2020 NYCECC Changes Outline

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- Adopted from NYStretch Energy Code-2020 (published by NYSERDA)
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II. Select Minor Changes

- Adopted from NYStretch Energy Code 2020 (published by NYSERDA)
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- **Appendix CC** Additional power distribution system packages

Major Changes

1. C402.2.9 Continuous Insulation

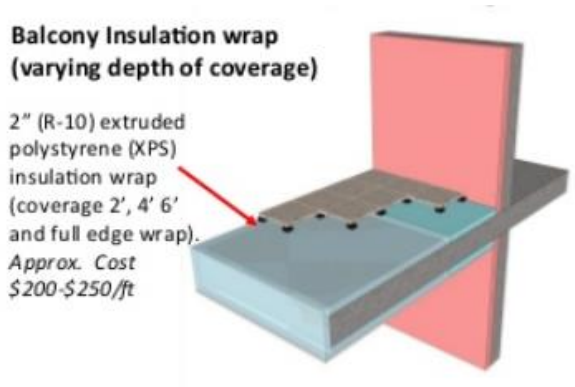
C402.2.9 Continuous insulation. In new construction, balconies and parapets that interrupt the building thermal envelope shall comply with one of the following:

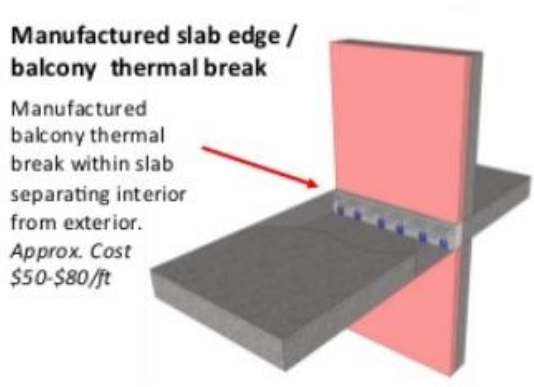
1. Shall be insulated with continuous insulation having a minimum thermal resistance equivalent to the continuous insulation component required in the adjacent wall assembly as listed in Table C402.1.3. Where more than one wall assembly is interrupted by an adjacent balcony, the higher thermal resistance shall be followed.

2. Shall incorporate a minimum R-3 thermal break where the structural element penetrates the building thermal envelope.

Description: This is a new requirement for new buildings designed with balconies and/or parapets. Balconies and parapets are currently not addressed in the Energy Code and if left uninsulated can be a major source of heat loss in a building. This new provision will require that the designer either encapsulate the balcony or parapet with the code minimum insulation for above-grade walls or design the structure in such a way that a thermal break is incorporated in the design.

Stringency: This provision increases the stringency of the code by requiring that balconies and parapets are insulated or if left uninsulated, are accounted for in the thermal performance of the building. These envelope assemblies are currently not addressed in the code.





Takeaway: Balconies and parapets will be required to either be insulated or provide a thermal break in the design. This is not a mandatory requirement and may be traded-off for higher insulation areas in other parts of the building.

2. **C405.2.1.3 Occupant sensor control function in open plan office areas, cafeteria dining areas, and fast food dining areas**

C405.2.1.3 Occupant sensor control function in open plan office areas, cafeteria dining areas, and fast food dining areas. Occupant sensor controls in open plan office spaces, cafeteria dining areas, and fast food dining areas less than 300 square feet (28 m^2) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces, cafeteria dining spaces, and fast food dining spaces shall comply with all of the following:

1. The controls shall be configured so that general lighting can be controlled separately in control zones with floor areas not greater than 600 square feet (55 m^2) within the open plan office space or dining space.
2. The controls shall automatically turn off general lighting in all control zones within 15 minutes after all occupants have left the open plan office space or dining space.
3. The controls shall be configured so that general lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power in a reasonably uniform illumination pattern within 15 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.
4. The controls shall be configured such that any daylight responsive control will activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.

Description: This code provision requires certain occupant sensor control requirements for the open plan offices, cafeteria dining areas and fast food dining areas that are 300 square feet or greater. The requirements include occupancy sensors within maximum zones of 600 square feet, all lighting within control zones are required to shut off within 15 minutes of no activity, when no activity is detected in a control zone the lighting power is reduced by not less than 80% of the full zone general lighting power within 15 minutes of no activity, and daylight responsive controls do not activate when there is no occupancy.

Stringency: This code provision increases stringency by requiring cafeteria dining and fast food dining spaces 300 square feet and greater in area to meet increased lighting occupancy controls that align with the 2020 ECCCNYS lighting controls for open plan offices.

Takeaway: Open plan offices, cafeteria dining spaces, and fast food dining spaces that are greater than 300 square feet are required to provide occupancy sensors throughout the open area grouped in zones no greater than 600 sqft.

3. Tables C405.3.2(1), C405.3.2(2) Interior Lighting Power Allowances

Description: Interior Lighting Power Density (LPD) allowances are significantly reduced to account for the prevalence of LEDs on the market. The new LPD values are an average of 25% lower than the current code, when averaging the reduction from the 2016 NYCECC compared to the 2020 NYCECC across the 32 different building types and 99 different space types. Below is a truncated table showing the most common building area types and the corresponding reduction in LPD.

Stringency: This code change is much more stringent than the 2020 ECCCNYS as it reduces the allowable wattage in most spaces within the building.

BUILDING AREA TYPE	Lighting Power Density (LPD) (watt/ft^2)	% reduction in LPD compared to the 2016 NYCECC	Space TYPE	Lighting Power Density (LPD) (watt/ft^2)	% reduction in LPD compared to the 2016 NYCECC
Dormitory[a, b]	0.52	9%	Conference Room	0.93	24%
Hotel/Motel[a, b]	0.70	20%	Corridor, all other	0.58	12%
Multifamily[c]	0.49	4%	Electrical/Mech Rm	0.39	59%
Office	0.69	16%	Lobby	0.90	0%
School/university	0.67	23%	Office, Open Plan	0.78	3%
			Restroom	0.75	23%

Takeaway: The reduction in lighting power densities will require the use of efficient lighting achieved by mostly using LED technology that is widely available on the market.

4. C408.4 Air barrier commissioning

C408.4 Air barrier commissioning.
For new buildings or additions that are 10,000 gross square feet (929 m^2) and greater, prior to passing final inspection, the approved agency shall provide evidence of air barrier commissioning and substantial completion in accordance with the provisions of sections C408.4.1 through C408.4.3.

C408.4.1 Documentation.
Construction documents shall include documentation of the continuous air barrier components included in the design and a field inspection checklist that includes all requirements necessary for maintaining air barrier continuity and durability in accordance with Section C402.5.1.

C408.4.2 Field Inspections.
Reports from field inspections during project construction showing compliance with continuous air barrier requirements including proper material handling and storage, use of approved materials and material substitutes, proper material and surface preparation, and air barrier continuity shall be provided to the owner and, upon request, to the code official. Air barrier continuity shall be determined by testing or inspecting each type of unique air barrier joint or seam in the building envelope for continuity and defects.

C408.4.3 Report.
A final commissioning report indicating compliance with the continuous air barrier requirements shall be provided to the building owner and, upon request, to the code official.

Description: New buildings 10,000 sq ft and greater are required to show compliance with either whole building air leakage testing or an Air Barrier Continuity Plan. Air Barrier Commissioning ensures that the required testing is documented on the construction documents and applied accordingly during the inspection process.

Stringency: This code provision is more stringent than the 2020 ECCCNYS as it requires additional documentation on air sealing within the building and additional requirements during field inspections.

Takeaway: This provision codifies the documentation requirements and testing requirements on new buildings required to comply with air barrier testing.

