooling}} \times CF$$

Annual Fossil Fuel Energy Savings

$$\Delta MMBtu = units \times \frac{\Delta MMBtu}{unit} \times F_{FuelHeat}$$

where:

ΔkWh	= Annual electric energy savings
ΔkW	= Peak coincident demand electric savings
$\Delta MMBtu$	= Annual fossil fuel energy savings
$\Delta kWh_{cooling}$	= Annual electric cooling energy savings
$\Delta kWh_{heating}$	= Annual electric heating energy savings
units	= Number of windows with cellular shades installed
$\Delta kWh_{cooling}$/unit	= Annual electric cooling energy savings per treated window
$\Delta kWh_{heating}$/unit	= Annual electric heating energy savings per treated window
$\Delta MMBtu$/unit	= Annual fossil fuel energy savings per treated window
$F_{ElecCool}$	= Electric cooling factor; used to account for the presence or absence of an electric cooling system
$F_{ElecHeat}$	= Electric heating factor; used to account for the presence or absence of an electric heating system
$F_{FuelHeat}$	= Fossil fuel heating factor; used to account for the presence or absence of a fossil fuel heating system
$EFLH_{cooling}$	= Cooling equivalent full-load hours

CF = Coincidence Factor

Summary of Variables and Data Sources

Variable	Value	Notes
units		From application
$\Delta kWh_{cooling}$/unit		Lookup from Deemed Savings Table below based on Climate Zone, Window Type, and Shade Type. For mid-stream programs, use the location of the participating store. For new construction applications, assume Double Pane w/ Low-e Argon Fill values.
$\Delta kWh_{heating}$/unit		Lookup from Deemed Savings Table below based on Climate Zone, Window Type, and Shade Type. For mid-stream programs, use the location of the participating store. For new construction applications, assume Double Pane w/ Low-e Argon Fill values.
ΔMMBtu/unit		Lookup from Deemed Savings Table below based on Climate Zone, Window Type, and Shade Type. For mid-stream programs, use the location of the participating store. For new construction applications, assume Double Pane w/ Low-e Argon Fill values.
$F_{ElecCool}$	Central Electric Cooling: 1 No Central Electric Cooling: 0 Unknown: 0.43	Based on EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States.[3]
$F_{ElecHeat}$	Electric Heating: 1 No Electric Heating: 0 Unknown: 0.19	Based on EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States.[4]
$F_{FuelHeat}$	Fossil Fuel Heating: 1 No Fossil Fuel Heating: 0 Unknown: 0.61	Based on EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States.[5]

[3] EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States, Table HC7.7 ("Unknown" calculated as the number of homes with central AC divided by the total number of homes).
[4] EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States, Table HC6.7 ("Unknown" calculated as the number of homes with electric heat divided by the total number of homes).
[5] EIA Residential Energy Consumption Survey (RECS) 2020 for Middle Atlantic States, Table HC6.7 ("Unknown" calculated as the number of homes with natural gas heat divided by the total number of homes).

Variable	Value	Notes
$EFLH_{cooling}$		Lookup based on building type, vintage and location from Appendix G. For midstream programs, use the location of the participating store. If building type and vintage are unknown, assume a single-family detached dwelling of average vintage.
CF	0.69	

To claim savings associated with the "Automatic" Shade Type in the Deemed Savings Table below, the shade must be professionally installed, and the programmed schedule of operation must be verified. Additionally, the customer shall be provided with guidance on an optimal schedule to maximize energy savings, like that illustrated in the table below. All other applications shall claim savings associated with "Manual" Shade Type from the Deemed Savings Table below.

Deemed Savings Table[6]

Climate Zone	Window Type	Shade Type	$\Delta kWh_{cooling}$ /unit	$\Delta kWh_{heating}$ /unit	ΔMMBtu /unit
4	Single Pane	Manual	49.9	6.8	0.096
		Automatic	69.7	40.7	0.573
	Double Pane	Manual	48.3	1.7	0.024
		Automatic	67.4	10.2	0.144
	Double Pane w/ Low-e Argon Fill	Manual	17.7	0.5	0.007
		Automatic	24.8	3.0	0.042
	Unknown	Manual	48.4	3.2	0.046
		Automatic	67.6	19.5	0.274
5	Single Pane	Manual	33.3	49.2	0.693
		Automatic	55.9	128.1	1.804
	Double Pane	Manual	32.2	12.3	0.174
		Automatic	54.1	32.1	0.452
	Double Pane w/ Low-e Argon Fill	Manual	11.8	3.6	0.051
		Automatic	19.9	9.3	0.132
	Unknown	Manual	32.3	23.6	0.332
		Automatic	54.3	61.3	0.863
6	Single Pane	Manual	16.6	91.7	1.291
		Automatic	42.2	215.4	3.035
	Double Pane	Manual	16.0	23.0	0.324
		Automatic	40.8	54.0	0.761
		Manual	5.9	6.7	0.094

[6] Deemed savings per window established based on prototype modeling of single-family detached homes in climate zones 4A and 6A, interpolated for Climate Zone 5 values. Modeling assumed a standard efficiency gas furnace and electric central AC system. Electric heating savings were derived based on predicted gas savings and assumed relative gas and electric heating system efficiencies of 0.78 AFUE and 3.22 seasonal heating COP (based on email response from ICF regarding the average COP of residential heat pumps installed with NY Clean Heat Incentives, 11/1/2022), respectively. Additional details regarding modeling parameters and derivation of deemed savings values are provided in the Baseline and Compliance Efficiency sections of this write-up and supplemental calculation spreadsheet ("Residential Cellular Window Shade - Supplemental Calcs.xlsx").

Climate Zone	Window Type	Shade Type	ΔkWh$_{cooling}$ /unit	ΔkWh$_{heating}$ /unit	ΔMMBtu /unit
	Double Pane w/ Low-e Argon Fill	Automatic	15.0	15.7	0.221
	Unknown	Manual	16.1	43.9	0.618
		Automatic	41.0	103.1	1.452

Coincidence Factor (CF)

The prescribed value for the coincidence factor is 0.69.[7]

Baseline Efficiencies from which Energy Savings are Calculated

The baseline condition is an existing or new single-pane or double-pane window assembly in a detached, single-family home with manual operation 1” aluminum off white horizontal blinds.

2020 Residential Energy Consumption Survey (RECS) data for Middle Atlantic States (Table HC2.7) was used to establish weighting for “Unknown” Window Type deemed savings values in the table above. Distribution of residences in the Middle Atlantic States with Single-Pane, Double-Pane, and Triple-Pane (used as a proxy for Double-Pane w/ Low-e Argon Fill) windows from 2020 RECS data is presented below.

Window Type	# of Residences	
Single-Pane	4.92	million
Double-Pane	10.93	million
Triple-Pane	0.19	million
Total	*16.04*	*million*

Compliance Efficiency from which Incentives are Calculated

The compliance condition is an existing or new single-pane or double-pane window assembly in a detached, single-family home with manual or automatic operation cellular shades listed with AERC and certified with the following, with the following:

- Typical Use Warm Climate Rating (Cooling Energy Performance, EPc) ≥ 36
- Typical Use Cool Climate Rating (Heating Energy Performance, EPh) ≥ 6

[7] Based on BG&E ‘Development of Residential Load Profile for Central Air Conditioners and Heat Pumps’ research, the Maryland Peak Definition coincidence factor is 0.69. This study is not publicly available, but is referenced by M. M. Straub, Using Available Information for Efficient Evaluation of Demand-Side Management Programs, Electricity Journal, September 2011 and supported by research conducted by Cadmus on behalf of the TRM Management Committee.

Energy performance indices, EPc and EPh of window attachments are established using ISO 18292 standard (ISO 2011), which provides methodologies for calculating heating and cooling energy performance of windows.

This TRM methodology is based on the results of energy simulation of typical single family detached homes utilizing a gas furnace and electric air conditioning in climate zones 4A and 6A using sub hourly energy analysis program EnergyPlus (DOE 2016) and TMY3 weather data.[8,9,10]

The model residential home assumed the following parameters:

- 2 story (8.5’ each), 2,400 SF square structure (34.64’ x 34.64’), cardinal direction orientation, equal square footage of each exterior exposure
- 16 equal windows, four on each exposure, 39” high x 30” wide, clear pane wood frame
- Insulation: Ceiling R-49, Walls R-21; Air Infiltration: ACH50 = 7
- Gas Furnace Efficiency (AFUE) = 0.78; AC Efficiency (SEER) = 10.0
- Thermostat Settings: 70°F in heating season, 75°F in cooling season

A total of nine simulations were performed for Climate Zone 4A:

1. Typical house, single pane windows; no window covering
2. Typical house, single pane windows; all windows covered with manual operation AERC cellular shades with an EPc of 38 and EPh of 6
3. Typical house, single pane windows; all windows covered with automatic operation AERC cellular shades with an EPc of 38 and EPh of 6
4. Typical house, double pane windows; no window covering
5. Typical house, double pane windows; all windows covered with manual operation AERC cellular shades with an EPc of 38 and EPh of 6
6. Typical house, double pane windows; all windows covered with automatic operation AERC cellular shades with an EPc of 38 and EPh of 6
7. New construction with low-e double pane windows (argon fill); no window covering
8. New construction with low-e double pane windows (argon fill); all windows covered with manual operation AERC cellular shades with an EPc of 38 and EPh of 6
9. New construction with low-e double pane windows (argon fill); all windows covered with automatic operation AERC cellular shades with an EPc of 38 and EPh of 6

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[8] LBNL, Energy Performance Indices EPc and EPh Calculation Methodology and Implementation in Software Tool, August 2022

[9] PNNL, Testing the Performance and Dynamic Control of Energy-Efficient Cellular Shades in the PNNL Lab Homes, August 2018

[10] PNNL, Evaluation of Cellular Shades in the PNNL Lab Homes, November 2016

A total of four simulations were performed for Climate Zone 6A:

1. Typical house, double pane windows; no window covering
2. Typical house, double pane windows; all windows with manual operation 1" aluminum off white horizontal blinds with an EPc of 25 and EPh of -11. Deployment schedule developed from the results of a behavioral study surveying 2,467 households in 12 markets. A deployment schedule was developed for 3 periods during the day, two periods during the week, and for two seasons.[11]
3. Typical house, double pane windows; all windows covered with manual operation AERC cellular shades with an EPc of 36 and EPh of 9
4. Typical house, double pane windows; all windows covered with automatic operation AERC cellular shades with an EPc of 36 and EPh of 9

Model outputs provided whole home energy consumption for each simulated scenario. The difference between the heating and cooling consumption in the baseline case versus the performance cases was used to establish deemed savings for the whole home. Per window savings was determined by dividing whole home savings by 16 total windows. Actual savings are skewed higher for south and west-facing windows given higher solar gain on those exposures. However, this measure does not distinguish between exposures and assumes that installations will on average be evenly distributed amongst all four exposures.

For additional details on derivation of deemed savings values, reference the supplemental calculation spreadsheet ("Residential Cellular Window Shade - Supplemental Calcs.xlsx").

Operating Hours

HVAC system operating hours vary by building type. Operating hour assumptions for the prototypical building models are described in Appendix A. Cooling EFLH data by location, building type and vintage are tabulated in Appendix G.

Example Calculation *(Not to be used as default)*

AERC automatic cellular shades with EPc of 39 and EPh of 11 are installed on 8 double-pane windows of a single-family detached home built in 1980 near Albany, NY (Climate Zone 5A). The home has gas heating and central electric cooling. Annual Electric Energy Savings, Summer Peak Coincident Demand Savings and Annual Fossil Fuel Energy Savings are calculated as below.

$$\Delta kWh = \Delta kWh_{cooling} + \Delta kWh_{heating}$$

[11] LBNL, Energy Performance Indices EPc and EPh Calculation Methodology and Implementation in Software Tool, August 2022. (NOTE: The **Manual Operation Schedule** is detailed in Tables 4 and 5 on pages 12 and 13 of the LBNL Study. The **Automated Operation Schedule** is detailed in Tables 6 and 7 on page 14 of the LBNL Study.)

$$\Delta kWh_{cooling} = units \times \frac{\Delta kWh_{cooling}}{unit} \times F_{ElecCool}$$

$$\Delta kWh_{heating} = units \times \frac{\Delta kWh_{heating}}{unit} \times F_{ElecHeat}$$

$$\Delta kW = \frac{\Delta kWh_{cooling}}{EFLH_{cooling}} \times CF$$

$$\Delta MMBtu = units \times \frac{\Delta MMBtu}{unit} \times F_{FuelHeat}$$

units = 8, from application
ΔkWh$_{cooling}$/unit = 54.1, from Deemed Savings Table based on climate zone, window type, and shade type
ΔkWh$_{heating}$/unit = 32.1, from Deemed Savings Table based on climate zone, window type, and shade type
ΔMMBtu/unit = 0.452, from Deemed Savings Table based on climate zone, window type, and shade type
$F_{ElecCool}$ = 1, from Summary of Variables and Data Sources table
$F_{ElecHeat}$ = 0, from Summary of Variables and Data Sources table
$F_{FuelHeat}$ = 1, from Summary of Variables and Data Sources table
$EFLH_{cooling}$ = 358, from Appendix G based on housing type, building vintage, and location from application
CF = 0.69, from Summary of Variables and Data Sources table

$$\Delta kWh_{cooling} = 8 \times 54.1 \times 1 = 432.8\ kWh$$

$$\Delta kWh_{heating} = 8 \times 32.1 \times 0 = 0\ kWh$$

$$\Delta kWh = 432.8 + 0 = 432.8\ kWh$$

$$\Delta kW = \frac{432.8}{358} \times 0.69 = 0.834\ kW$$

$$\Delta MMBtu = 8 \times 0.452 \times 1 = 3.62\ MMBtu$$

Effective Useful Life (EUL)

See Appendix P.

Ancillary Fossil Fuel Savings Impacts

Ancillary fossil fuel savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

Ancillary Electric Savings Impacts

Ancillary electric savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

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Record of Revision

Record of Revision Number	Issue Date
12-24-1	2/7/2025

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BUILDING SHELL

WINDOW - LOW-E STORM

Measure Description

This measure covers the installation of storm windows with low-emissivity (low-e) glass on existing single or double pane windows. Low-e windows are designed to allow the optimal amount of solar heat through windows and lower infiltration rates to reduce passive convective heat transfer between conditioned and unconditioned spaces or outside air, thereby reducing heating and cooling loads and improving occupant comfort. Energy and demand saving are realized through reductions in the building's heating and cooling loads.

Method for Calculating Annual Energy and Summer Peak Coincident Demand Savings

Annual Electric Energy Savings

$$\Delta kWh = \frac{SF}{100} \times (\Delta kWh/100\ SF)$$

Summer Peak Coincident Demand Savings

$$\Delta kW = \frac{SF}{100} \times (\Delta kW/100\ SF) \times CF$$

Annual Fossil Fuel Energy Savings

$$\Delta MMBtu = \frac{SF}{100} \times \frac{(\Delta therms/100\ SF)}{10}$$

where:

ΔkWh	= Annual electric energy savings
ΔkW	= Peak coincident demand electric savings
ΔMMBtu	= Annual fossil fuel energy savings
SF	= Total glazing area of installed windows (ft^2)
(ΔkWh/100 SF)	= Annual electric energy savings per 100 SF of window glazing area
(ΔkW/100 SF)	= Peak coincident demand electric savings per 100 SF of window glazing area
(Δtherms/100 SF)	= Annual fossil fuel energy savings per 100 SF of window glazing area
100	= Conversion from SF to 100 SF
10	= Conversion factor, one MMBtu equals 10 therms
CF	= Coincidence Factor

Summary of Variables and Data Sources

Variable	Value	Notes
(ΔkWh/100 SF)		Lookup in table below based on location, window configuration and HVAC type.
(ΔkW/100 SF)		Lookup in table below based on location, window configuration and HVAC type.
(Δtherms/100 SF)		Lookup in table below based on location, window configuration and HVAC type.
SF		From application.
CF	0.69	

Unit Energy and Demand Savings

Unit energy and demand savings were derived using LBNL's RESFEN V6.0 software. For additional detail on the derivation of these values, refer to the "NY TRM Residential Low-E Storm Window Supplement.xlsx" workbook.