5. R403.6.2 Balanced Ventilation and HRV/ERV systems

R403.6.2 Balanced ventilation and HRV/ERV systems (Mandatory). In new buildings, every dwelling unit shall be served by a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) installed per manufacturer's instructions. The HRV/ERV must be *listed* and sized adequately for the specific application, which will include the building's conditioned area, and number of occupants.

Exception: A balanced *ventilation* system designed and installed according to the requirements of Sections R403.6.2.1 through R403.6.2.3, using the return side of the building's heating and/or cooling system air handler to supply outdoor air, shall be permitted to comply with this section. When the outdoor air supply is ducted to the heating and/or cooling system air handler, the mixed air temperature shall not be less than that permitted by the heating equipment manufacturer's installation instructions. Heating and/or cooling system air handlers used to distribute outdoor air shall be field-verified to not exceed an efficacy of 45 W/CFM if using furnaces for heating and 58 W/CFM if using other forms of heating. In the balanced system design, an equivalent exhaust air flow rate shall be provided simultaneously by one or more exhaust fans, located remotely from the source of supply air. The balanced system's exhaust and supply fans shall be interlocked for operation, sized to provide equivalent air flow at a rate greater than or equal to that determined by Table R403.6.2(1) and shall have their fan capacities adjusted for intermittent run time per Table R403.6.2(2). Continuous operation of the balanced *ventilation* system shall not be permitted.

R403.6.2.1 Whole-house mechanical ventilation (balanced ventilation option) system design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such as system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

R403.6.2.2 System controls. The whole-house ventilation system shall be provided with controls that enable manual override.

R403.6.2.3 Mechanical ventilation rate. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4 hour segment and the ventilation rate prescribed in Table R403.6.2(1) is multiplied by the factor determined in accordance with Table R403.6.2(2).

TABLE R403.6.2(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE R403.6.2(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a,b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.

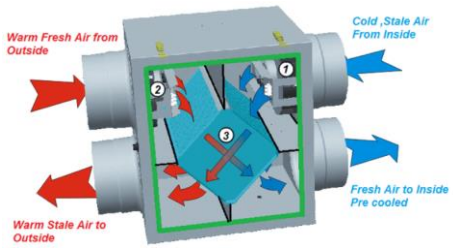
b. Extrapolation beyond the table is prohibited.

Description: This change will require that 1- and 2-Family homes and multifamily buildings 3 stories and less provide a designed ventilation system that complies with one of two options:

1. Incorporate an energy or heat recovery ventilation system (ERV/HRV) in which the exhaust air is used to pre-heat or pre-cool the incoming outdoor ventilation air or

2. Design a balanced ventilation system per the 2018 International Residential Code requirements that provides supply air (which is a combination of return air and outdoor air) when the exhaust fans are operating.

The 2012 International Mechanical Code (and later versions) requires that when buildings are tighter than 5 ACH, mechanical ventilation is required. The NYCECC requires residential buildings to not exceed 3 ACH, and therefore trigger the mechanical ventilation requirement in the IMC, but the 2014 NYC Mechanical Code does not have this requirement, and allows natural ventilation via windows. As homes become tighter due to the increasing stringency of the Energy Code, ventilation becomes more of a concern as less air is transferred between the leaks within the structure. Inadequate ventilation can lead to comfort problems, humidity, mold, buildup of toxins, or particulate contamination.



Stringency: This code change is slightly more stringent than the 2020 ECCCNYS as it prohibits exhaust only ventilation and instead requires Energy Recovery or balanced ventilation.

Takeaway: DOB anticipates this code provision to require the most education and outreach for residential construction, as the current NYC Mechanical Code does not require supply ventilation in homes. This is an important amendment because as the code requires buildings to become tighter, ventilation is important to maintain indoor air quality and health for the occupants.

6. R403.5.5 Supply of Heated Water

R403.5.5 Supply of heated water. In new *buildings*, heated water supply piping shall be in accordance with one of the following:

1. **Maximum allowable pipe length method.** The maximum allowable pipe length from the nearest source of heated water to the termination of the fixture supply pipe shall be in accordance with the maximum pipe length in Table R403.5.5. Where the length contains more than one size of pipe, the largest size shall be used for determining the maximum allowable length of the piping in Table R403.5.5.

2. **Maximum allowable pipe volume method.** The water volume in the piping shall be calculated in accordance with Table R403.5.5. The maximum volume of hot or tempered water in the piping to public lavatory faucets shall be 2 ounces. For fixtures other than public lavatory faucets, the maximum volume shall be 64 ounces for hot or tempered water from a water heater or boiler; and 24 ounces for hot or tempered water from a circulation loop pipe or an electrically heat-traced pipe.

3. **Drain water heat recovery units**. New buildings shall include a drain water heat recovery unit that captures heat from at least one shower per dwelling unit, and such drain water heat recovery unit must have a minimum efficiency of 40 percent if installed for equal flow or a minimum efficiency of 52 percent if installed for unequal flow.

4. **Recirculation Systems.** Projects shall include a recirculation system with no more than 0.5 gallon (1.9 liter) storage. The storage limit shall be measured from the point where the branch feeding the fixture branches off the recirculation loop to the fixture. Recirculation systems must be based on an occupant-controlled switch or an occupancy sensor, installed in each bathroom which is located beyond a 0.5 gallon stored-volume range from the water heater.

TABLE R403.5.5
PIPE VOLUME AND MAXIMUM PIPING LENGTHS[b]

Nominal Pipe or Tube Size (inch)	VOLUME (Liquid Ounces Per Foot Length)	Maximum Pipe or Tube Length		
		System without a circulation loop or heat-traced line (feet)	System with a circulation loop or heat-traced line (feet)	Lavatory faucets – public (metering and nonmetering (feet)
1/4[a]	0.33	50	16	6
5/16[a]	0.5	50	16	4
3/8[a]	0.75	50	16	3
1/2	1.5	43	16	2
5/8	2	32	12	1
3/4	3	21	8	0.5
7/8	4	16	6	0.5
1	5	13	5	0.5
1 1/4	8	8	3	0.5
1 1/2	11	6	2	0.5
2 or larger	18	4	1	0.5

a. The flow rate for 1/4-inch size pipe or tube is limited to 0.5 gallons per minute; for 5/16-inch size, it is limited to 1 gpm; for 3/8-inch size, it is limited to 1.5 gpm.
b. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the source of hot water and the termination of the fixture supply pipe. The volume contained within fixture shutoff valves, flexible water supply connectors to a fixture fitting, or within a fixture fitting shall not be included in the water volume determination. Where hot or tempered water is supplied by a circulation loop pipe or a heat-traced pipe, the volume shall include the portion of the fitting on the branch pipe that supplies water to the fixture.

Description: This is a new requirement for designing the distribution piping of service hot water system (i.e. domestic hot water systems). The designer has the option of choosing one of the four categories which will regulate the following:

1. Set a maximum length of pipe from the hot water tank to the fixture
2. Set a maximum volume of water inside the pipe
3. Provide at least one shower drain with a heat exchanger that is used to recover heat from waste hot water that would otherwise go down the drain, but would now preheat the domestic hot water
4. Install an occupancy-sensor based recirculation system (i.e. with a pump) with no more than ½ gallon of water storage

Items 1 and 2 in this code section are requirements that were introduced in the commercial provisions in the 2016 NYCECC. The maximum distances and maximum water volume from the hot water system to the fixture are the same in the commercial and residential provisions.

The 2014 NYC Plumbing Code requires a minimum pipe size of 0.5" for domestic hot water fixtures within a home – which equates to a maximum pipe length of 43 feet (Item 1).

Stringency: This code requirement is more stringent than the 2020 ECCCNYS as it adds a requirement for the design of the service hot water system distribution system.

Takeaway: Item 1 is the least expensive path for compliance. The 2014 NYC Plumbing Code requires a minimum pipe size of 0.5" for domestic hot water fixtures within a home – which equates to a maximum pipe length of 43 feet (Item 1) from the hot water heater to the fixture for non-circulating systems. Instantaneous hot water systems may become more prevalent to meet the distance requirement.

7. **R404.3 Electric Vehicle Service equipment capable**

R404.3 Electrical vehicle service equipment capable (Mandatory). One or two-family dwellings and townhouses with parking area provided on the building site shall provide a 208/240V 40-amp outlet for each dwelling unit or panel capacity and conduit for the future installation of such an outlet. Outlet or conduit termination shall be adjacent to the parking area. For residential occupancies where there is a common parking area, provide either:

1. Panel capacity and conduit for the future installation of 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet, or
2. 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet.

Description: This is a new mandatory requirement for new construction projects and requires that any parking area be provided with infrastructure for the future installation of an electric vehicle charger or charging station. For buildings with a common parking area, 5% of the parking spaces with a minimum of one space are required to meet this provision.

The requirement allows one of two options for compliance:

1. Install one 208/240V 40-amp outlet for each dwelling unit
2. Install electric conduit and connect to an electric panel for the future installation of one 208/240V 40-amp outlet for each dwelling unit

The 2014 NYC Building Code has a similar requirement for new parking garages and the future installation of electric vehicle charging stations.

406.2.11 Electric vehicle charging stations. Parking garages shall be capable of supporting electrical vehicle charging stations in accordance with this section. Electrical raceway to the electrical supply panel serving the garage shall be capable of providing a minimum of 3.1 kW of electrical capacity to at least 20 percent of the parking spaces of the garage. The electrical room supplying the garage must have the physical space for an electrical supply panel sufficient to provide 3.1kW of electrical capacity to at least 20 percent of the parking spaces of the garage. Such raceway and all components and work appurtenant thereto shall be in accordance with the *New York City Electrical Code*.

Exceptions:

1. The provisions of this section shall not apply to parking garages for buildings of Occupancy Group M (Mercantile).
2. The commissioner may waive compliance with this section if the commissioner determines that the parking garage is a temporary facility that will be in service no longer than 3 years.
3. The provisions of this section shall not apply to parking garages for buildings in which not less than fifty percent of the residential units are for households earning up to sixty percent of the area median income as determined by the United States Department of Housing and Urban Development.

Stringency: While this provision does not directly impact the stringency of the Energy Code, it requires that infrastructure for the future installation of electric vehicle chargers be incorporated into a new residential building.

Takeaway: This requirement will require newly constructed residential buildings to be constructed with enough electric capacity to accommodate the future installation of an electric vehicle charger.

8. R404.1 Lighting Equipment

R404.1 Lighting equipment (Mandatory). Not less than 90 percent of the permanently installed lighting fixtures shall use lamps with an efficacy of at least 65 lumens per watt, or have a total luminaire efficacy of at least 45 lumens per watt.

R404.1.1 Lighting equipment (Mandatory). Fuel gas lighting systems shall not have continuously burning pilot lights.

Description: The interior lighting requirements for all dwelling units, in both the commercial and residential provisions, require 90% high efficacy lighting. The current code requirement is 75% high efficacy lighting. This change originated with the State, and the Stretch Code amended the definition of high efficacy to be more stringent than the current definition. The 10% lighting that is not required to be high efficacy gives flexibility for decorative fixtures.

For reference, the current definition of high-efficacy lamps is as follows:

HIGH-EFFICACY LAMPS. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts;
2. 50 lumens per watt for lamps over 15 watts to 40 watts; and
3. 40 lumens per watt for lamps 15 watts or less.

Stringency: This code provision is more stringent than the ECCCNYS because it changes the definition of high-efficacy lamps and requires a lamp that provides more lumens for less wattage.

Takeaway: Most lighting within dwelling units will be LED lighting that is widely available on the market. Energy Star rated light fixtures meet the new lumens per watt requirement.

9. ASHRAE 90.1 Appendix I Additional Efficiency Package Options

4.2 Compliance

4.2.1 Compliance Paths

4.2.1.1 New Buildings

New *buildings* shall comply with either the provisions of

a. Section 5, "*Building Envelope*"; Section 6, "Heating, Ventilating, and Air Conditioning"; Section 7, "*Service Water Heating*"; Section 8, "Power"; Section 9, "Lighting"; Section 10, "Other *Equipment*"; and Appendix I "Required Additional Efficiency Packages," or

b. Section 11, "*Energy Cost Budget* Method," or

c. Appendix G, "*Performance Rating Method*," using one of the following:

This is a normative appendix and is part of this standard.

Normative Appendix I

Required Additional Efficiency Packages

I1 GENERAL

I1.1 Requirements

New buildings shall comply with at least one of the following sections:

1. More efficient HVAC equipment in accordance with Section I2.
2. Reduced lighting power density in accordance with Section I3.
3. Enhanced digital lighting controls in accordance with Section I4.
4. Dedicated outdoor air systems with energy recovery ventilation in accordance with Section I5.
5. High-efficiency service water heating in accordance with Section I6.
6. Enhanced envelope performance in accordance with Section I7.
7. Reduced air infiltration in accordance with Section I8.

Description: This code provision adds a new requirement to the ASHRAE compliance path that aligns with the ECC Section C406. This requirement is for any project choosing to comply with the prescriptive compliance path must comply with Appendix I, which requires that one of the seven additional efficiency package items is met.

Stringency: This code proposal increases the stringency of the ASHRAE compliance path by requiring inclusion of an additional efficiency package for prescriptive compliance with the standard.

Takeaway: The ASHRAE compliance path adds a new Appendix I that requires a project following prescriptive compliance to include one of the seven additional efficiency options.

10. ASHRAE 90.1 Section 5.2.3 Additional Requirements to Comply with Section 11 and Appendix G

5.2.3 Additional Requirements to Comply with Section 11 and Appendix G

For projects following the Energy Cost Budget Method (Section 11), or the Performance Rating Method (Appendix G), which are 25,000 square feet and greater, the building envelope shall comply with either:

a. Section 5.5, "*Prescriptive Building Envelope* Option", or

b. An *envelope performance factor* shall be calculated in accordance with Appendix C of this standard, and buildings shall comply with one of the following:

1. For multifamily, hotel/motel and dormitory building area types, the margin by which the *proposed envelope performance factor* exceeds the *base envelope performance factor* shall not be greater than 15%. For compliance with this requirement, the *base envelope performance factor* shall be calculated using metal framing operable windows. In *buildings* with window area accounting for 40% or more of the *gross wall* area, the SHGC of the *vertical fenestration* on east and west oriented façade may be reduced by the following multiplier to account for the permanent site shading from existing buildings or infrastructure.

   $M_{West} = 0.18 + 0.33/WWR$
   $M_{East} = 0.35 + 0.26/WWR$

   Where:
   M_{West} = SHGC multiplier for the West façade
   M_{East} = SHGC multiplier for the East façade
   WWR = the ratio of the proposed *vertical fenestration* area to the *gross wall* area in consistent units.

   The multiplier may be applied to the rated SHGC of the *vertical fenestration* which has at least 50% of the area located directly opposite of the shading surfaces and no higher from the street level than the difference between the shading surface height and the shading surface distance from the façade. *Orientation* must be determined following Section 5.5.4.5, Fenestration Orientation.

2. For all other *building* area types, the margin by which the proposed *envelope performance factor* exceeds the *base envelope performance factor* shall be not greater than 7%. For compliance with this requirement, the *base envelope performance factor* shall be calculated using metal framing fixed windows.