City	Baseline Window	HVAC System	ΔkWh/ 100 SF	ΔkW/ 100 SF	Δtherms/ 100 SF
Albany	Single-Pane	AC w/ Fuel heat	57	0.16	72.8
		Heat Pump	745	0.16	0.0
		AC w/ Resistance Heat	1,432	0.16	0.0
		Fuel Heat Only	0	0.00	72.8
		Resistance Heat Only	1,374	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	52	0.11	32.5
		Heat Pump	364	0.11	0.0
		AC w/ Resistance Heat	677	0.11	0.0
		Fuel Heat Only	0	0.00	32.5
		Resistance Heat Only	625	0.00	0.0
Binghamton	Single-Pane	AC w/ Fuel Heat	30	0.18	80.7
		Heat Pump	810	0.18	0.0
		AC w/ Resistance Heat	1,589	0.18	0.0
		Fuel Heat Only	0	0.00	80.7
		Resistance Heat Only	1,560	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	30	0.13	35.7
		Heat Pump	379	0.13	0.0
		AC w/ Resistance Heat	729	0.13	0.0
		Fuel Heat Only	0	0.00	35.7
		Resistance Heat Only	699	0.00	0.0

City	Baseline Window	HVAC System	ΔkWh/ 100 SF	ΔkW/ 100 SF	Δtherms/ 100 SF
Buffalo	Single-Pane	AC w/ Fuel Heat	47	0.18	75.7
		Heat Pump	758	0.18	0.0
		AC w/ Resistance Heat	1,468	0.18	0.0
		Fuel Heat Only	0	0.00	75.7
		Resistance Heat Only	1,421	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	44	0.12	33.7
		Heat Pump	361	0.12	0.0
		AC w/ Resistance Heat	678	0.12	0.0
		Fuel Heat Only	0	0.00	33.7
		Resistance Heat Only	634	0.00	0.0
Massena	Single-Pane	AC w/ Fuel Heat	46	0.17	83.3
		Heat Pump	1,058	0.17	0.0
		AC w/ Resistance Heat	2,069	0.17	0.0
		Fuel Heat Only	0	0.00	83.3
		Resistance Heat Only	2,023	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	42	0.11	37.5
		Heat Pump	502	0.11	0.0
		AC w/ Resistance Heat	962	0.11	0.0
		Fuel Heat Only	0	0.00	37.5
		Resistance Heat Only	920	0.00	0.0
NYC	Single-Pane	AC w/ Fuel Heat	70	0.19	57.0
		Heat Pump	531	0.19	0.0
		AC w/ Resistance Heat	991	0.19	0.0
		Fuel Heat Only	0	0.00	57.0
		Resistance Heat Only	921	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	61	0.13	23.8
		Heat Pump	259	0.13	0.0
		AC w/ Resistance Heat	457	0.13	0.0
		Fuel Heat Only	0	0.00	23.8
		Resistance Heat Only	396	0.00	0.0
Poughkeepsie	Single-Pane	AC w/ Fuel Heat	64	0.18	64.9
		Heat Pump	638	0.18	0.0
		AC w/ Resistance Heat	1,212	0.18	0.0
		Fuel Heat Only	0	0.00	64.9
		Resistance Heat Only	1,148	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	56	0.12	28.1
		Heat Pump	312	0.12	0.0
		AC w/ Resistance Heat	567	0.12	0.0
		Fuel heat Only	0	0.00	28.1
		Resistance Heat Only	511	0.00	0.0

City	Baseline Window	HVAC System	ΔkWh/ 100 SF	ΔkW/ 100 SF	Δtherms/ 100 SF
Syracuse	Single-Pane	AC w/ Fuel heat	49	0.14	74.0
		Heat Pump	771	0.14	0.0
		AC w/ Resistance Heat	1,494	0.14	0.0
		Fuel Heat Only	0	0.00	74.0
		Resistance Heat Only	1,445	0.00	0.0
	Double-Pane	AC w/ Fuel Heat	43	0.10	33.1
		Heat Pump	366	0.10	0.0
		AC w/ Resistance Heat	689	0.10	0.0
		Fuel Heat Only	0	0.00	33.1
		Resistance Heat Only	647	0.00	0.0

Coincidence Factor (CF)

The prescribed value for the coincidence factor is 0.69.[12]

Baseline Efficiencies from which Energy Savings are Calculated

The baseline case for this measure is a single or double-pane window unit with clear glass without storm windows.

Unit energy and demand savings were derived using LBNL's RESFEN V6.0 software. Single and two-story houses were modeled assuming glazing area equal to 15% of total home floor area. The homes were modeled for the cities both without storm windows and with low-e storm windows with different emissivity ratings. The analysis assumes an equal weighting between three low-E storm window glass options. For reference, the Emissivity, Solar Transmission, U-factor and Solar Heat Gain Coefficient (SHGC) of the modeled baseline and low-e storm windows are shown in the table below.

Window Type	Glass Options (3 mm)	Emissivity	Solar Trans-mission	U-factor	SHGC
Low-E	AGC Comfort Select 73	0.15	0.69	0.356	0.458
	Guardian IS20	0.20	0.77	0.364	0.502
	PPG Sungate 500	0.22	0.69	0.367	0.468

For additional detail on the derivation of per unit savings values, refer to the "NY TRM Residential Low-E Storm Window Supplement.xlsx" workbook.

[12] Based on BG&E 'Development of Residential Load Profile for Central Air Conditioners and Heat Pumps' research, the Maryland Peak Definition coincidence factor is 0.69. This study is not publicly available, but is referenced by M. M. Straub, Using Available Information for Efficient Evaluation of Demand-Side Management Programs, Electricity Journal, September 2011 and supported by research conducted by Cadmus on behalf of the TRM Management Committee.

Compliance Efficiency from which Incentives are Calculated

The compliance case is a single or double-pane window unit fitted with low-e storm windows installed outside or inside the window unit. Installed storm windows must meet the minimum compliance criteria required by V1.0 of the ENERGY STAR® Exterior and Interior Storm Windows Product Specification.[13] To qualify, installed storm windows must meet the following specifications:

Emissivity: ≤ 0.22
Solar Transmittance: > 0.55
Air Leakage (Exterior Storm Windows): ≤ 1.5 CFM/SF
Air Leakage (Interior Storm Windows): ≤ 0.5 CFM/SF

Operating Hours

These operating hours assumptions are embedded in the RESFEN prototype models used to derive energy and demand savings values. See the "NY TRM Residential Window Supplement.xlsx" workbook and RESFEN V6.0 User's Manual for additional detail.[14] Operating hour assumptions for the prototypical building models are described in Appendix A. The heating EFLH for C&I buildings in NY by location, building type and vintage are tabulated in Appendix G.

Example Calculation *(Not to be used as default)*

An existing residential customer in Albany installs low-e storm windows on existing single-pane windows in a home with gas heating and no electric cooling. The glazing area of the installed windows is 168 SF. Annual Electric Energy Savings and Summer Peak Coincident Demand Savings are not applicable. Annual Fossil Fuel Energy Savings are calculated as below.

$$\Delta MMBtu = \frac{SF}{100} \times \frac{(\Delta therms/100\,SF)}{10}$$

SF = 168 SF
Δtherms/100SF = 72.8, from Unit Energy and Demand Savings table based on city, baseline window, and HVAC type from application

$$\Delta MMBtu = \frac{168}{100} \times \frac{(72.8)}{10} = 12.23\ MMBtu$$

Effective Useful Life (EUL)

See Appendix P.

[13] ENERGY STAR® Product Specification Exterior and Interior Storm Windows, V1.0, September 2018.
[14] LBNL RESFEN6 for Calculating the Heating and Cooling Energy Use of Windows in Residential Buildings, December 2012.

Ancillary Fossil Fuel Savings Impacts

Ancillary fossil fuel savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

Ancillary Electric Savings Impacts

Ancillary electric savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

References

1. ENERGY STAR® Product Specification Exterior and Interior Storm Windows Eligibility Criteria, Version 1.0, September 2018.
   Available from: https://www.energystar.gov/sites/default/files/Storm%20Window%20Product%20Specification_Final_0.pdf
2. BG&E: Development of Residential Load Profile for Central Air Conditioners and Heat Pumps.
3. LBNL RESFEN6 for Calculating the Heating and Cooling Energy Use of Windows in Residential Buildings, December 2012.
   Available from: https://windows.lbl.gov/sites/default/files/Downloads/resfen60-user-manual.pdf
4. NY TRM Residential Low-E Storm Window Supplement.xlsx
   Available from: <Link to DMM pending>

Record of Revision

Record of Revision Number	Issue Date
9-19-2	9/27/2019
12-24-3	2/7/2025

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DOMESTIC HOT WATER

HEAT PUMP WATER HEATER (HPWH) – AIR SOURCE

Measure Description

This measure covers the installation of electric storage tank water heaters that use heat pump technology to move heat from the air (in conditioned or unconditioned spaces) to the water storage tank and are designed to heat and store potable water at a thermostatically controlled temperature of less than 180°F. It is not intended for equipment delivering process or space heating hot water. It applies to electric heat pump water heaters with a maximum current rating of 24 amperes at an input voltage 250 volts or less, and with a rated storage tank capacity of 120 gallons or less.[15,16]

This measure applies to new construction/major renovation projects and replacement of existing water heaters. Baseline equipment in new construction/major renovation shall be a minimally code compliant, gas-fired storage type water heater where gas service is available and a minimally code compliant, electric storage type water heater elsewhere. Baseline efficiency for replacement of equipment shall be a minimally code compliant system of the same type as the existing equipment. New construction projects in NYC must comply with the provisions of LL154 and reflect an electric baseline beginning in January 2024 in accordance with the LL154 Effectuation Schedule presented in the "New Construction Baselines - NYC Local Low 154 of 2021" section of this TRM's Introduction.

This measure applies to residential applications as well as residential-duty water heaters installed in commercial settings. In the latter case, this methodology shall be employed utilizing typical GPD values as defined in the "Gallons per Day (GPD)" section of the Commercial Storage Tank Water Heater measure detailed in this document.

Method for Calculating Annual Energy and Peak Coincident Demand Savings

Annual Electric Energy Savings

$$\Delta kWh = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3,412} \times \left(\frac{F_{eDHW}}{UEF_{baseline}} - \frac{1}{UEF_{ee} \times F_{derate,ER} \times F_{derate}}\right) + \Delta kWh_{cooling} - \Delta kWh_{heating}$$

$$\Delta kWh_{cooling} = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3,412} \times \frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{Loc} \times \frac{F_{Cool}}{SEER/3.412}$$

[15] ENERGY STAR® Program Requirements Product Specification for Residential Water Heaters, Eligibility Criteria Version 5.0, July 2022.
[16] 10 CFR 430.2.

$$\Delta kWh_{heating} = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3{,}412} \times \frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{Loc} \times F_{ElecHeat} \times \frac{F_{Heat}}{HSPF/3.412}$$

Peak Coincident Demand Savings

$$\Delta kW = units \times (\Delta kW/unit)$$

Annual Fossil Fuel Energy Savings

$$\Delta MMBtu = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{1{,}000{,}000} \times \left[\frac{F_{FFDHW}}{UEF_{baseline}} + \frac{F_{BoilerDHW}}{AFUE} - \left(\frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{loc} \times F_{FuelHeat} \times \frac{F_{Heat}}{AFUE}\right)\right]$$

where:

ΔkWh = Annual electric energy savings

ΔkW = Peak coincident demand electric savings

ΔMMBtu = Annual fossil fuel energy savings

$\Delta kWh_{cooling}$ = Annual electric cooling energy savings as a result of interactivity with the building's HVAC system (electric cooling bonus)

$\Delta kWh_{heating}$ = Annual electric heating energy savings as a result of interactivity with the building's HVAC system (electric heating penalty)

units = Number of households addressed by the program

GPD = Gallons per day of delivered hot water per person

PPH = Persons per household served by DHW system

ΔT_{main} = Average temperature difference between water heater set point temperature and the supply water temperature in water main (°F)

F_{eDHW} = Electric water heating factor, used to exclude baseline electric water heating consumption if no baseline electric water heating is present

F_{FFDHW} = Fossil fuel water heating factor, used to exclude baseline fossil fuel water heating consumption if no baseline fossil fuel fired direct water heating is present

$F_{BoilerDHW}$ = Fossil fuel water heating factor, used to exclude baseline fossil fuel water heating consumption if no baseline fossil fuel fired boiler-driven indirect water heating is present

$_{baseline}$ = Characteristic of baseline condition

$_{ee}$ = Characteristic of energy efficient condition

UEF = Uniform energy factor

$F_{derate,ER}$ = Efficiency derating factor used to account for systems relying on integrated supplemental electric resistance heating

F_{derate} = Efficiency derating factor used to account for the degradation of heat pump performance present in systems installed in unconditioned spaces
F_{Loc} = Installation location factor, used to exclude interactive HVAC impacts for systems installed in unconditioned spaces
F_{Cool} = Cooling factor, used to account for the percentage of heat extracted from ambient air by the heat pump water heater that reduces space cooling load
F_{Heat} = Heating factor, used to account for the percentage of heat extracted from ambient air by the heat pump water heater that increases space heating load
$F_{ElecHeat}$ = Electric heating factor, used to exclude electric heating penalty if no electric heating is present
$F_{FuelHeat}$ = Fossil fuel heating factor, used to exclude fossil fuel heating penalty if no fossil fuel heating is present
SEER = Seasonal average energy efficiency ratio over the cooling season, BTU/watthour, (used for average U.S. location/region)
HSPF = Heating seasonal performance factor, BTU/watt-hour, total heating output (supply heat) in BTU (including electric heat) during the heating season / total electric energy heat pump consumed (in watt-hour)
AFUE = Annual fuel utilization efficiency, seasonal energy efficiency for fuel heating equipment
(ΔkW/unit) = Deemed peak coincident demand savings per measure
365 = Days in one year
8.33 = Specific heat of water; energy required (BTU), to heat one gallon of water by one degree Fahrenheit [BTU/(gal-F)]
3,412 = Conversion factor, one kWh equals 3,412 BTU
3.412 = Conversion factor, one watt-hour equals 3.412 BTU
1,000,000 = Conversion factor, one MMBtu equals 1,000,000 BTU

Summary of Variables and Data Sources

Variable	Value	Notes
GPD	17.2	Average daily hot water usage per person.[17]
PPH		From application. If unknown, use a value of 2.8 for single-family homes[18] and 2.0 for multifamily homes.[19] For sites with multiple water heating systems, PPH shall be allocated proportional to the input heating capacity of each water heater relative to the total input heating capacity of all water heaters.[20]

[17] Water Research Foundation: Residential End Uses of Water, Version 2, April 2016, pg. 5; 17.2 GPD equated from the report findings indicating an average 2.65 people per household and 45.5 GPD per household.
[18] Residential Statewide Baseline Study of New York State, July 2015. Volume 1: Single-Family Report, Table 9.
[19] Residential Statewide Baseline Study of New York State, July 2015. Volume 2: Multifamily Report, Table 8.
[20] For example, if a home with 6 occupants contains two water heaters with 40 MBH and 50 MBH input capacities and the 40 MBH unit is being replaced with an equivalent capacity unit, the PPH value applied shall be PPH = 6 (occupants) x 40 (MBH) / (40 + 50) (MBH) = 2.7.

Variable	Value	Notes
ΔT_{main}	T_{set} - T_{main}	Average temperature difference between water heater set point temperature and the supply water temperature in water main (°F).
T_{set}	125	Water heater set point temperature (°F).[21]
T_{main}		Supply water temperature in water main (°F). Lookup in Cold Water Inlet Temperature table below based on nearest city. For systems with inlet water preheat and where presence of inlet water preheat cannot be verified due to program delivery mechanism (e.g., midstream programs), multiply the value identified from the table below by 1.24 to reflect a 24% increase in inlet water for preheat.[22] Inlet water preheat increases the inlet water temperature relative to mains temperature, decreasing temperature rise required to heat water to set point temperature.
F_{eDHW}		Use a value of 1.0 if the water was previously heated with electricity or if it is a new construction home with no gas access. Otherwise, use 0.0.
F_{FFDHW}		Use a value of 1.0 if the water was previously heated directly with fossil fuels or if it is a new construction home with gas access. Otherwise, use 0.0.
$F_{BoilerDHW}$		Use a value of 1.0 if the water was previously heated indirectly with fossil fuels through the boiler system. Otherwise, use 0.0.
$UEF_{baseline}$		Uniform Energy Factor of the baseline condition. See Baseline Efficiencies… section below for details regarding derivation of this input.
UEF_{ee}		Uniform Energy Factor of the energy efficient measure, from application.
$F_{derate,ER}$		For systems with integrated supplemental electric resistance heating, use a value of 0.91. Otherwise, use a value of 1.0.[23]
F_{derate}		For equipment installed in unconditioned spaces, lookup in Derate Factor table below based on installation location and nearest city. For equipment installed in conditioned spaces, a value of 1.0 shall be used.
F_{Loc}		Use a value of 1.0 if the water heater is installed in a conditioned space. Otherwise, use 0.0.

[21] 10 CFR 430 Appendix E to Subpart B of Part 430 Uniform Test Method for Measuring the Energy Consumption of Water Heaters, Section 2. Test Conditions, 2.5 Set Point Temperature.

[22] Technical Study of New York State Heat Pump Performance, Prepared for NYS DPS by DNV, July 25, 2024, pg. 60

[23] Technical Study of New York State Heat Pump Performance, Prepared for NYS DPS by DNV, July 25, 2024, pg. 59

Variable	Value	Notes
F_{Cool}		Lookup in HVAC Interactivity table below based on nearest city.
F_{Heat}		Lookup in HVAC Interactivity table below based on nearest city.
$F_{ElecHeat}$		Use a value of 1.0 if the building is electrically heated. Otherwise, use 0.0.
$F_{FuelHeat}$		Use a value of 1.0 if the building is fossil fuel heated. Otherwise, use 0.0.
SEER		From application. Use SEER2 rating if equipment has a SEER2 rating. If unknown use 13.4 SEER2, assuming a minimally code compliant, 3-ton, split system AC.[24]
HSPF		From application. For equipment rated in HSPF2, HSPF2 rating shall be used. If unknown use 7.5 HSPF2, assuming a 3-ton central ASHP system. [25] For electric resistance heating and electric furnaces, use 3.4 HSPF. If taken from application, COP must be converted to HSPF using the equivalency HSPF = COP x 3.412.
AFUE		From application. If unknown, lookup from Baseline Efficiencies section based on existing equipment type. For new construction/gut rehab or if equipment type is unknown, assume an 80 MBH gas furnace.
(ΔkW/unit)		Deemed Summer Peak Coincident Demand Savings. Use a value of 0.17 if the water was previously heated with electricity in replacement scenarios and if there is no gas service available in new construction/gut rehab scenarios.[26] Otherwise, use -0.17 for an electric penalty.[27]

Cold Water Inlet Temperature (T_{main})

Supply water main temperatures vary according to climate and are approximately equal to the annual average outdoor temperature plus 6°F.[28] Supply main temperatures based on the annual outdoor temperature are shown below.

[24] 10 CFR 430.32(c) (5)
[25] Ibid.
[26] "Field Testing of Pre-Production Prototype Heat Pump Water Heaters" Federal Energy Management Program, DOE/EE-0317, May 2007.
[27] "CT HVAC and Water Heater Process and Impact Evaluation and CT Heat Pump Water Heater Impact Evaluation", West Hill Energy and Computing, Final Report R1614/R1613, July 19, 2018.
[28] Burch, Jay and Christensen, Craig, "Towards Development of an Algorithm for Mains Water Temperature." National Renewable Energy Laboratory.

City	Annual average outdoor temperature[29] (°F)	T_{main} (°F)
Albany	49.4	55.4
Binghamton	46.8	52.8
Buffalo	49.1	55.1
Massena	45.1	51.1
NYC	54.7	60.7
Poughkeepsie	50.9	56.9
Syracuse	49.0	55.0

Derate Factor

Standard testing conditions for rating of heat pump water heaters require a dry bulb temperature of 67.5°F ± 1°F and a relative humidity of 50% ±2%.[30] The reported efficiency of heat pump water heaters is established at these conditions; however, heat pump efficiency degrades at lower ambient temperatures. The Derate Factor is established to adjust the published efficiency of the qualifying heat pump water heater when the system is installed in semi-conditioned or unconditioned spaces, namely, garages and basements. The values shown below were derived from Table 10 of Residential Heat Pump Water Heater Evaluation: Lab Testing & Energy Use Estimates published by Bonneville Power Administration in 2011[31] and verified via comparison with results from the 2013 NEEA Heat Pump Water Heater Field Study Report.[32] Average values from northwest heating zones 1 (<6,000 HDD), 2 (6,000 – 7,500 HDD) and 3 (>7,500 HDD)[33] from this analysis and comparison were then mapped to representative NY climate regions as shown below.

City	F_{derate} (Unconditioned Basement Installation)	F_{derate} (Garage Installation)
Albany	0.80	0.78
Binghamton	0.80	0.78
Buffalo	0.80	0.78
Massena	0.75	0.69
NYC	0.86	0.83
Poughkeepsie	0.80	0.78
Syracuse	0.80	0.78

HVAC Interactivity

Because heat pump water heaters operate via the transfer of heat from the ambient air to the water in the storage tank, systems installed in conditioned spaces will interact with the building's HVAC system. The values shown in the table below reflect the percentage of heat extracted from the

[29] Average annual outdoor temperatures taken from NCDC 1991-2020 climate normals.
[30] 10 CFR 430 Subpart B Appendix E.
[31] Residential Heat Pump Water Heater Evaluation: Lab Testing & Energy Use Estimates, Bonneville Power Administration, November 2011.
[32] NEEA Heat Pump Water Heater Field Study Report, Fluid Market Strategies, October 2013.
[33] NW Council Heating/Cooling zone maps.

ambient air by the heat pump that either decreases the building's cooling load (F_{Cool}) or increases the building's heating load (F_{Heat}). These values were derived from Table 12 of Residential Heat Pump Water Heater Evaluation: Lab Testing & Energy Use Estimates published by Bonneville Power Administration in 2011[34] and key operating assumptions specified therein. Average values from northwest heating zones 1 (<6,000 HDD), 2 (6,000 – 7,500 HDD) and 3 (>7,500 HDD)[35] were then mapped to representative NY climate regions and scaled linearly based on regional HDD and CDD. The HDD and CDD values are based on 30-year averages of U.S annual climate normals between 1981 and 2010 using base 65° F.[36]

City	CDD	F_{Cool}	HDD	F_{Heat}
Albany	721	0.26	6,391	0.70
Binghamton	383	0.17	7,200	0.76
Buffalo	607	0.24	6,502	0.70
Massena	406	0.16	8,030	0.84
Poughkeepsie	1017	0.29	4,900	0.65
NYC	745	0.51	6,026	0.49
Syracuse	618	0.25	6,625	0.70

Coincidence Factor (CF)

The recommended value for the coincidence factor is N/A. Deemed demand savings values incorporate system peak coincidence considerations.

Baseline Efficiencies from which Savings are Calculated

The baseline for a non-fuel switching normal replacement at end of the appliance effective useful life (EUL), in new construction, or substantial renovation scenarios is the minimally-compliant state or municipal energy code or federal standard, that is applicable to the measure or system being installed.

The baseline for a fuel switching installation at the end of the appliance effective useful life is the minimally-compliant, state or municipal energy code or federal standard, that is applicable to the measure or system, similar to the existing measure or system, that the consumer would have had installed without the influence of the energy efficiency program. New construction projects in New York City (NYC) are required to adhere to the regulations outlined in Local Law 154 (LL154) and must apply an electric baseline in accordance with the phased effectuation of that legislation. The LL154 Effectuation Schedule, as detailed in the "New Construction Baselines - NYC Local Law 154 of 2021" section of this TRM's Introduction, provides guidance for compliance.

The baseline for a system being installed prior to the end of useful life of the existing on-site equipment may be considered as an Early Replacement; consistent with methods described in Appendix M, *Guidelines for Early Replacement* of this TRM. The non-fuel switching and fuel

[34] Residential Heat Pump Water Heater Evaluation: Lab Testing & Energy Use Estimates, Bonneville Power Administration, November 2011.
[35] NW Council Heating/Cooling zone maps.
[36] HDD/CDD taken from NCEI 1991-2020 climate normals.

switching baselines detailed above shall be considered where applicable when calculating Remaining Useful Life (RUL).

For LMI applications, existing condition baseline shall be established based on nameplate efficiency or efficiency measured through combustion analysis.

$UEF_{baseline}$ shall be calculated as a function of qualifying equipment tank volume (v_t) per federal standards[37] as shown in the table below, using the qualifying equipment capacity and draw pattern. Draw pattern can be established based on the proposed equipment First Hour Rating (FHR), rated in gallons. See First Hour Rating vs. Draw Pattern table below. If FHR is unknown, a Medium draw pattern should be assumed for equipment with rated storage capacity ≤50 gallons and a High draw pattern should be assumed otherwise.[38]

Product Class	Rated Storage Volume and Input Rating	Draw Pattern	$UEF_{baseline}$
Electric Storage Water Heater	≥ 20 gal and ≤ 55 gal	Very Small	$0.8808 - (0.0008 \times v_t)$
		Low	$0.9254 - (0.0003 \times v_t)$
		Medium	$0.9307 - (0.0002 \times v_t)$
		High	$0.9349 - (0.0001 \times v_t)$
	> 55 gal and ≤ 120 gal	Very Small	$1.9236 - (0.0011 \times v_t)$
		Low	$2.0440 - (0.0011 \times v_t)$
		Medium	$2.1171 - (0.0011 \times v_t)$
		High	$2.2418 - (0.0011 \times v_t)$
Gas-Fired Storage Water Heater	≥ 20 gal and ≤ 55 gal	Very Small	$0.3456 – (0.0020 \times v_t)$
		Low	$0.5982 – (0.0019 \times v_t)$
		Medium	$0.6483 – (0.0017 \times v_t)$
		High	$0.6920 – (0.0013 \times v_t)$
	> 55 gal and ≤ 100 gal	Very Small	$0.6470 – (0.0006 \times v_t)$
		Low	$0.7689 – (0.0005 \times v_t)$
		Medium	$0.7897 – (0.0004 \times v_t)$
		High	$0.8072 – (0.0003 \times v_t)$
Oil-Fired Storage Water Heater	≤ 50 gal	Very Small	$0.2509 – (0.0012 \times v_t)$
		Low	$0.5330 – (0.0016 \times v_t)$
		Medium	$0.6078 – (0.0016 \times v_t)$
		High	$0.6815 – (0.0014 \times v_t)$

*v_t = tank volume in gallons

<u>First Hour Rating vs. Draw Pattern[39]</u>

First Hour Rating	Draw Pattern
<18 gallons	Very Small
≥18 and <51 gallons	Low

[37] 10 CFR 430.32(d).
[38] Based on review of typical usage bins for AHRI certified residential water heating equipment. (https://www.ahridirectory.org/ahridirectory/pages/home.aspx)
[39] 10 CFR 429.17.

First Hour Rating	Draw Pattern
≥51 and <75 gallons	Medium
≥75 gallons	High

The baseline efficiency for fossil fuel fired heating systems serving single-family homes and individual units is defined by the Code of Federal Regulations as shown in the table below.

Fossil Fuel Fired Heating System Baseline Efficiencies: Systems Serving Single Units[40]

Equipment Type	Size Range	Baseline Efficiency
Warm Air Furnace, Gas Fired	All Capacities	0.80 AFUE
Warm Air Furnace, Oil Fired	All Capacities	0.83 AFUE
Boiler, Hot Water, Gas Fired	All Capacities	0.84 AFUE
Boiler, Hot Water, Oil Fired	All Capacities	0.86 AFUE
Boiler, Steam, Gas Fired	All Capacities	0.82 AFUE
Boiler, Steam, Oil Fired	All Capacities	0.85 AFUE

The baseline efficiency for heating systems serving multiple dwelling units is defined by International Energy Conservation Code[41] and subsequently adopted by the Energy Conservation Construction Code of New York State (ECCCNYS) as shown in the table below.

Fossil Fuel Fired Heating System Baseline Efficiencies: Systems Serving Multiple Dwelling Units

Equipment Type	Size Range	Baseline Efficiency
Warm Air Furnace, Gas Fired	< 225 kBTU/h	0.80 AFUE
	≥ 225 kBTU/h	0.80 Et
Warm Air Furnace, Oil Fired	< 225 kBTU/h	0.83 AFUE
	≥ 225 kBTU/h	0.81 Et
Warm Air Unit Heaters, Gas Fired	All Capacities	0.80 Ec
Warm Air Unit Heaters, Oil Fired	All Capacities	0.80 Ec
Boiler, Hot Water, Gas Fired	< 300 kBTU/h	0.84 AFUE
	≥ 300 kBTU/h and ≤ 2,500 kBTU/h	0.80 Et
	> 2,500 kBTU/h	0.82 Ec
Boiler, Hot Water, Oil Fired	< 300 kBTU/h	0.86 AFUE
	≥ 300 kBTU/h and ≤ 2,500 kBTU/h	0.82 Et
	> 2,500 kBTU/h	0.84 Ec
Boiler, Steam, Gas Fired, All Except Natural Draft	< 300 kBTU/h	0.82 AFUE
	≥ 300 kBTU/h and ≤ 2,500 kBTU/h	0.79 Et
	> 2,500 kBTU/h	0.79 Et
Boiler, Steam, Gas Fired, Natural Draft	< 300 kBTU/h	0.82 AFUE
	≥ 300 kBTU/h and ≤ 2,500 kBTU/h	0.79 Et
	> 2,500 kBTU/h	0.79 Et

[40] 10 CFR 430.32(e)(2)(iii)(A); last reviewed 10/1/2024
[41] ECCCNYS 2020, Table C403.3.2(4) & Table C403.3.2(5).