3. For mixed-use *buildings* the margin shall be calculated as the *gross wall area*-weighted average of 1 and 2 above.

Description: This new provision affects only projects that are greater than 25,000 sq ft **AND** choose to comply with the energy code via energy modeling, which is a whole building performance based approach to compliance that allows the most flexibility to the designer. In this compliance approach, designers are allowed to 'trade-off' certain code requirements as long as they demonstrate that in doing so would result in a building that uses no more annual energy cost than a building of the same geometry with the code minimum requirements.

The Department typically sees around 70 energy modeling projects per year of the largest newly constructed buildings. The most common reason that designers choose this code compliance approach is to reduce the required amount of insulation and increase the fenestration area to greater than the code minimum of 40% of the overall wall area and then offset the minimum wall requirements with HVAC equipment and lighting systems that exceed the code minimum requirements.

Without an envelope backstop, there is no minimum requirement for the building's wall performance. This provision would set a minimum wall performance (based on insulation, fenestration performance and fenestration area) for projects that choose to follow energy modeling compliance path:

1. Insulation levels in Group R buildings may be no more than 15% worse than the wall performance for a building that does not choose the modeling path.
2. Insulation levels in non-Group R buildings may be no more than 7% worse than the wall performance for a building that does not choose the modeling path.
3. Any building with both Group R and non-Group R occupancies perform a weighted average of Item 1 and Item 2.

Analysis performed by NYSERDA shows that buildings may be constructed with up to 70% fenestration area and still meet the requirements by providing more insulated opaque wall areas, high efficiency HVAC & lighting equipment.

Stringency: This requirement is more stringent than the ECCCNYS as it requires projects that are choosing to comply with energy modeling to meet additional stringency requirements for the building's envelope, where the ECCCNYS currently has none.

Takeaway: New trade-off limits are set for the overall wall performance (i.e. insulation, fenestration performance, fenestration area) for new buildings 25,000 sq. ft. and greater that choose to follow the whole building performance method. This ensures that buildings with poorly performing envelopes are limited to 15% worse than code for Group R and 7% worse than code for non-Group R. This compliance path will require both an energy model and a ComCheck to demonstrate compliance.

11. ASHRAE 90.1 Section 4.2.1.1 Performance Source Energy Index Method

4.2.1 Compliance Paths

4.2.1.1 New Buildings

New *buildings* shall comply with either the provisions of

a. Section 5, "*Building Envelope*"; Section 6, "Heating, Ventilating, and Air Conditioning"; Section 7, "*Service Water Heating*"; Section 8, "Power"; Section 9, "Lighting"; Section 10, "Other *Equipment*"; and Appendix I "Required Additional Efficiency Packages", or

b. Section 11, "*Energy Cost Budget* Method," or

c. Appendix G, "*Performance Rating Method*," using one of the following:

1. **Performance Cost Index Method** When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCI_t) when calculated in accordance with the following:

$$PCI_t = [BBUEC + (BPF_{cost} \times BBREC)]/BBP$$

where

PCI	=	Performance Cost Index calculated in accordance with Section G1.2.
BBUEC	=	Baseline *Building* Unregulated *Energy* Cost, the portion of the annual *energy* cost of a *baseline building design* that is due to *unregulated energy use*.
BBREC	=	Baseline *Building* Regulated *Energy* Cost, the portion of the annual *energy* cost of a *baseline building design* that is due to *regulated energy use*.
BPF_{cost}	=	*Building* Performance Factor from Table 4.2.1.1. For *building* area types not listed in Table 4.2.1.1 use "All others." Where a *building* has multiple *building* area types, the required BPF_{cost} shall be equal to the area-weighted average of the *building* area types.
BBP	=	*Baseline Building Performance*.

Regulated *energy* cost shall be calculated by multiplying the total *energy* cost by the ratio of *regulated energy use* to total *energy* use for each *fuel* type. Unregulated *energy* cost shall be calculated by subtracting regulated *energy* cost from total *energy* cost.

2. **Performance Source Energy Index Method** When using Appendix G, the Performance *Source Energy* Index (PSEI) shall be less than or equal to the Performance Source Energy Index Target ($PSEI_t$) when calculated in accordance with the following:

$$PSEI_t = [BBUSE + (BPF_{source} \times BBRSE)]/BBSE$$

where

PSEI	=	Performance Source Energy Index calculated in accordance with Section G1.2.
BBUSE	=	Baseline *building* unregulated source energy use in units of Btu, the portion of the annual *site energy* of a *baseline building design* that is due to *unregulated energy use* multiplied by the site to source conversion ratios in Table 4.2.1.2 for each fuel type.
BBRSE	=	Baseline *building* regulated *source energy* use in units of Btu, the portion of the annual *site energy* of a *baseline building design* that is due to *regulated energy use* multiplied by the site to source conversion ratios in Table 4.2.1.2 for each fuel type.
BPF_{source}	=	*Building* Performance Factor from Table 4.2.1.3. For *building* area types not listed in Table 4.2.1.3 use "All others." Where a *building* has multiple *building* area types, the required BPF_{source} shall be equal to the area-weighted average of the *building* area types.
BBSE	=	*Baseline Building source energy*.

Table 4.2.1.2 Site to Source Energy Conversion Ratios

Energy Type	New York Ratio
Electricity (Grid Purchase)	2.55
Electricity (On-site Renewable Energy Installation)	1.00
Natural Gas	1.05
Fuel Oil	1.01
Propane & Liquid Propane	1.01
Steam	1.20
Hot Water	1.20
Chilled Water, Coal, Wood, Other	1.00

Description: This provision affects only projects that choose to comply with the energy code via energy modeling using Appendix G, which is a whole building performance based approach to compliance that allows the most flexibility to the designer. In this compliance approach, designers are allowed to 'trade-off' certain code requirements as long as they demonstrate that in doing so would result in a building that uses no more annual energy cost than a building of the same geometry with the code minimum requirements.

This provision would allow projects to comply with performance based energy modeling using either source energy or energy cost, when following Appendix G. Source energy is the amount of energy it takes to generate the energy consumed on a building's site, taking in to account transmission losses and power consumption at a generation

facility. The conversion factors from site energy to source energy are known by power companies such as Con Edison. The values listed in the proposed Table 4.2.1.2 are average conversion values across NY State, as determined by New York State Energy Research and Development Authority (NYSERDA).

In the past, energy modeling compliance only compared annual energy cost to determine compliance. In NYC, the electricity rates are approximately 5 times higher than the natural gas rates. Therefore, buildings with high electric usage are penalized compared to those buildings with high natural gas usage. However, the City's One City Plan to reduce greenhouse gas emissions 80% by 2050 depends on the electrification of buildings and adding renewable energy to the utility grid. By only comparing annual energy cost, buildings that are pursing electrification are penalized compared to those that would look at source energy.

Stringency: While adding an additional compliance option of source energy does not directly affect stringency, the source energy metrics in the 2020 NYCECC originate from the NYSERDA NYStretch Energy Code and were modeled to be 6.7% more stringent than ASHRAE 90.1-2016, which serves as the basis for the 2020 ECCCNYS.

Takeaway: For projects choosing to comply using the whole building performance approach via energy modeling using Appendix G, this change adds an option to comply by comparing annual source energy instead of annual energy cost. By comparing source energy instead of energy cost, buildings with high-efficiency electric heat pumps for space heating and hot water will be able to comply, aligning with the policy goal – the electrification of buildings – in the One City Plan.

The Department plans to require projects to report the annual source energy consumption and the CO2 equivalent consumption (per LL97 limits), regardless of which energy modeling path is chosen. The data collected from these projects can inform both the designer and the department of the energy use in new buildings constructed to the 2020 NYCECC.