Equipment Type	Size Range	Baseline Efficiency
Boiler, Steam, Oil Fired	< 300 kBTU/h	0.85 AFUE
	≥ 300 kBTU/h and ≤ 2,500 kBTU/h	0.81 Et
	> 2,500 kBTU/h	0.81 Et

Compliance Efficiency from which Incentives are Calculated

The compliance condition is a heat pump water heater meeting minimum performance requirements specified in ENERGY STAR® Program Requirements Product Specification for Residential Water Heaters, Eligibility Criteria Version 5.0.[42] The table below presents minimum UEF ratings for heat pump water heaters required by that standard.

Product Type	UEF
Integrated HPWH	≥ 3.30
Integrated HPWH, 120 Volt / 15 Amp Circuit	≥ 2.20
Split-System HPWH	≥ 2.20

Operating Hours

Water heater run hours are not utilized in the estimation of energy or demand savings, but water heater is assumed to be available for operation 8,760 hours per year.

Example Calculation *(Not to be used as default)*

A 40-gallon heat pump water heater replaces an existing gas-fired storage water heater in a single family detached home located near Albany with 3 residents. The heat pump water heater has a UEF of 3.5,a first hour rating of 60 gallons per hour, and is equipped with inlet preheat. The water heater is installed in the home's conditioned utility closet, and the home's gas heating system has an AFUE of 80%. Annual Electric Energy Savings, Summer Peak Coincident Demand Savings and Annual Fossil Fuel Energy Savings are calculated as below.

$$\Delta kWh = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3{,}412} \times \left(\frac{F_{eDHW}}{UEF_{baseline}} - \frac{1}{UEF_{ee} \times F_{derate,ER} \times F_{derate}}\right) + \Delta kWh_{cooling} - \Delta kWh_{heating}$$

$$\Delta kWh_{cooling} = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3{,}412} \times \frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{Loc} \times \frac{F_{Cool}}{SEER/3.412}$$

[42] ENERGY STAR® Program Requirements Product Specification for Residential Water Heaters, Eligibility Criteria Version 5.0, July 2022.

$$\Delta kWh_{heating} = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{3{,}412} \times \frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{Loc} \times F_{ElecHeat} \times \frac{F_{Heat}}{HSPF/3.412}$$

$$\Delta kW = units \times (\Delta kW/unit)$$

$$\Delta MMBtu = units \times \frac{GPD \times PPH \times 365 \times 8.33 \times \Delta T_{main}}{1{,}000{,}000} \times \left[\frac{F_{FFDHW}}{UEF_{baseline}} + \frac{F_{BoilerDHW}}{AFUE} - \left(\frac{1}{UEF_{ee} \times F_{derate,ER}} \times F_{loc} \times F_{FuelHeat} \times \frac{F_{Heat}}{AFUE}\right)\right]$$

units = 1, from application
GPD = 17.2 from Summary of Variables and Data Source table
PPH = 3, from application
$\Delta T_{main} = T_{set} - T_{main}$ = 125 – (55.4 x 1.24) = 56.3
T_{set} from Summary of Variables and Data Sources table
T_{main} from Cold Water Inlet Temperature lookup table based on location from application, adjusted to account for presence of inlet preheat
F_{eDHW} = 0, from Summary of Variable and Data Sources table based on baseline DHW fuel source from application
UEF_{ee} = 3.5, from application
$F_{derate,ER}$ = 1.0, from Summary of Variables and Data Sources table based on absence of supplemental electric resistance heat
F_{derate} = 1, from Summary of Variable and Data Sources table based on location from application
F_{Loc} = 1, from Summary of Variable and Data Sources based on location from application
F_{cool} = 0.26, from HVAC Interactivity section based on location from application
SEER = 13, from Summary of Variable and Data Sources table
$F_{ElecHeat}$ = 0, from Summary of Variable and Data Sources table based on location from application
HSPF = N/A, from application
(ΔkW/unit) = -0.17, from Summary of Variables and Data Sources table based on existing water heating system fuel from application
F_{FFDHW} = 1, from Summary of Variables and Data Sources table based on existing water heating system from application
$UEF_{baseline}$ = 0.6483 – (0.0017 x v_t) = 0.6483 – (0.0017 x 40) = 0.5803
$UEF_{baseline}$ equation lookup from Baseline Efficiencies section based on Product Class from baseline application and Rated Storage Volume and Draw Pattern from compliance equipment from application, where Draw Pattern is determined by the First Hour Rating based on application
v_t from application of compliance equipment

$F_{BoilerDHW}$ = 0, from Summary of Variables and Data Sources table based on existing water heating system from application
F_{Heat} = 0.70, from HVAC Interactivity section based on location from application
AFUE = 0.80, from application

$$\Delta kWh_{cooling} = 1 \times \frac{17.2 \times 3 \times 365 \times 8.33 \times 56.3}{3{,}412} \times \frac{1}{3.5 \times 1.0} \times 1 \times \frac{0.26}{13/3.412}$$
$$= 50.47\ kWh$$

$$\Delta kWh_{heating} = 0$$

$$\Delta kWh = 1 \times \frac{17.2 \times 3 \times 365 \times 8.33 \times 56.3}{3{,}412} \times \left(0 - \frac{1}{3.5 \times 1.0 \times 1}\right) + 62.40 - 0$$
$$= -677.24\ kWh$$

$$\Delta kW = 1 \times (-0.17) = -0.17\ kW$$

$$\Delta MMBtu = 1 \times \frac{17.2 \times 3 \times 365 \times 8.33 \times 56.3}{1{,}000{,}000} \times \left[\frac{1}{0.5803} + 0 - \left(\frac{1}{3.5 \times 1.0} \times 1 \times 1 \times \frac{0.7}{0.8}\right)\right] = 13.0\ MMBtu$$

Effective Useful Life (EUL)

See Appendix P.

Ancillary Fossil Fuel Savings Impacts

Heat pump water heaters installed in conditioned spaces will result in an increase in space heating load due to the extraction of heat from the ambient air. This interactivity is addressed in the prescribed methodology.

Ancillary Electric Savings Impacts

Heat pump water heaters installed in conditioned spaces will result in an increase in space heating load and a decrease in cooling load due to the extraction of heat from the ambient air. This interactivity is addressed in the prescribed methodology.

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Record of Revision

Record of Revision Number	Issue Date
0	10/15/2010
6-13-3	6/30/2013
11-13-2	11/26/2013
12-17-7	12/31/2017
12-18-3	12/31/2018

2-20-1	2/28/2020
7-21-7	8/30/2021
3-23-19	3/31/2023
12-23-1	1/5/2024
12-24-4	2/7/2025

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MEASURE RECOMMENDED FOR REMOVAL FROM TRM
OTHER

SHADE TREE

Measure Description

This measure covers the planting of trees nearby a single-family detached home in New York State. These trees provide primarily electric cooling savings by shading a home from sunlight, thereby reducing heat gain. Projects may also experience heating savings by partially blocking cold winds from hitting homes. However, these savings from wind shielding may be negated by reduced heat from solar energy, particularly in northern NY locations.

This measure is restricted to deciduous trees planted south, southwest, or west within 60 feet[43] of the home. Note that while a variety of tree species may be used to provide shading, oak trees were used in software simulations to develop deemed savings values based on information provided by the Arbor Day Foundation indicating oak trees to be the most common planted for this purpose. Additionally, oak trees were found to result in conservative estimate of savings relative to other common shade tree species in i-Tree Planting simulation software.

Method for Calculating Annual Energy and Peak Coincident Demand Savings

Annual Electric Energy Savings

$$\Delta kWh = units \times \frac{\Delta kWh}{unit}$$

Summer Peak Coincident Demand Savings

$$\Delta kW = \left(\frac{\Delta kWh}{EFLH_{cooling}}\right) \times CF$$

Annual Fossil Fuel Energy Savings

$$\Delta MMBtu = units \times \frac{\Delta MMBtu}{unit}$$

where:

ΔkWh = Annual electric energy savings
ΔkW = Peak coincident demand electric savings
ΔMMBtu = Annual fossil fuel energy savings
units = Number of trees planted
ΔkWh/unit = Deemed annual electric energy savings per unit
ΔMMBtu/unit = Deemed annual fossil fuel energy savings per unit

[43] 60-foot threshold based on maximum distance with nonzero savings when modeled in i-Tree Planting Calculator.

$EFLH_{cooling}$ = Cooling equivalent full-load hours
CF = Coincidence factor

Summary of Variables and Data Sources

Variable	Value	Notes
units		From application.
ΔkWh/unit		Look up in Deemed Savings Table section below based on location.
ΔMMBtu/unit		Look up in Deemed Savings Table section below based on location.
$EFLH_{cooling}$		Lookup based on building type, vintage and location from Appendix G.
CF		Lookup from Coincidence Factor section below based on electric cooling system type.

Coincidence Factor (CF)

The prescriptive value for the coincidence factor is presented in the table below, based on the equipment type.

Equipment Type	CF Value
Central Air Conditioner	0.69[44]
Room Air Conditioner	0.3[45]

Baseline Efficiencies from which Savings are Calculated

The baseline condition for this measure is a single family detached home with no trees planted south, southwest, or west within 60 feet of the home.

Compliance Efficiency from which Incentives are Calculated

The compliance condition is that 1 to 3 deciduous shade trees must be planted no closer than 20 feet apart and located in the south, southwest, or west within 60 feet of a single-family detached home.

Trees must have a minimum lifespan of 20 years. They should provide shade to at least the third story of a home during the cooling season, requiring them to reach a height of at least 30 feet when fully mature.

Deemed Savings Table

Deemed savings were established based on simulations conducted using i-Tree Planting software and assuming oak trees with an assumed 40-year lifetime. Annual savings reflect a cumulative, 40-year projection of energy impacts divided by the assumed 40-year lifetime to normalize

[44] Ibid.
[45] RLW Analytics, Coincidence Factor Study: Residential Room Air Conditioners, June 2008, p. iv (based on average Seasonal CF for all load zones using 2007 weather data).

lifetime benefits to per annum impact. The fact that no savings occur before the tree reaches maturity is accounted for in the model and associated analysis.[46] Look up energy savings per unit from the table below, based on city. The kWh savings are associated with trees providing shade during the cooling season, while the MMBtu savings reflect the net impact of shading and shielding from cold winds during the heating season.

City	ΔkWh/unit[47]	ΔMMBtu/unit[48]	Net ΔMMBtu/unit[49]
Albany	38.2	-0.06	0.07
Binghamton	41.4	-0.06	0.09
Buffalo	41.4	-0.06	0.09
Massena	38.2	-0.06	0.07
NYC	75.7	0.16	0.42
Poughkeepsie	54.0	0.03	0.21
Syracuse	43.0	-0.05	0.09

Operating Hours

HVAC system operating hours vary by building type. Operating hour assumptions for the prototypical building models are described in Appendix A. Cooling EFLH data by location, building type and vintage are tabulated in Appendix G.

Example Calculation *(Not to be used as default)*

A residential customer purchases and plants 3 deciduous trees to be used for shading 30 feet from the southern exterior wall of their single-family detached home built in 1982 near Syracuse, NY. The home is cooled with a central air conditioning system. Annual Electric Energy Savings, Summer Peak Coincident Demand Savings and Annual Fossil Fuel Energy Savings are calculated as below.

$$\Delta kWh = units \times \frac{\Delta kWh}{unit}$$

$$\Delta kW = \left(\frac{\Delta kWh}{EFLH_{cooling}}\right) \times CF$$

$$\Delta MMBtu = units \times \frac{\Delta MMBtu}{unit}$$

units = 3, from application
ΔkWh/unit = 43.0, from Deemed Savings Table based on location

[46] Deemed savings analysis is detailed in “NY TRM Residential Shade Tree Savings Analysis.xlsx
[47] Ibid.
[48] Ibid.
[49] Ibid.

ΔMMBtu/unit = -0.05, from Deemed Savings Table based on location
$EFLH_{cooling}$ = 329, from Appendix G based on housing type, building vintage, and location from application
CF = 0.69, from Summary of Variables and Data Sources table

$$\Delta kWh = 3 \times 43.0 = 129\ kWh$$

$$\Delta kW = \left(\frac{129}{329}\right) \times 0.69 = 0.271\ kW$$

$$\Delta MMBtu = 3 \times -0.05 = -0.15\ MMBtu$$

Effective Useful Life (EUL)

See Appendix P.

Ancillary Fossil Fuel Savings Impacts

Ancillary fossil fuel savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

Ancillary Electric Savings Impacts

Ancillary electric savings impacts, if appropriate, will be researched and incorporated into this measure algorithm in future revisions to the TRM.

References

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3. Communication with a representative of the Arbor Day Foundation indicating that oak trees are the most popular tree planted by shade tree program participants. Oak trees were the species used in the deemed savings development. E-mail communication available on DMM under Case (TBD).
4. BG&E, Development of Residential Load Profile for Central Air Conditioners and Heat Pumps.
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Record of Revision

Record of Revision Number	Issue Date
9-24-6	10/22/2024
12-24-6	1/31/2025

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APPENDIX S

ENERGY CODES & STANDARDS REFERENCE

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	APPLIANCE	Air Purifier	9,10	ENERGY STAR® Air Purifiers (Cleaners) version 2.0, Rev. May 2022	ENERGY STAR Version 2.0 Room Air Cleaners Specification (Rev. May 2022)
Residential	APPLIANCE	Clothes Dryer	13,14	ENERGY STAR® Clothes Dryers Version 1.1, May 2017.	ENERGY STAR Version 1.1 Clothes Dryer Specification
Residential	APPLIANCE	Clothes Washer	18,21,23	ENERGY STAR® Clothes Washers, Version 8.1, April 2021	ENERGY STAR Version 8.1 Clothes Washer Specification
Residential	APPLIANCE	Dehumidifier	30,31	ENERGY STAR® Dehumidifiers Version 5.0, October 2019	ENERGY STAR Dehumidifiers Version 5.0 Program Requirements
Residential	APPLIANCE	Dishwasher	34,36	ENERGY STAR® Residential Dishwashers Version 7.0, effective July 19, 2023.	ENERGY STAR Version 7.0 Residential Dishwasher Final Specification
Residential	APPLIANCE	Fireplace	41	Canadian Standards Association (CSA) CSA-P.4.1-15	CAN/CSA-P.4.1-15 (R2020) | Product | CSA Group
Residential	APPLIANCE	Heat Pump Clothes Dryers	45	ENERGY STAR® Clothes Dryers Version 1.1, May 2017.	ENERGY STAR Version 1.1 Clothes Dryer Specification
Residential	APPLIANCE	Induction Cooktops	48,49	ENERGY STAR®, Emerging Technology, 2021-2022 Residential Induction Cooking Tops.	2021-2022 Residential Induction Cooking Tops | ENERGY STAR
Residential	APPLIANCE	Refrigerator and Freezer	52,62	ENERGY STAR® Refrigerators & Freezers Key Product Criteria, August 5, 2021	Refrigerators & Freezers Key Product Criteria | ENERGY STAR
Residential	APPLIANCE	Soundbar	68,69	ENERGY STAR® Audio/Video Version 3.0, December 2014.	ENERGY STAR AV Version 3.0 Program Requirements (Rev Dec-2014)
Residential	Appliance – Control	Advanced Power Strip (APS)	72,73	New York State Energy Research and Development Authority, Advanced Power Strip Research Report	Search Results - NYSERDA

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	Appliance Recycling	Air Conditioner - Room (RAC) Recycling	76,77	ENERGY STAR® Room Air Conditioners Version 5	ENERGY STAR Version 5.0 Residential Room Air Conditioner Final Draft Specification
Residential	Appliance Recycling	Dehumidifier Recycling	82	ENERGY STAR® Dehumidifiers, Version 5.0, February 2019.	ENERGY STAR Dehumidifiers Version 5.0 Program Requirements
Residential	Appliance Recycling	Refrigerator and Freezer Recycling	85,87	10 CFR, 430.32 (a)	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Building Shell	Air Conditioner – Room (RAC) Cover and Gap Sealer	93	ECCCNYS 2020 Table C403.2.3(4)	2020 Energy Conservation Construction Code of New York State
Residential	Building Shell	Air Conditioner – Room (RAC) Cover and Gap Sealer	93	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Building Shell	Air Leakage Sealing	98	ECCCNYS 2020 Section C402.5.1	2020 Energy Conservation Construction Code of New York State
Residential	Building Shell	Air Leakage Sealing	99	ECCCNYS 2020 Section R402	2020 Energy Conservation Construction Code of New York State
Residential	Building Shell	Attic Access Insulation and Sealing	105	ECCCNYS 2020 Section R402, R403, R503	CHAPTER 5 RE EXISTING BUILDINGS - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Residential	Building Shell	Attic Access Insulation and Sealing	105	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Building Shell	Door and Window Seal Caulking	112	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Building Shell	Insulation - Hot Water and Steam Pipe	118	10 CFR 430 Subpart B – Test Procedures, Appendix E 10 CFR 430 Subpart B – Test Procedures, Appendix C1 10 CFR 430.32	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Building Shell	Insulation - Hot Water and Steam Pipe	120	ECCCNYS 2020 R403.5.3	2020 Energy Conservation Construction Code of New York State

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	Building Shell	Insulation - Opaque Shell	127,128,129	ECCCNYS 2020 Section R402, R403, R503	2020 Energy Conservation Construction Code of New York State
Residential	Building Shell	Window	138	ENERGY STAR® Residential Windows, Doors, and Skylights, Version 7.0, effective 23rd October, 2023	ENERGY STAR Residential Windows, Doors, and Skylights Version 7.0 Specification
Residential	Building Shell	Window – Film	148	ECCCNYS 2020, Table R402	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Residential	Building Shell	Window - Low-E Storm	154	ENERGY STAR® Exterior and Interior Storm Windows, Version 1.0, September 2018	Storm Windows Product Specification
Residential	Domestic Hot Water	Heat Pump Water Heater (HPWH) – Air Source	171	ENERGY STAR® Residential Water Heaters, Version 5.0, July 2022	ENERGY STAR Version 5.0 Residential Water Heaters Specification and Partner Commitments
Residential	Domestic Hot Water	Indirect Water Heater	178,179	10 CFR 430 Appendix E to Subpart B of Part 430 Uniform Test Method for Measuring the Energy Consumption of Water Heaters 10 CFR 430 Subpart B – Test Procedures, Appendix E – Uniform Test Method for Measuring the Energy Consumption of Water Heaters	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Domestic Hot Water	Storage Tank and Instantaneous Domestic Water Heater	190	ENERGY STAR® Residential Water Heaters, Version 5.0, July 2022	ENERGY STAR Version 5.0 Residential Water Heaters Specification and Partner Commitments
Residential	Domestic Hot Water – Control	Low-Flow - Faucet Aerator	198	10 CFR 429.17	eCFR :: 10 CFR Part 429 -- Certification, Compliance, and Enforcement for Consumer Products and Commercial and Industrial Equipment
Residential	Domestic Hot Water – Control	Low-Flow - Showerhead	203	The Energy Policy Act (EPAct) of 1992	Energy Policy Act of 1992

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	Domestic Hot Water – Control	Thermostatic Shower Restriction Valve	212	NYS 2020 Residential Code of New York State, November 2019: Chapter 29 – 2020 NYSRC Table P2903.2 NYS Plumbing Code 2020; Table 604.4	CHAPTER 29 WATER SUPPLY AND DISTRIBUTION - 2020 RESIDENTIAL CODE OF NEW YORK STATE
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Air Conditioner - Room (RAC)	224	10 CFR 430.32(b)	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Air Conditioner - Room (RAC)	225	ENERGY STAR® Program Requirements Product Specification for Room Air Conditioners Eligibility Criteria Version 5.0, effective February 28, 2023	ENERGY STAR Version 5.0 Residential Room Air Conditioner Final Draft Specification
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Air Conditioner and Heat Pump – Packaged Terminal	230	ECCCNYS 2020 Table C403.3.2(3)	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Boiler, Furnace and Unit Heater	237	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Boiler and Furnace - Combination (“Combi”) Boiler and Furnace	244	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Boiler and Furnace - Combination (“Combi”) Boiler and Furnace	244	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Duct Sealing and Insulation	253	ECCCNYS 2020 R403.3.1	CHAPTER 4 RE RESIDENTIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Energy and Heat Recovery Ventilator	272	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Energy and Heat Recovery Ventilator	272	AHRI GUIDELINE V (I-P)-2011 Calculating the Efficiency of Energy Recovery Ventilation and its Effect on Efficiency and Sizing of Building HVAC Systems	Guideline V
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Air Source (ccASHP)	282	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Air Source (ccASHP)	283	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Air-to-Water	300	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Air-to-Water	300	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Water-to-Air Ground Source (GSHP)	313	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Residential	Heating, Ventilation and Air Conditioning (HVAC)	Heat Pump – Water-to-Air Ground Source (GSHP)	313	10 CFR 430.32(e)(2)(iii)(A)	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Residential	Heating, Ventilation and Air Conditioning (HVAC) – Control	Submetering	361	New York State Codes, Rules and Regulations (NYCRR) Title 16. NYS Department of Public Service Chapter II. Electric Utilities Part 96. Residential Electric Submetering	View Document - Unofficial New York Codes, Rules and Regulations
Residential	Heating, Ventilation and Air Conditioning (HVAC) – Control	Connected Thermostat	367	ENERGY STAR Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2016	ENERGY STAR Program Requirements for Connected Thermostats Version 1.0

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Residential	Heating, Ventilation and Air Conditioning (HVAC) – Control	Thermostat - Programmable Setback	373	ENERGY STAR Product Specification for Connected Thermostat Products, Eligibility Criteria Version 1.0, January 2017	ENERGY STAR Program Requirements for Connected Thermostats Version 1.0
Residential	Lighting	Interior and Exterior Lighting	400,401	ENERGY STAR® Luminaires	Luminaires V2.2 Final Specification
Residential	Motors and Drives	Pool Circulator Timer	411	DOE 81 FR 64580, Energy Conservation Program: Test Procedure for Dedicated-Purpose Pool Pumps	Federal Register :: Energy Conservation Program: Test Procedure for Dedicated-Purpose Pool Pumps
Residential	Motors and Drives	Pool Pump	417	ENERGY STAR® Pool Pumps	ENERGY STAR Version 3.1 Pool Pumps Final Specification
Residential	Other	Heat Pump Pool Heater	421	2019 ASHRAE Handbook – HVAC Applications, Chapter 6: Indoor Swimming Pools. 2019 ASHRAE Handbook – HVAC Applications, Chapter 51: Service Water Heating	
Commercial	Appliance	Air Purifier	474	ENERGY STAR® Program Requirements Product Specification for Air Cleaners, Eligibility Criteria Version 2.0, October 2020	ENERGY STAR Version 2.0 Room Air Cleaners Specification (Rev. May 2022)
Commercial	Appliance	Clothes Dryer	478	ENERGY STAR® Program Requirements Product Specification for Clothes Dryers, Eligibility Criteria Version 1.1, May 2017	ENERGY STAR Version 1.1 Clothes Dryers Specification - Program Commitment Criteria and Eligibility Criteria
Commercial	Appliance	Clothes Washer	484	ENERGY STAR® Program Requirements Product Specification for Clothes Washers, Eligibility Criteria Version 8.1, February 2018.	ENERGY STAR Version 8.1 Clothes Washer Specification

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Appliance	Combination Oven	494	ENERGY STAR® Program Requirements Product Specification for Commercial Ovens, Eligibility Criteria, Version 3.0 via NYS Appliance Standards	Commercial Ovens Specification Version 3.0 | ENERGY STAR
Commercial	Appliance	Dehumidifier	505	ENERGY STAR® Program Requirements Product Specification for Dehumidifiers, Eligibility Criteria Version 5.0, October 2019	Dehumidifiers Key Efficiency Criteria | ENERGY STAR
Commercial	Appliance	Dishwasher	511	ENERGY STAR® Program Requirements Product Specification for Commercial Dishwashers Eligibility Criteria Version 3.0	Commercial Dishwashers Version 3.0 Specification (Rev. - September 2021)
Commercial	Appliance	Fireplace	521	Canadian Standards Association (CSA) CSA-P.4.1-15	CAN/CSA-P.4.1-15 (R2020) | Product | CSA Group
Commercial	Appliance	Ice Maker	526	ENEGY STAR® Program Requirements Product Specification for Automatic Commercial Ice Makers, Eligibility Criteria Version 3.0, January 2018.	ENERGY STAR Automatic Commercial Ice Makers Version 3.0 Specification
Commercial	Appliance	Insulated Holding Cabinet	545	ENERGY STAR® Program Requirements for Commercial Hot Food Holding Cabinets, Eligibility Criteria. Version 2.0, July 2011	ENERGY STAR Program Requirements for Commercial Hot Food Holding Cabinets
Commercial	Appliance	Oven, Steamer, Fryer, and Griddle	553	ENERGY STAR® Program Requirements Product Specification for Commercial Ovens Eligibility Criteria Version 3.0	ENERGY STAR Version 3.0 Commercial Ovens Final Specification
Commercial	Appliance	Refrigerator and Freezer	567	ENERGY STAR® Program Requirements Product Specification for Commercial Refrigerators and Freezers, Eligibility Criteria Version 5.0.	ENERGY STAR Version 5.0 (Rev. November - 2022) Commercial Refrigerators and Freezers Specification

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Appliance Recycling	Air Conditioner – Room (RAC) Recycling	584	ENERGY STAR® Room Air Conditioners Version 4	ENERGY STAR Final Draft Version 4.0 Room Air Conditioners
Commercial	Building Shell	Air Curtain	590	ECCCNYS 2020 Table C403.4.1.4	2020 Energy Conservation Construction Code of New York State
Commercial	Building Shell	Air Leakage Sealing	589	ECCCNYS 2020 Section C402.5	2020 Energy Conservation Construction Code of New York State
Commercial	Building Shell	Insulation - Hot Water and Steam Pipe	509	ECCCNYS 2020, Table C403.11.3	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Building Shell	Insulation - Opaque Shell	617	ECCCNYS 2020 Section C402	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Building Shell	Insulation - Opaque Shell	617	ECCCNYS 2020 Section C503	CHAPTER 5 CE EXISTING BUILDINGS - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Building Shell	Window - Glazing	626	ENERGY STAR® Product Specification Residential Windows, Doors, and Skylights, Eligibility Criteria, V6.0, January 2014.	ENERGY STAR Product Specification Residential Windows, Doors, and Skylights
Commercial	Domestic Hot Water	Indirect Water Heater	664	ECCCNYS 2020, Table C403.3.2(5) and Table C404.2	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Domestic Hot Water	Instantaneous Water Heater	671	10 CFR 429, 430, and 431, ENERGY STAR® Commercial Water Heater Key Product Criteria	Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Test Procedures for Consumer and Commercial Water Heaters, Supplemental Notice of Proposed Rulemaking
Commercial	Domestic Hot Water	Storage Tank Water Heater	680	10 CFR 429, 430, and 431	Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Test Procedures for Consumer and Commercial Water Heaters, Supplemental Notice of Proposed Rulemaking
Commercial	Domestic Hot Water (DHW) – Control	Central Domestic Hot Water (DHW) Control	684	ECCCNYS 2020, C404.7	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Domestic Hot Water (DHW) – Control	Domestic Hot Water (DHW) Temperature Turndown	694	10 CFR 429, 430, and 431	eCFR :: 10 CFR 430.32 -- Energy and water conservation standards and their compliance dates.
Commercial	Domestic Hot Water (DHW) – Control	Drain Water Heat Recovery (DWHR)	701	ECCCNYS 2020, Section R403.5.4	CHAPTER 4 RE RESIDENTIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Domestic Hot Water (DHW) – Control	Low-Flow - Faucet Aerator	705	10 CFR 429.17	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment
Commercial	Domestic Hot Water (DHW) – Control	Low-Flow - Pre-Rinse Spray Valve (PRSV)	711	10 CFR 431.266	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Domestic Hot Water (DHW) – Control	Low-Flow - Salon Valve	716	NYS Plumbing Code 2020, Chapter 6	CHAPTER 6 WATER SUPPLY AND DISTRIBUTION - 2020 PLUMBING CODE OF NEW YORK STATE
Commercial	Domestic Hot Water (DHW) – Control	Low-Flow - Shower-head	722	EPA WaterSense® Specification for Showerheads, Version 1.1, July 26, 2018	WaterSense® Specification for Showerheads, Version 1.1
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Air Conditioner and Heat Pump – Packaged Terminal	729	ECCCNYS 2020, Table C403.3.2(4) and Table C403.3.2(5).	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Air Conditioner and Heat Pump - Unitary & Applied	735	ECCCNYS 2020 Table C403.3.2(3), 10 CFR 431.97	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Boiler, Furnace and Unit Heater	742	ECCCNYS 2020, Table C403.3.2(4) and Table C403.2.3(5)	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Boiler and Furnace - Combination ("Combi") Boiler and Furnace	747	ECCCNYS 2020 Table C403.3.2(4)	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Boiler Economizer	755	ECCCNYS 2020 Table C403.3.2(5):	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Chiller - Air and Water Cooled	759	ECCCNYS 2020, Table C403.3.2(7).	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Energy and Heat Recovery Ventilator		ECCCNYS 2020 Table C403.3.2(4):	2020 Energy Conservation Construction Code of New York State