12. Table C402.1.4 Fenestration U-factors

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	4 EXCEPT MARINE	
Vertical fenestration		
***U*-factor[a]**		
	Below 95'[b]	**95' and above[b]**
Non-metal framing (all)	0.28	0.28
Metal framing fixed	0.30	0.36
Metal framing operable	0.40	0.42
Curtainwall fixed	0.36	0.36
Entrance doors	0.77	
SHGC[c]		
PF < 0.2	0.36	
0.2 ≤ PF < 0.5	0.43	
PF ≥ 0.5	0.58	
Skylights		
U-factor[a]	0.48	
SHGC[c]	0.38	

PF = Projection Factor.

a. U-factor shall be rated in accordance with NFRC 100.
b. Where any portion of the fenestration frame is installed at or above 95' (28 950 mm) above grade, the unit may meet the requirements for 95' (28 950 mm) and above.
c. SHGC shall be rated in accordance with NFRC 200.

Description: This requirement improves the fenestration performance (i.e. window glass plus frame U-factor) for all vertical fenestration categories, sets more stringent requirements for windows installed below 95 feet, and also adds more stringent requirements for windows containing non-metal framing. Our committee determined that the 95 foot limit is the height at which fenestration requires additional structural support to account for increased wind loads. Increased structural support means more framing is required for glazing, which reduces the overall fenestration performance.

Stringency: This code provision requires more stringent U-factors for all fenestration.

Takeaway: This is a prescriptive requirement (can be traded-off with above-code measures) that increases the minimum performance for fenestration assemblies. Fenestration assemblies installed below 95 feet are 10-25% more stringent than current requirements and assemblies installed 95 feet or above are 5-7% more stringent than current requirements.

13. C402.1.4.2 Default Spandrel Values

C402.1.4.2 Thermal resistance of spandrel panels.
U-factors of opaque assemblies within fenestration framing systems shall be determined in accordance with Table C402.1.4.2.

TABLE C402.1.4.2
EFFECTIVE U-FACTORS FOR SPANDREL PANELS[a]

Frame Type	Spandrel Panel	Rated R-value of Insulation between Framing Members						
		R-4	R-7	R-10	R-15	R-20	R-25	R-30
Aluminum without Thermal Break[b]	Single glass pane, stone, or metal panel	0.242	0.222	0.212	0.203	0.198	0.195	0.193
	Double glass with no low-e coatings	0.233	0.218	0.209	0.202	0.197	0.194	0.192
	Triple or low-e glass	0.226	0.214	0.207	0.200	0.196	0.194	0.192
Aluminum with Thermal Break[c]	Single glass pane, stone, or metal panel	0.211	0.186	0.173	0.162	0.155	0.151	0.149
	Double glass with no low-e coatings	0.200	0.180	0.170	0.160	0.154	0.151	0.148
	Triple or low-e glass	0.191	0.176	0.167	0.159	0.153	0.150	0.148
Structural Glazing[d]	Single glass pane, stone, or metal panel	0.195	0.163	0.147	0.132	0.123	0.118	0.114
	Double glass with no low-e coatings	0.180	0.156	0.142	0.129	0.122	0.117	0.114
	Triple or low-e glass	0.169	0.150	0.138	0.127	0.121	0.116	0.113
No framing or Insulation is Continuous[e]	Single glass pane, stone, or metal panel	0.148	0.102	0.078	0.056	0.044	0.036	0.031
	Double glass with no low-e coatings	0.136	0.097	0.075	0.054	0.043	0.035	0.030
	Triple or low-e glass	0.129	0.093	0.073	0.053	0.042	0.035	0.030

a. Opaque assembly U-factors based on designs tested in accordance with ASTM C 1363 or NFRC 100 shall be permitted. Interpolation outside of the table shall not be permitted. Spandrel panel assemblies in the table do not include metal backpans.
b. Aluminum frame without a thermal break shall be used for systems where the mullion provides a thermal bridge through the insulation.
c. Aluminum frame with a thermal break shall be used for systems where a urethane or other non-metallic element separates the metal exposed to the exterior from the metal that is exposed to the interior condition.
d. Structural glazing frame type shall be used for systems that have no exposed mullion on the interior.
e. No framing or insulation is continuous shall be used for systems where there is no framing or the insulation is continuous and uninterrupted between framing.

Description: Spandrel is a common wall assembly in NYC. Although most spandrel has exterior glazing, the assembly is opaque and considered an opaque wall in the Energy Code. Because most spandrel is unique to each building, the U-factor is difficult to determine without performing simulations on the wall assembly. This addition pulls from California's Title 24 and assigns a default U-factor for many different types of spandrel assemblies. If an applicant has a spandrel assembly that does not fall within the defined assembly types in the Table, then the applicant will be required to demonstrate the U-factor of the assembly, as is the current practice under the 2016 NYCECC.

Stringency: This code change does not affect the stringency, instead it helps the user determine the proposed U-factor for spandrel assemblies instead, which are typically difficult to determine without additional simulation.

Takeaway: The addition of a default spandrel table will save designers and plan examiners time in determining the U-factor of a spandrel assembly in a design. If a spandrel panel does not fall within the table, the designer will be required to provide simulation of the wall assembly, as is the current enforcement protocol.

14. C402.5.1.3 Air barrier testing

C402.5.1.3 Air barrier testing. New buildings and additions of a certain size must comply with the following requirements and the rules of the department:

1. New buildings and additions 10,000 square feet (929 m^2) and greater, but less than 50,000 square feet (4 645.2 m^2), and less than or equal to 75 feet (22.86 m) in height must show compliance through testing in accordance with ASTM E 779 or other approved standards. R-2 buildings may alternatively show compliance through testing in accordance with Section R402.4.1.3 of this code.

2. New buildings and additions 10,000 square feet (929 m^2) and greater, but less than 50,000 square feet (4 645.2 m^2), and greater than 75 feet (22.86 m) in height, shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Item 1 of this Section and department rules.

3. New buildings and additions 50,000 square feet (4 645.2 m^2) and greater shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Item 1 of this Section and department rules.

Description: This requirement expands the universe of new construction projects that are required to show compliance through air barrier testing through either a whole building pressurization test (i.e. blower door testing) or through an Air Barrier Continuity Plan (ABC Plan). The requirement is dependent on the building size – taller buildings above 75 feet in height have difficulty complying with the existing ASTM E779 standard due to the pressurization differences between the ground and top floors. Buildings less than 10,000 sq ft may not see the cost benefit of the testing cost compared to the energy savings realized after performing the testing.

Area of Building (sqft)	Height of Building	2016 NYCECC Air Leakage Requirement	2020 NYCECC Air Leakage Requirement
< 10,000	Any	Visual Inspection	Visual Inspection
10,000-25,000	≤ 75 ft	Visual Inspection	Blower door test
10,000-25,000	> 75 ft	Visual Inspection	ABC Plan or Blower door test
25,000-50,000	≤ 75 ft	Blower door test	Blower door test
25,000-50,000	> 75 ft	Visual Inspection	ABC Plan or Blower door test
> 50,000	any	ABC Plan or Blower door test	ABC Plan or Blower door test

Stringency: This code provision is more stringent than the ECCCNYS as it requires buildings of a certain size or height to perform air leakage testing instead of visual inspection only.

Takeaway: New buildings over 10,000 sqft are required to show compliance with the air leakage provisions of the energy code through testing – either by performing a whole building pressurization test or an Air Barrier Continuity Plan. Whole building pressurization testing is mandatory for this subset of buildings less than 75 feet in height.