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Heat Pump – Air Source (ccASHP)	799	ECCCNYS 2020, Table C403.3.2(4): Warm-Air Furnaces And Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces And Unit Heaters, Minimum Efficiency Requirements & Table C403.2.3(5): Minimum Efficiency Requirements: Gas-And Oil-Fired Boilers.	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Heat Pump – Water-to-Air Ground Source (GSHP)	814	ECCCNYS 2020, Table C403.3.2(4): Warm-Air Furnaces And Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces And Unit Heaters, Minimum Efficiency Requirements & Table C403.2.3(5): Minimum Efficiency Requirements: Gas-And Oil-Fired Boilers.	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Heat Pump – Water-to-Air Ground Source (GSHPs) in Systems with Central Pumping	833	ECCCNYS, 2016, per IECC 2015; Section R403.7	CHAPTER 4 RE RESIDENTIAL ENERGY EFFICIENCY - 2015 INTERNATIONAL ENERGY CONSERVATION CODE (2ND PRINTING AS ADOPTED BY NEW YORK STAT
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Infrared Heater	858	ECCCNYS 2020, Table C403.3.2(4) and Table C403.2.3(5).	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC	Kitchen Demand Control Ventilation (KDCV)	862	ECCCNYS 2020 403.2.6 Ventilation and C403.2.8 Kitchen Exhaust Systems	CHAPTER 4 RE RESIDENTIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Heating, Ventilation and Air Conditioning (HVAC) – Control	Advanced RTU Control		ECCCNYS 2020; C403.2.2 Ventilation	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC) – Control	Demand Control Ventilation (DCV)		ECCCNYS 2020 C403.7 Ventilation	2020 Energy Conservation Construction Code of New York State
Commercial	Heating, Ventilation and Air Conditioning (HVAC) – Control	Energy Management System (EMS) - Guest Room	903	2015 International Energy Conservation Code. Table C403.2.3(3). 2015	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2015 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
Commercial	Heating, Ventilation and Air Conditioning (HVAC) – Control	Thermostat - Wi-Fi (Communicating)	926	ECCCNYS 2020 Table C403.3.2(2):	2015 International Energy Conservation Code (2nd Printing as adopted by New York Stat
Commercial	Lighting	Interior and Exterior Lighting	936	ECCCNYS 2020 Chapter C405.3:	2020 Energy Conservation Construction Code of New York State
Commercial	Lighting	Indoor Horticultural Lighting	945	DLC Technical Requirements for LED-Based Horticultural Lighting Version 3.0, Effective March 31, 2023.	DLC_HORT-Technical-Requirements-V3-0_FINAL_05132024.pdf
Commercial	Lighting – Control	Bi-Level Lighting	958	ECCCNYS 2020 Chapter 4 Commercial Energy Efficiency	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Lighting – Control	Interior Lighting Control	963	ECCCNYS 2020 Chapter C405.2: Lighting Controls (Mandatory).	2020 Energy Conservation Construction Code of New York State
Commercial	Motors and Drives	Motor	977	10 CFR 431.25 (h) Table	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Motors and Drives	PEI-Rated Clean Water Pump	989	10 CFR 431.465	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment
Commercial	Motors and Drives	Pool Pump	994	ENERGY STAR® Program Requirements Product Specification for Pool Pumps, Eligibility Criteria Version 3.1, July 2021	ENERGY STAR Version 3.1 Pool Pumps Final Specification
Commercial	Other	Pool Heater	1011	10 CFR 430.32	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Commercial	Other	Heat Pump Pool Heater	1016	10 CFR 430.32	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Commercial	Other	High Efficiency Transformer	1024	ECCCNYS 2020, Table C405.6 Minimum Nominal Efficiency Levels for 10 CFR 431 Low-Voltage Dry-Type Distribution Transformers.	CHAPTER 4 CE COMMERCIAL ENERGY EFFICIENCY - 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE
Commercial	Process Equipment	Ozone Generator for On-Premises Laundry	1052	10 CFR 430 Subpart B Appendix E	eCFR :: 10 CFR Part 430 -- Energy Conservation Program for Consumer Products
Commercial	Refrigeration	Cooler and Freezer Door Strip	1080	10 CFR 431.302	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment
Commercial	Refrigeration	Electronically Commutated (EC) Motor - Refrigerated Case or Walk-In Cooler/Freezer Evaporator Fan	1084	10 CFR 431.25, 10 CFR 431.446 , 10 CFR 431.306	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equipment

Measure Sector	Measure Category	Measure Name	TRM Page Number of Reference	Code/Standard Name	Code/Standard URL
Commercial	Refrigeration	Evaporator Fan Motor – with Permanent Magnet Synchronous Motor (PMSM), for Refrigerated Case or Walk-In Cooler/Freezer	1091	10 CFR 431.446 , 10 CFR 431.25, 10 CFR 431.306	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equip-ment
Commercial	Refrigeration	Refrigerated Case Night Cover	1100	10 CFR 431.66	eCFR :: 10 CFR Part 431 -- Energy Efficiency Program for Certain Commercial and Industrial Equip-ment

Record of Revision

Record of Revision Number	Issue Date
12-24-12	2/7/2025

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APPENDIX T

ZIP CODE / / CITY LOOKUP

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
00501	NYC	10047	NYC	10131	NYC	10257	NYC
00544	NYC	10048	NYC	10132	NYC	10258	NYC
06390	NYC	10055	NYC	10133	NYC	10259	NYC
10001	NYC	10060	NYC	10138	NYC	10260	NYC
10002	NYC	10065	NYC	10149	NYC	10261	NYC
10003	NYC	10069	NYC	10150	NYC	10265	NYC
10004	NYC	10072	NYC	10151	NYC	10268	NYC
10005	NYC	10075	NYC	10152	NYC	10269	NYC
10006	NYC	10079	NYC	10153	NYC	10270	NYC
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10009	NYC	10082	NYC	10156	NYC	10273	NYC
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10027	NYC	10111	NYC	10174	NYC	10306	NYC
10028	NYC	10112	NYC	10175	NYC	10307	NYC
10029	NYC	10113	NYC	10176	NYC	10308	NYC
10030	NYC	10114	NYC	10177	NYC	10309	NYC
10031	NYC	10115	NYC	10178	NYC	10310	NYC
10032	NYC	10116	NYC	10179	NYC	10311	NYC
10033	NYC	10117	NYC	10184	NYC	10312	NYC
10034	NYC	10118	NYC	10185	NYC	10313	NYC
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10039	NYC	10123	NYC	10203	NYC	10454	NYC
10040	NYC	10124	NYC	10211	NYC	10455	NYC
10041	NYC	10125	NYC	10212	NYC	10456	NYC
10043	NYC	10126	NYC	10213	NYC	10457	NYC
10044	NYC	10128	NYC	10242	NYC	10458	NYC
10045	NYC	10129	NYC	10249	NYC	10459	NYC
10046	NYC	10130	NYC	10256	NYC	10460	NYC
Zip Code	**City**	**Zip Code**	**City**	**Zip Code**	**City**	**Zip Code**	**City**

10461	NYC	10541	Poughkeepsie	10703	NYC	10960	NYC
10462	NYC	10542	Poughkeepsie	10704	NYC	10962	NYC
10463	NYC	10543	NYC	10705	NYC	10963	Poughkeepsie
10464	NYC	10545	NYC	10706	NYC	10964	NYC
10465	NYC	10546	NYC	10707	NYC	10965	NYC
10466	NYC	10547	NYC	10708	NYC	10968	NYC
10467	NYC	10548	NYC	10709	NYC	10969	Poughkeepsie
10468	NYC	10549	NYC	10710	NYC	10970	NYC
10469	NYC	10550	NYC	10801	NYC	10973	Poughkeepsie
10470	NYC	10551	NYC	10802	NYC	10974	NYC
10471	NYC	10552	NYC	10803	NYC	10975	Poughkeepsie
10472	NYC	10553	NYC	10804	NYC	10976	NYC
10473	NYC	10557	NYC	10805	NYC	10977	NYC
10474	NYC	10558	NYC	10901	NYC	10979	Poughkeepsie
10475	NYC	10560	NYC	10910	Poughkeepsie	10980	NYC
10499	NYC	10562	NYC	10911	Poughkeepsie	10981	Poughkeepsie
10501	NYC	10566	NYC	10912	Poughkeepsie	10982	NYC
10502	NYC	10567	NYC	10913	NYC	10983	NYC
10503	NYC	10570	NYC	10914	Poughkeepsie	10984	NYC
10504	NYC	10571	NYC	10915	Poughkeepsie	10985	Poughkeepsie
10505	NYC	10572	NYC	10916	Poughkeepsie	10986	NYC
10506	NYC	10573	NYC	10917	Poughkeepsie	10987	Poughkeepsie
10507	NYC	10576	NYC	10918	Poughkeepsie	10988	Poughkeepsie
10509	Poughkeepsie	10577	NYC	10919	Poughkeepsie	10989	NYC
10510	NYC	10578	NYC	10920	NYC	10990	Poughkeepsie
10511	NYC	10579	Poughkeepsie	10921	Poughkeepsie	10992	Poughkeepsie
10512	Poughkeepsie	10580	NYC	10922	Poughkeepsie	10993	NYC
10514	NYC	10583	NYC	10923	NYC	10994	NYC
10516	Poughkeepsie	10587	NYC	10924	Poughkeepsie	10996	Poughkeepsie
10517	NYC	10588	NYC	10925	Poughkeepsie	10997	Poughkeepsie
10518	NYC	10589	NYC	10926	Poughkeepsie	10998	Poughkeepsie
10519	NYC	10590	NYC	10927	NYC	11001	NYC
10520	NYC	10591	NYC	10928	Poughkeepsie	11002	NYC
10521	NYC	10594	NYC	10930	Poughkeepsie	11003	NYC
10522	NYC	10595	NYC	10931	NYC	11004	NYC
10523	NYC	10596	NYC	10932	Poughkeepsie	11005	NYC
10524	Poughkeepsie	10597	NYC	10933	Poughkeepsie	11010	NYC
10526	NYC	10598	NYC	10940	Poughkeepsie	11020	NYC
10527	NYC	10601	NYC	10941	Poughkeepsie	11021	NYC
10528	NYC	10602	NYC	10943	Poughkeepsie	11022	NYC
10530	NYC	10603	NYC	10949	Poughkeepsie	11023	NYC
10532	NYC	10604	NYC	10950	Poughkeepsie	11024	NYC
10533	NYC	10605	NYC	10952	NYC	11025	NYC
10535	NYC	10606	NYC	10953	Poughkeepsie	11026	NYC
10536	NYC	10607	NYC	10954	NYC	11027	NYC
10537	Poughkeepsie	10610	NYC	10956	NYC	11030	NYC
10538	NYC	10701	NYC	10958	Poughkeepsie	11040	NYC
10540	NYC	10702	NYC	10959	Poughkeepsie	11041	NYC

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
11042	NYC	11231	NYC	11378	NYC	11535	NYC
11043	NYC	11232	NYC	11379	NYC	11536	NYC
11044	NYC	11233	NYC	11380	NYC	11542	NYC
11050	NYC	11234	NYC	11381	NYC	11545	NYC
11051	NYC	11235	NYC	11385	NYC	11547	NYC
11052	NYC	11236	NYC	11386	NYC	11548	NYC
11053	NYC	11237	NYC	11390	NYC	11549	NYC
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11055	NYC	11239	NYC	11411	NYC	11551	NYC
11096	NYC	11240	NYC	11412	NYC	11552	NYC
11099	NYC	11241	NYC	11413	NYC	11553	NYC
11101	NYC	11242	NYC	11414	NYC	11554	NYC
11102	NYC	11243	NYC	11415	NYC	11555	NYC
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11206	NYC	11352	NYC	11427	NYC	11570	NYC
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11209	NYC	11356	NYC	11430	NYC	11575	NYC
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11216	NYC	11363	NYC	11437	NYC	11590	NYC
11217	NYC	11364	NYC	11439	NYC	11592	NYC
11218	NYC	11365	NYC	11451	NYC	11594	NYC
11219	NYC	11366	NYC	11499	NYC	11595	NYC
11220	NYC	11367	NYC	11501	NYC	11596	NYC
11221	NYC	11368	NYC	11507	NYC	11597	NYC
11222	NYC	11369	NYC	11509	NYC	11598	NYC
11223	NYC	11370	NYC	11510	NYC	11599	NYC
11224	NYC	11371	NYC	11514	NYC	11690	NYC
11225	NYC	11372	NYC	11516	NYC	11691	NYC
11226	NYC	11373	NYC	11518	NYC	11692	NYC
11228	NYC	11374	NYC	11520	NYC	11693	NYC
11229	NYC	11375	NYC	11530	NYC	11694	NYC
11230	NYC	11377	NYC	11531	NYC	11695	NYC

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
11697	NYC	11756	NYC	11901	NYC	12010	Albany
11701	NYC	11757	NYC	11930	NYC	12015	Albany
11702	NYC	11758	NYC	11931	NYC	12016	Albany
11703	NYC	11760	NYC	11932	NYC	12017	Albany
11704	NYC	11762	NYC	11933	NYC	12018	Albany
11705	NYC	11763	NYC	11934	NYC	12019	Albany
11706	NYC	11764	NYC	11935	NYC	12020	Albany
11707	NYC	11765	NYC	11937	NYC	12022	Albany
11708	NYC	11766	NYC	11939	NYC	12023	Albany
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11710	NYC	11768	NYC	11941	NYC	12025	Albany
11713	NYC	11769	NYC	11942	NYC	12027	Albany
11714	NYC	11770	NYC	11944	NYC	12028	Albany
11715	NYC	11771	NYC	11946	NYC	12029	Albany
11716	NYC	11772	NYC	11947	NYC	12031	Albany
11717	NYC	11773	NYC	11948	NYC	12032	Albany
11718	NYC	11774	NYC	11949	NYC	12033	Albany
11719	NYC	11775	NYC	11950	NYC	12035	Albany
11720	NYC	11776	NYC	11951	NYC	12036	Albany
11721	NYC	11777	NYC	11952	NYC	12037	Albany
11722	NYC	11778	NYC	11953	NYC	12040	Albany
11724	NYC	11779	NYC	11954	NYC	12041	Albany
11725	NYC	11780	NYC	11955	NYC	12042	Albany
11726	NYC	11782	NYC	11956	NYC	12043	Albany
11727	NYC	11783	NYC	11957	NYC	12045	Albany
11729	NYC	11784	NYC	11958	NYC	12046	Albany
11730	NYC	11786	NYC	11959	NYC	12047	Albany
11731	NYC	11787	NYC	11960	NYC	12050	Albany
11732	NYC	11788	NYC	11961	NYC	12051	Albany
11733	NYC	11789	NYC	11962	NYC	12052	Albany
11735	NYC	11790	NYC	11963	NYC	12053	Albany
11736	NYC	11791	NYC	11964	NYC	12054	Albany
11737	NYC	11792	NYC	11965	NYC	12055	Albany
11738	NYC	11793	NYC	11967	NYC	12056	Albany
11739	NYC	11794	NYC	11968	NYC	12057	Albany
11740	NYC	11795	NYC	11969	NYC	12058	Albany
11741	NYC	11796	NYC	11970	NYC	12059	Albany
11742	NYC	11797	NYC	11971	NYC	12060	Albany
11743	NYC	11798	NYC	11972	NYC	12061	Albany
11746	NYC	11801	NYC	11973	NYC	12062	Albany
11747	NYC	11802	NYC	11975	NYC	12063	Albany
11749	NYC	11803	NYC	11976	NYC	12064	Binghamton
11750	NYC	11804	NYC	11977	NYC	12065	Albany
11751	NYC	11815	NYC	11978	NYC	12066	Albany
11752	NYC	11819	NYC	11980	NYC	12067	Albany
11753	NYC	11853	NYC	12007	Albany	12068	Albany
11754	NYC	11854	NYC	12008	Albany	12069	Albany
11755	NYC	11855	NYC	12009	Albany	12070	Albany