15. C402.6 & R402.6 Thermal Bridges

THERMAL BRIDGE: Thermal bridges are elements that interrupt areas of uniform thermal resistance in the building envelope.

clear field thermal bridge: an area-based thermal transmittance associated with elements of a building envelope assembly which repeat at regular intervals. Examples of clear field thermal bridges include metal or wood studs, brick ties and cladding attachments such as z-girts.

linear thermal bridge: a length-based thermal transmittance associated with horizontal, vertical, or diagonal elements within the building envelope and with length measured along the exterior surface of the building envelope. Examples of linear thermal bridges include balconies or floor assemblies which penetrate walls in the building envelope, fenestration perimeter interfaces, parapets, and shelf angles. Linear thermal transmittance is heat flow divided by length and by the temperature difference between the interior and exterior sides of the assembly, represented by a Ψ-value (Psi-Value) in units Btu/hr-ft-°F [W/mK].

point thermal bridge: an element-based thermal transmittance associated with a discrete element that penetrates the building envelope. Examples of point thermal bridges include a beam penetrating a wall, a column penetrating a roof or floor, and an anchor or connection used to attach an element to the building and not otherwise addressed as a clear field thermal bridge or linear thermal bridge. Point thermal transmittance is heat flow divided by the temperature difference between the interior and exterior sides of the assembly, represented by a X-value (Chi-Value) in units Btu/hr-°F [W/K].

C402.6 Thermal bridges (Mandatory).
Applications for construction document approval shall include the following documentation of thermal bridges:

C402.6.1 Clear field thermal bridges. Where otherwise not included in pre-calculated assembly U-factors, C-factors, or F-factors outlined in ASHRAE 90.1-2016, Appendix A, clear field thermal bridges in a wall, roof, or floor assembly shall be noted as such in the drawings.

C402.6.2 Point thermal bridges. Point thermal bridges greater than or equal in area to 12 in^2 (7744 mm^2) and not associated with HVAC or electrical systems shall be noted as thermal bridges in the drawings.

C402.6.3 Linear thermal bridges. Construction documents shall include the following documentation in tabular format for linear thermal bridges listed in Table C402.6:

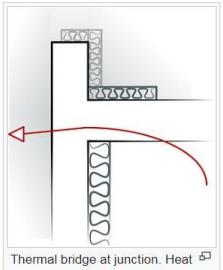
1. Linear thermal bridge type.
2. Aggregate length of each type of linear thermal bridge.
3. Relevant detail in the construction documents showing a cross-section through the thermal bridge.
4. Ψ-value for each thermal bridge from Table C402.6.

Exception: Where linear thermal bridges have been tested or modeled using methods approved by the department, alternate values may be used.

TABLE C402.6
AVERAGE THERMAL TRANSMITTANCE FOR UNMITIGATED LINEAR THERMAL BRIDGES

Type of Thermal Bridge	Ψ-value[a] [Btu / hr ft F]
Balcony	0.50
Floor Slab	0.44
Fenestration Perimeter Transition[b]	0.32
Parapet	0.42
Shelf Angle	0.41

a. Psi-values are derived from the *BC Hydro Building Envelope Thermal Bridging Guide V. 1.2 - Sept. 2018*, and are based on poor performing details.
b. Fenestration Perimeter Transition is the thermal bridge between any fenestration frame and the typical wall, roof or floor assembly it abuts or is mounted within.



Thermal bridge at junction. Heat moves from the floor structure through the wall because there is no thermal break.

Description: Thermal bridges are essentially portions of the building where the thermal envelope (i.e. insulation) is not present or is otherwise compromised. The insulation requirements in the R-value and U-factor tables within the Energy Code do not take into account most thermal bridging, even though thermal bridging reduces the overall performance of a building envelope.

This provision requires that the designer documents certain thermal bridges on the construction documents, including any clear field thermal bridge not mentioned in the insulation tables, any point thermal bridge greater than 12 in^2, and any linear thermal bridge listed in Table C402.6. For linear thermal bridges, the documentation must include a detail of the thermal bridge, the length of the thermal bridge, and the Psi-value associated with the thermal bridge.

Stringency: These code changes are increases in stringency as documentation for certain linear and point source thermal bridges are categorized and documented on the drawing set. The ECCCNYS does not require analysis or documentation of these particular envelope assemblies.

Takeaway: This provision requires the designer to identify certain common thermal bridges and document each of them in the construction documents. This prepares the industry for a future code that may require wall assemblies to account for the decrease in envelope performance for these areas of thermal bridging.

16. C402.5.7 Vestibules

C402.5.7 Vestibules. Building entrances shall be protected with an enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. The installation of one or more revolving doors in the building entrance shall not eliminate the requirement that a vestibule be provided on any doors adjacent to revolving doors.

Exceptions: Vestibules are not required for the following:

1. Buildings in *Climate Zones* 1 and 2.
2. Doors not intended to be used by the public, such as doors to mechanical or electrical equipment rooms, or intended solely for employee use.
3. Doors opening directly from a *sleeping unit* or dwelling unit.
4. Doors that open directly from a space less than 3,000 square feet (298 m^2) in area, in buildings less than 75 feet (22.86 m) in height, and doors that open directly from a space less than 1,000 square feet (92.9 m^2) in area, in buildings 75 feet (22.86 m) and greater in height.
5. Revolving doors.
6. Doors used primarily to facilitate vehicular movement or material handling and adjacent personnel doors.

Description: The 2015 IECC introduced an exception to the vestibule requirement and allowed air curtains to be used in lieu of vestibules. The NYC Advisory Committee felt that air curtains do not provide the same energy savings as vestibules or revolving doors and advised to remove exception 7.

Stringency: This requirement removes an exception for when a vestibule is required and is neither a reduction nor increase in stringency.

Takeaway: This code change will no longer allow an air curtain to be used in lieu of a vestibule.

17. C408.2 Mechanical systems and service water-heating systems commissioning

Prior to passing the final mechanical and plumbing inspections, the approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Construction document notes shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the code official upon request in accordance with Sections C408.2.4 and C408.2.5.

Mechanical systems, renewable energy, and service water heating systems shall include but are not limited to, at a minimum, the following heating, ventilating, air conditioning, service water heating, indoor air quality and refrigeration systems (mechanical and/or passive) and associated controls:

1. Heating, cooling, air handling and distribution, ventilation, and exhaust systems, and their related air quality monitoring systems.

2. Air, water, and other energy recovery systems.

3. Manual or automatic controls, whether local or remote, on energy using systems including but not limited to temperature controls, setback sequences, and occupancy based control, including energy management functions of the building management system.

4. Plumbing, including insulation of piping and associated valves, domestic and process water pumping, and mixing systems.

5. Mechanical heating systems and service water heating systems.

6. Refrigeration systems.

7. Renewable energy and energy storage systems.

8. Other systems, equipment and components that are used for heating, cooling or ventilation and that affect energy use.

Exceptions: The following systems are exempt:

1. Mechanical systems and service water heating systems in new buildings, additions, or alterations where the total mechanical equipment capacity being installed or the total mechanical equipment connected load serving the alteration space is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.

2. Renewable energy systems being installed with a generating capacity of less than 25kW.

Description: Commissioning is a quality control process that ensures the equipment installed is functioning as it was designed to function, and it became a requirement for mechanical and service water heating systems in the 2014 NYCECC. This requirement has applied to any newly installed (either in new construction, additions or alterations) heating, cooling, refrigeration or service hot water equipment when the installed equipment exceeded a certain capacity threshold. The Committee recommended changes to Exception 1 to capture additions and alterations that are altering HVAC distribution equipment but not necessarily altering the heating or cooling equipment.

The Stretch Code also requires all buildings over 25,000 sq ft to be commissioned, regardless of installed capacity. DOB does not recommend adopting the NYStretch language, as most buildings over 25,000 sq ft should hit the equipment capacity triggers. If they do not, there is less equipment to do commissioning on. We can look for evidence to support a change in future code cycles over the next three years.

Stringency: This code change increases the stringency by requiring more alteration projects to perform commissioning.

Takeaway: Projects that are altering the distribution portion of the HVAC system (i.e. radiator or duct replacement) may be subject to the commissioning requirements, depending on the capacity of the connected load that this distribution equipment serves.

II. Select Minor Changes

18. Tables C402.1.3 & C402.1.4 Opaque Thermal Envelope Requirements

CLIMATE ZONE	4 EXCEPT MARINE		5 AND MARINE 4		6	
	All other	Group R	All other	Group R	All other	Group R
Roofs						
Insulation entirely above roof deck	U-0.030	U-0.030	U-0.032	U-0.032	U-0.032	U-0.032
Metal buildings	U-0.035	U-0.035	U-0.035	U-0.035	U-0.031	U-0.031
Attic and other	U-0.020	U-0.020	U-0.027	U-0.021	U-0.021	U-0.021
Walls, above grade						
Mass[f]	U-0.099	U-0.086	U-0.090	U-0.080	U-0.080	U-0.071
Metal building	U-0.048	U-0.048	U-0.052	U-0.052	U-0.052	U-0.052
Metal framed	U-0.061	U-0.061	U-0.064	U-0.064	U-0.064	U-0.064
Wood framed and other[c]	U-0.061	U-0.061	U-0.064	U-0.064	U-0.051	U-0.051
Walls, below grade						
Below-grade wall[c]	C-0.119	C-0.092	C-0.119	C-0.119	C-0.119	C-0.119
Floors						
Mass[d]	U-0.057	U-0.051	U-0.074	U-0.064	U-0.064	U-0.064
Joist/framing	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033
Slab-on-grade floors						
Unheated slabs	F-0.52	F-0.52	F-0.54	F-0.54	F-0.54	F-0.52
Heated slabs[e]	F-0.63 0.64	F-0.63 0.64	F-0.79 0.64	F-0.79 0.64	F-0.79 0.55	F-0.69 0.55
Opaque doors						
Swinging door	U-0.50	U-0.50	U-0.37	U-0.37	U-0.37	U-0.37
Garage door <14% glazing	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31

CLIMATE ZONE	4 EXCEPT MARINE		5 AND MARINE 4		6	
	All other	Group R	All other	Group R	All other	Group R
Roofs						
Insulation entirely above roof deck	R-33ci	R-33ci	R-30ci	R-30ci	R-30ci	R-30ci
Metal buildings[b]	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-25 + R-11 LS	R-25 + R-11 LS
Attic and other	R-53	R-53	R-38	R-49	R-49	R-49
Walls, above grade						
Mass[f]	R-11.2ci	R-13.25ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci
Metal building	R-13 + R-13ci	R-13 + R-19.5ci	R-13 + R-13ci	R-13 + R-13ci	R-13 + R-13ci	R-13 + R-13ci
Metal framed	R-13 + R-8.5ci	R-13 + R-8.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed and other	R-13 + R-4.5ci or R-19 + R-1.5ci	R-13 + R-4.5ci or R-19 + R-1.5ci	R-13 + R-3.8ci or R-20	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci
Walls, below grade						
Below-grade wall[c]	R-7.5ci	R-10ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci
Floors						
Mass[d]	R-14.6ci	R-16.7ci	R-10ci	R-12.5ci	R-12.5ci	R-12.5ci
Joist/framing	R-30	R-30	R-30	R-30	R-30	R-30[e]
Slab-on-grade floors						
Unheated slabs	R-15 for 24" below	R-15 for 24" below	R-10 for 24" below	R-10 for 24" below	R-10 for 24" below	R-15 for 24" below
Heated slabs[g]	R-20 for 48" below + R-5 full slab	R-20 for 48" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-20 for 48" below + R-5 full slab
Opaque doors						
Nonswinging	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75

Description: Insulation requirements have increased over all building components to reduce the amount of heat loss within the building. The average percent increase of insulation performance is as follows:

- Mass floors (above unconditioned space): 28%
- Attic & other: 26%
- Below-grade wall (residential occupancy): 23%
- Roof insulation entirely above deck: 5%
- Above-grade walls: 5%
- Slab-on-grade (unheated): 3%

Stringency: This code provision increases the stringency by increasing the required amount of insulation on opaque building assemblies.

Takeaway: Mass floors over unconditioned space will require an additional 1 to 2" of insulation over the current code. Attics/other (commercial buildings only) will require an additional 3 to 5" of insulation. Below-grade walls for Group R buildings will require an additional ½ to 1" of insulation. Above-grade walls will require an additional ¼ to ½" of insulation.

19. C405.2.1.4 Occupant sensor control function for Egress Illumination

C405.2.1.4 Occupant sensor control function for egress illumination.
In new buildings, luminaires serving the exit access and providing means of egress illumination required by Section 1008.1 of the *New York City Building Code*, including luminaires that function as both normal and emergency means of egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors, or signal from another building control system, that automatically reduces the lighting power by 50 percent when unoccupied for a period longer than 15 minutes.

Exceptions:

1. Means of egress illumination serving the exit access that does not exceed 0.02 watts per square foot of building area is exempt from this requirement.

2. Emergency lighting designated to meet Section 1008.3 of the *New York City Building Code*.

Description: Egress illumination can account for a significant portion of a commercial and residential building's energy use during nighttime hours. If left uncontrolled, this lighting will be illuminated 24/7. The code currently exempts all of this lighting from controls. This provision requires that egress illumination be provided with occupancy sensors and dim the power by 50% during unoccupied periods to the minimum foot-candle level required by the Building Code.

Stringency: This code change increases the stringency by requiring additional controls on lighting that serves means of egress.

Takeaway: This provision requires that egress illumination be provided with occupancy sensors and dim the power by 50% during unoccupied periods to the minimum foot-candle level required by the Building Code.

20. C405.8.1.1 Power Conversion System

C405.8.1 Elevator equipment and cabs.
For the luminaires in each elevator cab, not including signals and displays, the sum of the lumens divided by the sum of the watts shall be not less than 35 lumens per watt. Ventilation fans in elevators that do not have their own air-conditioning system shall not consume more than 0.33 watts/cfm at the maximum rated speed of the fan. Controls shall be provided that will de-energize ventilation fans and lighting systems when the elevator is stopped, unoccupied and with its doors closed for over 15 minutes.

C405.8.1.1 Power conversion system. New traction elevators with a rise of 75 feet (23 m) or more in new buildings shall have a power conversion system that complies with Sections 405.8.1.1.1 through 405.8.1.1.3.

C405.8.1.1.1 Motor. Induction motors with a Class IE2 efficiency ratings, as defined by IEC EN 60034-30, or alternative technologies, such as permanent magnet synchronous motors that have equal or better efficiency, shall be used.

C405.8.1.1.2 Transmission. Transmissions shall not reduce the efficiency of the combined motor/transmission below that shown for the Class IE2 motor for elevators with capacities below 4,000 pounds (1814 kg). Gearless machines shall be assumed to have a 100 percent transmission efficiency.

C405.8.1.1.3 Drive. Potential energy released during motion shall be recovered with a regenerative drive that supplies electrical energy to the building electrical system.

Description: This requirement applies to traction elevators in new buildings that have a rise within the elevator shaft of 75 feet or more. Traction elevators are the most common type of elevator serving mid- to high-rise buildings. The cab is raised and lowered by traction steel rope or belts on a pulley system and use a counterweight to offset the weight of the cab and passengers.