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
12071	Albany	12147	Albany	12204	Albany	12302	Albany
12072	Albany	12148	Albany	12205	Albany	12303	Albany
12073	Albany	12149	Albany	12206	Albany	12304	Albany
12074	Albany	12150	Albany	12207	Albany	12305	Albany
12075	Albany	12151	Albany	12208	Albany	12306	Albany
12076	Albany	12153	Albany	12209	Albany	12307	Albany
12077	Albany	12154	Albany	12210	Albany	12308	Albany
12078	Albany	12155	Binghamton	12211	Albany	12309	Albany
12082	Albany	12156	Albany	12212	Albany	12325	Albany
12083	Albany	12157	Albany	12214	Albany	12345	Albany
12084	Albany	12158	Albany	12220	Albany	12401	Poughkeep-sie
12085	Albany	12159	Albany	12222	Albany	12402	Poughkeep-sie
12086	Albany	12160	Albany	12223	Albany	12404	Poughkeep-sie
12087	Albany	12161	Albany	12224	Albany	12405	Albany
12089	Albany	12164	Massena	12225	Albany	12406	Binghamton
12090	Albany	12165	Albany	12226	Albany	12407	Albany
12092	Albany	12166	Albany	12227	Albany	12409	Poughkeep-sie
12093	Albany	12167	Binghamton	12228	Albany	12410	Poughkeep-sie
12094	Albany	12168	Albany	12229	Albany	12411	Poughkeep-sie
12095	Albany	12169	Albany	12230	Albany	12412	Poughkeep-sie
12106	Albany	12170	Albany	12231	Albany	12413	Albany
12107	Albany	12172	Albany	12232	Albany	12414	Albany
12108	Massena	12173	Albany	12233	Albany	12416	Poughkeep-sie
12110	Albany	12174	Albany	12234	Albany	12417	Poughkeep-sie
12115	Albany	12175	Albany	12235	Albany	12418	Albany
12116	Binghamton	12176	Albany	12236	Albany	12419	Poughkeep-sie
12117	Albany	12177	Albany	12237	Albany	12420	Poughkeep-sie
12118	Albany	12180	Albany	12238	Albany	12421	Binghamton
12120	Albany	12181	Albany	12239	Albany	12422	Albany
12121	Albany	12182	Albany	12240	Albany	12423	Albany
12122	Albany	12183	Albany	12241	Albany	12424	Albany
12123	Albany	12184	Albany	12242	Albany	12427	Albany
12124	Albany	12185	Albany	12243	Albany	12428	Poughkeep-sie
12125	Albany	12186	Albany	12244	Albany	12429	Poughkeep-sie
12128	Albany	12187	Albany	12245	Albany	12430	Binghamton
12130	Albany	12188	Albany	12246	Albany	12431	Albany
12131	Albany	12189	Albany	12247	Albany	12432	Poughkeep-sie
12132	Albany	12190	Massena	12248	Albany	12433	Poughkeep-sie

12133	Albany	12192	Albany	12249	Albany	12434	Binghamton
12134	Albany	12193	Albany	12250	Albany	12435	Poughkeep-sie
12136	Albany	12194	Albany	12252	Albany	12436	Albany
12137	Albany	12195	Albany	12255	Albany	12438	Binghamton
12138	Albany	12196	Albany	12256	Albany	12439	Albany
12139	Massena	12197	Binghamton	12257	Albany	12440	Poughkeep-sie
12140	Albany	12198	Albany	12260	Albany	12441	Poughkeep-sie
12141	Albany	12201	Albany	12261	Albany	12442	Albany
12143	Albany	12202	Albany	12288	Albany	12443	Poughkeep-sie
12144	Albany	12203	Albany	12301	Albany	12444	Albany

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
12446	Poughkeep-sie	12504	Poughkeep-sie	12566	Poughkeep-sie	12743	Poughkeep-sie
12448	Poughkeep-sie	12506	Poughkeep-sie	12567	Poughkeep-sie	12745	Poughkeep-sie
12449	Poughkeep-sie	12507	Poughkeep-sie	12568	Poughkeep-sie	12746	Poughkeep-sie
12450	Albany	12508	Poughkeep-sie	12569	Poughkeep-sie	12747	Poughkeep-sie
12451	Albany	12510	Poughkeep-sie	12570	Poughkeep-sie	12748	Poughkeep-sie
12452	Albany	12511	Poughkeep-sie	12571	Poughkeep-sie	12749	Poughkeep-sie
12453	Poughkeep-sie	12512	Poughkeep-sie	12572	Poughkeep-sie	12750	Poughkeep-sie
12454	Albany	12513	Albany	12574	Poughkeep-sie	12751	Poughkeep-sie
12455	Binghamton	12514	Poughkeep-sie	12575	Poughkeep-sie	12752	Poughkeep-sie
12456	Poughkeep-sie	12515	Poughkeep-sie	12577	Poughkeep-sie	12754	Poughkeep-sie
12457	Poughkeep-sie	12516	Albany	12578	Poughkeep-sie	12758	Poughkeep-sie
12458	Poughkeep-sie	12517	Albany	12580	Poughkeep-sie	12759	Poughkeep-sie
12459	Binghamton	12518	Poughkeep-sie	12581	Poughkeep-sie	12760	Binghamton
12460	Albany	12520	Poughkeep-sie	12582	Poughkeep-sie	12762	Poughkeep-sie
12461	Poughkeep-sie	12521	Albany	12583	Poughkeep-sie	12763	Poughkeep-sie
12463	Albany	12522	Poughkeep-sie	12584	Poughkeep-sie	12764	Poughkeep-sie
12464	Poughkeep-sie	12523	Albany	12585	Poughkeep-sie	12765	Poughkeep-sie
12465	Poughkeep-sie	12524	Poughkeep-sie	12586	Poughkeep-sie	12766	Poughkeep-sie
12466	Poughkeep-sie	12525	Poughkeep-sie	12588	Poughkeep-sie	12767	Poughkeep-sie
12468	Albany	12526	Albany	12589	Poughkeep-sie	12768	Poughkeep-sie
12469	Albany	12527	Poughkeep-sie	12590	Poughkeep-sie	12769	Poughkeep-sie
12470	Albany	12528	Poughkeep-sie	12592	Poughkeep-sie	12770	Poughkeep-sie
12471	Poughkeep-sie	12529	Albany	12593	Albany	12771	Poughkeep-sie
12472	Poughkeep-sie	12530	Albany	12594	Poughkeep-sie	12775	Poughkeep-sie
12473	Albany	12531	Poughkeep-sie	12601	Poughkeep-sie	12776	Poughkeep-sie
12474	Binghamton	12533	Poughkeep-sie	12602	Poughkeep-sie	12777	Poughkeep-sie
12475	Poughkeep-sie	12534	Albany	12603	Poughkeep-sie	12778	Poughkeep-sie

12477	Poughkeep-sie	12537	Poughkeep-sie	12604	Poughkeep-sie	12779	Poughkeep-sie
12480	Poughkeep-sie	12538	Poughkeep-sie	12701	Poughkeep-sie	12780	Poughkeep-sie
12481	Poughkeep-sie	12540	Poughkeep-sie	12719	Poughkeep-sie	12781	Poughkeep-sie
12482	Albany	12541	Albany	12720	Poughkeep-sie	12783	Poughkeep-sie
12483	Poughkeep-sie	12542	Poughkeep-sie	12721	Poughkeep-sie	12784	Poughkeep-sie
12484	Poughkeep-sie	12543	Poughkeep-sie	12722	Poughkeep-sie	12785	Poughkeep-sie
12485	Albany	12544	Albany	12723	Poughkeep-sie	12786	Poughkeep-sie
12486	Poughkeep-sie	12545	Poughkeep-sie	12724	Poughkeep-sie	12787	Poughkeep-sie
12487	Poughkeep-sie	12546	Poughkeep-sie	12725	Poughkeep-sie	12788	Poughkeep-sie
12489	Poughkeep-sie	12547	Poughkeep-sie	12726	Poughkeep-sie	12789	Poughkeep-sie
12490	Poughkeep-sie	12548	Poughkeep-sie	12727	Poughkeep-sie	12790	Poughkeep-sie
12491	Poughkeep-sie	12549	Poughkeep-sie	12729	Poughkeep-sie	12791	Poughkeep-sie
12492	Albany	12550	Poughkeep-sie	12732	Poughkeep-sie	12792	Poughkeep-sie
12493	Poughkeep-sie	12551	Poughkeep-sie	12733	Poughkeep-sie	12801	Albany
12494	Poughkeep-sie	12552	Poughkeep-sie	12734	Poughkeep-sie	12803	Albany
12495	Poughkeep-sie	12553	Poughkeep-sie	12736	Poughkeep-sie	12804	Albany
12496	Albany	12555	Poughkeep-sie	12737	Poughkeep-sie	12808	Albany
12498	Poughkeep-sie	12561	Poughkeep-sie	12738	Poughkeep-sie	12809	Albany
12501	Poughkeep-sie	12563	Poughkeep-sie	12740	Poughkeep-sie	12810	Albany
12502	Albany	12564	Poughkeep-sie	12741	Poughkeep-sie	12811	Albany
12503	Albany	12565	Albany	12742	Poughkeep-sie	12812	Massena

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
12814	Albany	12871	Albany	12952	Massena	13033	Syracuse
12815	Albany	12872	Massena	12953	Massena	13034	Syracuse
12816	Albany	12873	Albany	12955	Massena	13035	Syracuse
12817	Albany	12874	Albany	12956	Massena	13036	Syracuse
12819	Albany	12878	Albany	12957	Massena	13037	Syracuse
12820	Albany	12879	Massena	12958	Massena	13039	Syracuse
12821	Albany	12883	Massena	12959	Massena	13040	Syracuse
12822	Albany	12884	Albany	12960	Massena	13041	Syracuse
12823	Albany	12885	Albany	12961	Massena	13042	Syracuse
12824	Albany	12886	Albany	12962	Massena	13043	Syracuse
12827	Albany	12887	Albany	12964	Massena	13044	Syracuse
12828	Albany	12901	Massena	12965	Massena	13045	Syracuse
12831	Albany	12903	Massena	12966	Massena	13051	Syracuse
12832	Albany	12910	Massena	12967	Massena	13052	Syracuse
12833	Albany	12911	Massena	12969	Massena	13053	Binghamton
12834	Albany	12912	Massena	12970	Massena	13054	Syracuse
12835	Albany	12913	Massena	12972	Massena	13056	Syracuse
12836	Albany	12914	Massena	12973	Massena	13057	Syracuse
12837	Albany	12915	Massena	12974	Massena	13060	Syracuse
12838	Albany	12916	Massena	12975	Massena	13061	Syracuse
12839	Albany	12917	Massena	12976	Massena	13062	Binghamton
12841	Albany	12918	Massena	12977	Massena	13063	Syracuse
12842	Massena	12919	Massena	12978	Massena	13064	Syracuse
12843	Albany	12920	Massena	12979	Massena	13065	Syracuse
12844	Albany	12921	Massena	12980	Massena	13066	Syracuse
12845	Albany	12922	Massena	12981	Massena	13068	Binghamton
12846	Albany	12923	Massena	12983	Massena	13069	Syracuse
12847	Massena	12924	Massena	12985	Massena	13071	Syracuse
12848	Albany	12926	Massena	12986	Massena	13072	Syracuse
12849	Albany	12927	Massena	12987	Massena	13073	Binghamton
12850	Albany	12928	Massena	12989	Massena	13074	Syracuse
12851	Massena	12929	Massena	12992	Massena	13076	Syracuse
12852	Massena	12930	Massena	12993	Massena	13077	Syracuse
12853	Albany	12932	Massena	12995	Massena	13078	Syracuse
12854	Albany	12933	Massena	12996	Massena	13080	Syracuse
12855	Massena	12934	Massena	12997	Massena	13081	Syracuse
12856	Albany	12935	Massena	12998	Massena	13082	Syracuse
12857	Massena	12936	Massena	13020	Syracuse	13083	Syracuse
12858	Massena	12937	Massena	13021	Syracuse	13084	Syracuse
12859	Albany	12939	Massena	13022	Syracuse	13087	Syracuse
12860	Albany	12941	Massena	13024	Syracuse	13088	Syracuse
12861	Albany	12942	Massena	13026	Syracuse	13089	Syracuse
12862	Albany	12943	Massena	13027	Syracuse	13090	Syracuse
12863	Albany	12944	Massena	13028	Syracuse	13092	Syracuse
12864	Massena	12945	Massena	13029	Syracuse	13093	Syracuse
12865	Albany	12946	Massena	13030	Syracuse	13101	Syracuse
12866	Albany	12949	Massena	13031	Syracuse	13102	Binghamton
12870	Massena	12950	Massena	13032	Syracuse	13103	Syracuse

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
13104	Syracuse	13165	Syracuse	13321	Syracuse	13413	Syracuse
13107	Syracuse	13166	Syracuse	13322	Syracuse	13415	Binghamton
13108	Syracuse	13167	Syracuse	13323	Syracuse	13416	Syracuse
13110	Syracuse	13201	Syracuse	13324	Syracuse	13417	Syracuse
13111	Syracuse	13202	Syracuse	13325	Massena	13418	Syracuse
13112	Syracuse	13203	Syracuse	13326	Binghamton	13420	Syracuse
13113	Syracuse	13204	Syracuse	13327	Massena	13421	Syracuse
13114	Syracuse	13205	Syracuse	13328	Syracuse	13424	Syracuse
13115	Syracuse	13206	Syracuse	13329	Syracuse	13425	Syracuse
13116	Syracuse	13207	Syracuse	13331	Syracuse	13426	Syracuse
13117	Syracuse	13208	Syracuse	13332	Syracuse	13428	Albany
13118	Syracuse	13209	Syracuse	13333	Binghamton	13431	Syracuse
13119	Syracuse	13210	Syracuse	13334	Syracuse	13433	Massena
13120	Syracuse	13211	Syracuse	13335	Binghamton	13435	Syracuse
13121	Syracuse	13212	Syracuse	13337	Binghamton	13436	Massena
13122	Syracuse	13214	Syracuse	13338	Syracuse	13437	Syracuse
13123	Syracuse	13215	Syracuse	13339	Albany	13438	Syracuse
13124	Binghamton	13217	Syracuse	13340	Syracuse	13439	Binghamton
13126	Syracuse	13218	Syracuse	13341	Syracuse	13440	Syracuse
13131	Syracuse	13219	Syracuse	13342	Binghamton	13441	Syracuse
13132	Syracuse	13220	Syracuse	13343	Massena	13442	Syracuse
13134	Syracuse	13221	Syracuse	13345	Massena	13449	Syracuse
13135	Syracuse	13224	Syracuse	13346	Syracuse	13450	Binghamton
13136	Binghamton	13225	Syracuse	13348	Binghamton	13452	Albany
13137	Syracuse	13235	Syracuse	13350	Syracuse	13454	Syracuse
13138	Syracuse	13244	Syracuse	13352	Syracuse	13455	Syracuse
13139	Syracuse	13250	Syracuse	13353	Massena	13456	Syracuse
13140	Syracuse	13251	Syracuse	13354	Syracuse	13457	Binghamton
13141	Syracuse	13252	Syracuse	13355	Syracuse	13459	Albany
13142	Syracuse	13261	Syracuse	13357	Syracuse	13460	Binghamton
13143	Syracuse	13290	Syracuse	13360	Massena	13461	Syracuse
13144	Syracuse	13301	Syracuse	13361	Syracuse	13464	Binghamton
13145	Syracuse	13302	Syracuse	13362	Syracuse	13465	Syracuse
13146	Syracuse	13303	Syracuse	13363	Syracuse	13468	Binghamton
13147	Syracuse	13304	Syracuse	13364	Syracuse	13469	Syracuse
13148	Syracuse	13305	Massena	13365	Syracuse	13470	Albany
13152	Syracuse	13308	Syracuse	13367	Massena	13471	Syracuse
13153	Syracuse	13309	Syracuse	13368	Massena	13472	Syracuse
13154	Syracuse	13310	Syracuse	13401	Syracuse	13473	Massena
13155	Binghamton	13312	Massena	13402	Syracuse	13475	Syracuse
13156	Syracuse	13313	Syracuse	13403	Syracuse	13476	Syracuse
13157	Syracuse	13314	Syracuse	13404	Massena	13477	Syracuse
13158	Syracuse	13315	Binghamton	13406	Syracuse	13478	Syracuse
13159	Syracuse	13316	Syracuse	13407	Syracuse	13479	Syracuse
13160	Syracuse	13317	Albany	13408	Syracuse	13480	Syracuse
13162	Syracuse	13318	Syracuse	13409	Syracuse	13482	Binghamton
13163	Syracuse	13319	Syracuse	13410	Albany	13483	Syracuse
13164	Syracuse	13320	Binghamton	13411	Binghamton	13484	Syracuse

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
13485	Syracuse	13637	Massena	13691	Massena	13787	Binghamton
13486	Syracuse	13638	Massena	13692	Massena	13788	Binghamton
13488	Binghamton	13639	Massena	13693	Massena	13790	Binghamton
13489	Massena	13640	Massena	13694	Massena	13794	Binghamton
13490	Syracuse	13641	Massena	13695	Massena	13795	Binghamton
13491	Syracuse	13642	Massena	13696	Massena	13796	Binghamton
13492	Syracuse	13643	Massena	13697	Massena	13797	Binghamton
13493	Syracuse	13645	Massena	13699	Massena	13801	Binghamton
13494	Syracuse	13646	Massena	13730	Binghamton	13802	Binghamton
13495	Syracuse	13647	Massena	13731	Binghamton	13803	Syracuse
13501	Syracuse	13648	Massena	13732	Binghamton	13804	Binghamton
13502	Syracuse	13649	Massena	13733	Binghamton	13806	Binghamton
13503	Syracuse	13650	Massena	13734	Binghamton	13807	Binghamton
13504	Syracuse	13651	Massena	13736	Binghamton	13808	Binghamton
13505	Syracuse	13652	Massena	13737	Binghamton	13809	Binghamton
13599	Syracuse	13654	Massena	13738	Syracuse	13810	Binghamton
13601	Massena	13655	Massena	13739	Binghamton	13811	Binghamton
13602	Massena	13656	Massena	13740	Binghamton	13812	Binghamton
13603	Massena	13657	Massena	13743	Binghamton	13813	Binghamton
13605	Massena	13658	Massena	13744	Binghamton	13814	Binghamton
13606	Massena	13659	Massena	13745	Binghamton	13815	Binghamton
13607	Massena	13660	Massena	13746	Binghamton	13820	Binghamton
13608	Massena	13661	Massena	13747	Binghamton	13825	Binghamton
13611	Massena	13662	Massena	13748	Binghamton	13826	Binghamton
13612	Massena	13664	Massena	13749	Binghamton	13827	Binghamton
13613	Massena	13665	Massena	13750	Binghamton	13830	Binghamton
13614	Massena	13666	Massena	13751	Binghamton	13832	Binghamton
13615	Massena	13667	Massena	13752	Binghamton	13833	Binghamton
13616	Massena	13668	Massena	13753	Binghamton	13834	Binghamton
13617	Massena	13669	Massena	13754	Binghamton	13835	Binghamton
13618	Massena	13670	Massena	13755	Binghamton	13837	Binghamton
13619	Massena	13671	Massena	13756	Binghamton	13838	Binghamton
13620	Massena	13672	Massena	13757	Binghamton	13839	Binghamton
13621	Massena	13673	Massena	13758	Binghamton	13840	Binghamton
13622	Massena	13674	Massena	13760	Binghamton	13841	Binghamton
13623	Massena	13675	Massena	13761	Binghamton	13842	Binghamton
13624	Massena	13676	Massena	13762	Binghamton	13843	Binghamton
13625	Massena	13677	Massena	13763	Binghamton	13844	Binghamton
13626	Massena	13678	Massena	13774	Binghamton	13845	Binghamton
13627	Massena	13679	Massena	13775	Binghamton	13846	Binghamton
13628	Massena	13680	Massena	13776	Binghamton	13847	Binghamton
13630	Massena	13681	Massena	13777	Binghamton	13848	Binghamton
13631	Massena	13682	Massena	13778	Binghamton	13849	Binghamton
13632	Massena	13683	Massena	13780	Binghamton	13850	Binghamton
13633	Massena	13684	Massena	13782	Binghamton	13851	Binghamton
13634	Massena	13685	Massena	13783	Binghamton	13856	Binghamton
13635	Massena	13687	Massena	13784	Syracuse	13859	Binghamton
13636	Massena	13690	Massena	13786	Binghamton	13860	Binghamton

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
13861	Binghamton	14056	Buffalo	14135	Buffalo	14231	Buffalo
13862	Binghamton	14057	Buffalo	14136	Buffalo	14233	Buffalo
13863	Syracuse	14058	Buffalo	14138	Buffalo	14240	Buffalo
13864	Binghamton	14059	Buffalo	14139	Buffalo	14241	Buffalo
13865	Binghamton	14060	Buffalo	14140	Buffalo	14260	Buffalo
13901	Binghamton	14061	Buffalo	14141	Buffalo	14261	Buffalo
13902	Binghamton	14062	Buffalo	14143	Buffalo	14263	Buffalo
13903	Binghamton	14063	Buffalo	14144	Buffalo	14264	Buffalo
13904	Binghamton	14065	Buffalo	14145	Buffalo	14265	Buffalo
13905	Binghamton	14066	Buffalo	14150	Buffalo	14267	Buffalo
14001	Buffalo	14067	Buffalo	14151	Buffalo	14269	Buffalo
14004	Buffalo	14068	Buffalo	14166	Buffalo	14270	Buffalo
14005	Buffalo	14069	Buffalo	14167	Buffalo	14272	Buffalo
14006	Buffalo	14070	Buffalo	14168	Buffalo	14273	Buffalo
14008	Buffalo	14072	Buffalo	14169	Buffalo	14276	Buffalo
14009	Buffalo	14075	Buffalo	14170	Buffalo	14280	Buffalo
14010	Buffalo	14080	Buffalo	14171	Buffalo	14301	Buffalo
14011	Buffalo	14081	Buffalo	14172	Buffalo	14302	Buffalo
14012	Buffalo	14082	Buffalo	14173	Buffalo	14303	Buffalo
14013	Buffalo	14083	Buffalo	14174	Buffalo	14304	Buffalo
14020	Buffalo	14085	Buffalo	14201	Buffalo	14305	Buffalo
14021	Buffalo	14086	Buffalo	14202	Buffalo	14410	Buffalo
14024	Buffalo	14091	Buffalo	14203	Buffalo	14411	Buffalo
14025	Buffalo	14092	Buffalo	14204	Buffalo	14413	Syracuse
14026	Buffalo	14094	Buffalo	14205	Buffalo	14414	Buffalo
14027	Buffalo	14095	Buffalo	14206	Buffalo	14415	Syracuse
14028	Buffalo	14098	Buffalo	14207	Buffalo	14416	Buffalo
14029	Buffalo	14101	Buffalo	14208	Buffalo	14418	Syracuse
14030	Buffalo	14102	Buffalo	14209	Buffalo	14420	Buffalo
14031	Buffalo	14103	Buffalo	14210	Buffalo	14422	Buffalo
14032	Buffalo	14105	Buffalo	14211	Buffalo	14423	Buffalo
14033	Buffalo	14107	Buffalo	14212	Buffalo	14424	Syracuse
14034	Buffalo	14108	Buffalo	14213	Buffalo	14425	Syracuse
14035	Buffalo	14109	Buffalo	14214	Buffalo	14427	Buffalo
14036	Buffalo	14110	Buffalo	14215	Buffalo	14428	Buffalo
14037	Buffalo	14111	Buffalo	14216	Buffalo	14429	Buffalo
14038	Buffalo	14112	Buffalo	14217	Buffalo	14430	Buffalo
14039	Buffalo	14113	Buffalo	14218	Buffalo	14432	Syracuse
14040	Buffalo	14120	Buffalo	14219	Buffalo	14433	Syracuse
14041	Buffalo	14125	Buffalo	14220	Buffalo	14435	Buffalo
14042	Buffalo	14126	Buffalo	14221	Buffalo	14437	Buffalo
14043	Buffalo	14127	Buffalo	14222	Buffalo	14441	Syracuse
14047	Buffalo	14129	Buffalo	14223	Buffalo	14443	Syracuse
14048	Buffalo	14130	Buffalo	14224	Buffalo	14445	Buffalo
14051	Buffalo	14131	Buffalo	14225	Buffalo	14449	Syracuse
14052	Buffalo	14132	Buffalo	14226	Buffalo	14450	Buffalo
14054	Buffalo	14133	Buffalo	14227	Buffalo	14452	Buffalo
14055	Buffalo	14134	Buffalo	14228	Buffalo	14453	Syracuse

Zip Code	City	Zip Code	City	Zip Code	City	Zip Code	City
14454	Buffalo	14529	Binghamton	14609	Buffalo	14716	Buffalo
14456	Syracuse	14530	Buffalo	14610	Buffalo	14717	Buffalo
14461	Syracuse	14532	Syracuse	14611	Buffalo	14718	Buffalo
14462	Buffalo	14533	Buffalo	14612	Buffalo	14719	Buffalo
14463	Syracuse	14534	Buffalo	14613	Buffalo	14720	Buffalo
14464	Buffalo	14536	Buffalo	14614	Buffalo	14721	Buffalo
14466	Syracuse	14537	Syracuse	14615	Buffalo	14722	Buffalo
14467	Buffalo	14538	Syracuse	14616	Buffalo	14723	Buffalo
14468	Buffalo	14539	Buffalo	14617	Buffalo	14724	Buffalo
14469	Syracuse	14541	Syracuse	14618	Buffalo	14726	Buffalo
14470	Buffalo	14542	Syracuse	14619	Buffalo	14727	Buffalo
14471	Syracuse	14543	Buffalo	14620	Buffalo	14728	Buffalo
14472	Buffalo	14544	Syracuse	14621	Buffalo	14729	Buffalo
14475	Syracuse	14545	Buffalo	14622	Buffalo	14730	Buffalo
14476	Buffalo	14546	Buffalo	14623	Buffalo	14731	Buffalo
14477	Buffalo	14547	Syracuse	14624	Buffalo	14732	Buffalo
14478	Syracuse	14548	Syracuse	14625	Buffalo	14733	Buffalo
14479	Buffalo	14549	Buffalo	14626	Buffalo	14735	Buffalo
14480	Buffalo	14550	Buffalo	14627	Buffalo	14736	Buffalo
14481	Buffalo	14551	Syracuse	14638	Buffalo	14737	Buffalo
14482	Buffalo	14555	Syracuse	14639	Buffalo	14738	Buffalo
14485	Buffalo	14556	Buffalo	14642	Buffalo	14739	Buffalo
14486	Buffalo	14557	Buffalo	14643	Buffalo	14740	Buffalo
14487	Buffalo	14558	Buffalo	14644	Buffalo	14741	Buffalo
14488	Buffalo	14559	Buffalo	14645	Buffalo	14742	Buffalo
14489	Syracuse	14560	Buffalo	14646	Buffalo	14743	Buffalo
14502	Syracuse	14561	Syracuse	14647	Buffalo	14744	Buffalo
14504	Syracuse	14563	Syracuse	14649	Buffalo	14745	Buffalo
14505	Syracuse	14564	Syracuse	14650	Buffalo	14747	Buffalo
14506	Buffalo	14568	Syracuse	14651	Buffalo	14748	Buffalo
14507	Syracuse	14569	Buffalo	14652	Buffalo	14750	Buffalo
14508	Buffalo	14571	Buffalo	14653	Buffalo	14751	Buffalo
14510	Buffalo	14572	Binghamton	14664	Buffalo	14752	Buffalo
14511	Buffalo	14580	Buffalo	14673	Buffalo	14753	Buffalo
14512	Syracuse	14585	Syracuse	14683	Buffalo	14754	Buffalo
14513	Syracuse	14586	Buffalo	14692	Buffalo	14755	Buffalo
14514	Buffalo	14588	Syracuse	14694	Buffalo	14756	Buffalo
14515	Buffalo	14589	Syracuse	14701	Buffalo	14757	Buffalo
14516	Syracuse	14590	Syracuse	14702	Buffalo	14758	Buffalo
14517	Buffalo	14591	Buffalo	14706	Buffalo	14760	Buffalo
14518	Syracuse	14592	Buffalo	14707	Buffalo	14766	Buffalo
14519	Syracuse	14602	Buffalo	14708	Buffalo	14767	Buffalo
14520	Syracuse	14603	Buffalo	14709	Buffalo	14769	Buffalo
14521	Syracuse	14604	Buffalo	14710	Buffalo	14770	Buffalo
14522	Syracuse	14605	Buffalo	14711	Buffalo	14772	Buffalo
14525	Buffalo	14606	Buffalo	14712	Buffalo	14774	Buffalo
14526	Buffalo	14607	Buffalo	14714	Buffalo	14775	Buffalo
14527	Syracuse	14608	Buffalo	14715	Buffalo	14777	Buffalo

Zip Code	City	Zip Code	City	Zip Code	City
14778	Buffalo	14847	Syracuse	14925	Binghamton
14779	Buffalo	14850	Binghamton		
14781	Buffalo	14851	Binghamton		
14782	Buffalo	14852	Binghamton		
14783	Buffalo	14853	Binghamton		
14784	Buffalo	14854	Binghamton		
14785	Buffalo	14855	Binghamton		
14786	Buffalo	14856	Binghamton		
14787	Buffalo	14857	Syracuse		
14788	Buffalo	14858	Binghamton		
14801	Binghamton	14859	Binghamton		
14802	Buffalo	14860	Syracuse		
14803	Buffalo	14861	Binghamton		
14804	Buffalo	14863	Binghamton		
14805	Binghamton	14864	Binghamton		
14806	Buffalo	14865	Binghamton		
14807	Binghamton	14867	Binghamton		
14808	Binghamton	14869	Binghamton		
14809	Binghamton	14870	Binghamton		
14810	Binghamton	14871	Binghamton		
14812	Binghamton	14872	Binghamton		
14813	Buffalo	14873	Binghamton		
14814	Binghamton	14874	Binghamton		
14815	Binghamton	14876	Binghamton		
14816	Binghamton	14877	Binghamton		
14817	Binghamton	14878	Binghamton		
14818	Binghamton	14879	Binghamton		
14819	Binghamton	14880	Buffalo		
14820	Binghamton	14881	Binghamton		
14821	Binghamton	14882	Binghamton		
14822	Buffalo	14883	Binghamton		
14823	Binghamton	14884	Buffalo		
14824	Binghamton	14885	Binghamton		
14825	Binghamton	14886	Binghamton		
14826	Binghamton	14887	Binghamton		
14827	Binghamton	14889	Binghamton		
14830	Binghamton	14891	Binghamton		
14831	Binghamton	14892	Binghamton		
14836	Buffalo	14893	Binghamton		
14837	Syracuse	14894	Binghamton		
14838	Binghamton	14895	Buffalo		
14839	Binghamton	14897	Buffalo		
14840	Binghamton	14898	Binghamton		
14841	Binghamton	14901	Binghamton		
14842	Syracuse	14902	Binghamton		
14843	Binghamton	14903	Binghamton		
14845	Binghamton	14904	Binghamton		
14846	Buffalo	14905	Binghamton		

Record of Revision

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