These types of elevators will be required to meet certain energy requirements for the motor, transmission and drives. Motors and transmissions are required to have High Efficiency Class IE2 motors. The elevator is required to have a regenerative drive that recovers energy during use and supplies excess energy back to the building's electrical system. Regenerative drives have the ability to generate energy when a fully loaded elevator car is descending and when a lightly loaded car is ascending.

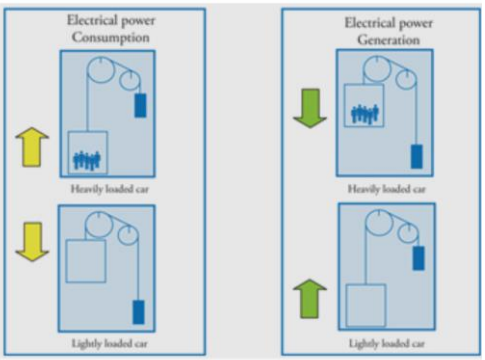


Diagram depicting how the Regenerative Drive sytem works. *Image: Otis Worldwide*

Stringency: This is an increase in the scope of the Energy Code and provides efficiency requirements for certain elevators. The ECCCNYS does not have requirements for elevators.

Takeaway: Certain passenger elevators (in new buildings, with a rise within the elevator shaft of 75 feet or more) will now be regulated in the energy code and required to be equipped with high efficiency motors and regenerative drives. This technology is widely available and the code section has been reviewed by the DOB Elevator Unit.

21. **Table R402.1.4 Fenestration U-factor**

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED ENESTRATION SHGC[b,e]
4	0.27	0.50	0.40
5	0.30	0.55	NR
6	0.30	0.55	NR

Description: The Stretch Code is amending the fenestration U-factor from U-0.32 to U-0.27 and the skylight U-factor from U-0.55 to U-0.50. This is the only change made to the building envelope performance requirements in the residential provisions.

Stringency: This is an increase in stringency as it reduces the U-factor for fenestration and skylights.

Takeaway: The fenestration performance will increase by 15% and the skylight performance will increase by 9%. There are products on the market that are available to meet these requirements.

22. R403.3 Ducts

R403.3 Ducts. Ducts and air handlers shall be installed in accordance with Sections R403.3.1 through R403.3.8. The duct system in new buildings and additions shall be located in a conditioned space in accordance with Section R403.3.7.

Description: The Stretch Code added a new provision that requires all ducts to be located in conditioned space. This change affects only new construction and additions and will require that ducts, including air handlers, are located entirely within conditioned space, including within the continuous air barrier and the building's thermal envelope. This requirement would not allow the installation of air handlers within unconditioned attics.

Stringency: This change increases the stringency of the code by requiring all ducts to be located within conditioned space.

Takeaway: This change affects only new construction and additions and will require that ducts and air handlers are located entirely within conditioned space. We may see a change in construction where attics are conditioned or ductless HVAC systems are used instead of ducted systems.

23. C405.10 Commercial Kitchen Equipment

C405.10 Commercial kitchen equipment. Commercial kitchen equipment shall comply with the minimum efficiency requirements of Tables C405.10(1) through C405.10(5).

TABLE C405.10(1)
MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL FRYERS

	HEAVY-LOAD COOKING ENERGY EFFICIENCY	IDLE ENERGY RATE	TEST PROCEDURE
Standard Open Deep-Fat Gas Fryers	≥ 50%	≤ 9,000 Btu/hr	ASTM Standard F1361-17
Standard Open Deep-Fat Electric Fryers	≥ 83%	≤ 800 watts	
Large Vat Open Deep-Fat Gas Fryers	≥ 50%	≤ 12,000 Btu/hr	ASTM Standard F2144-17
Large Vat Open Deep-Fat Electric Fryers	≥ 80%	≤ 1,100 watts	

Description: This code change expands the scope of the Energy Code by providing minimum efficiency requirements for certain commercial kitchen equipment including commercial fryers, hot food holding cabinets, steam cookers, commercial dishwashers, and commercial ovens. These requirements align with the Energy Star version 2.2, although these requirements do not mandate the Energy Star label.

Stringency: This code provision increases the stringency by expanding the scope of the Energy Code to certain commercial kitchen equipment.

Takeaway: Certain commercial kitchen equipment is required to meet the specifications for Energy Star version 2.2.

24. C405.11 & C405.12 Whole Building Energy Monitoring

C405.11 Whole building energy monitoring. Measurement devices shall be installed in new buildings to individually monitor energy use of each of the following types of energy supplied by a utility, energy provider, or plant that is not within the building:

1. Natural gas
2. Fuel oil
3. Propane
4. Steam
5. Chilled Water
6. Hot Water

Exceptions:

1. Buildings less than 25,000 square feet (2,325 m^2).
2. *Group R* buildings with less than 10,000 square feet (930 m^2) of common area.
3. Fuel use for on-site emergency equipment.

C405.12 Whole building electrical monitoring. Each new building shall have a measurement device capable of recording electrical energy use every 60 minutes and the capability to report that use on an hourly, daily, monthly and annual basis. The measurement device shall be capable of retaining the recorded data for 36 months.

Exceptions:

1. Buildings less than 25,000 square feet (2,325 m^2).
2. *Group R* buildings with less than 10,000 square feet (930 m^2) of common area.
3. Fuel use for on-site emergency equipment.

Description: This provision requires that buildings measure how much of each energy type is consumed at a building level, if the building is new construction and greater than 25,000 sq ft. A multifamily building with less than 10,000 sq ft of common area is exempt from this provision. This requirement was added by ASHRAE in the last code cycle.

Stringency: This code change is an increase in stringency as it requires additional requirements for metering.

Takeaway: New buildings over 25,000 sqft are required to monitor the whole building energy use per energy type (i.e. electricity, natural gas, etc.). Monitoring whole building energy use will aid the future owner of this building to comply with LL84 (Benchmarking) and LL97 (Carbon Emission Limits), as the whole building energy consumption will be known.

25. C401.2.1 Application to Group R-3 buildings

C401.2 Application.
Commercial buildings shall comply with one of the following compliance paths:

1. ASHRAE Compliance Path: The requirements of ASHRAE 90.1-2016, as amended.

2. Prescriptive Compliance Path: The requirements of Sections C402 through C405 and C408. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.

3. Performance Compliance Path: The requirements of Section C407.

C401.2.1 Application to Group R-3 buildings.
Where Group R-3 buildings must comply with C401.2, the requirements of R401.3, R402.4.1.2, and R403.6.2 shall also be met.

Description: The definition of residential and commercial buildings within the NYCECC is defined differently than the other Construction Codes. The residential provisions apply to buildings with residential occupancies, 3 stories or less in height. The commercial provisions apply to buildings with any non-residential occupancy and any residential occupancy 4 stories or greater. This means that single family homes (R-3) may be considered a commercial building in the NYCECC. The addition of this provision aligns some of the residential provisions that would apply to an R-3 building if it were 3 stories or less:

1. **R401.3 – Permanent certificate** showing energy compliance

PERMANENT ENERGY EFFICIENCY CERTIFICATE

INSULATION RATING					
Ceiling/Roof	Attic	R-49 cavity			
	Vaulted	R-49 cavity			
Walls	Framed Wall	R-5 continuous +	R-21 cavity	Wood frame	
	Mass Wall	N/A			
	Basement	R-10 continuous +	R-19 cavity		
	Crawl Space	N/A			
Floors	Over unconditioned space	R-30 cavity			
	Slab Edge	R-10 continuous	4ft deep		
Ducts Outside	Attic	R-8			
Conditioned Space	Other	R-6			
FENESTRATION RATING					
Window	NFRC U-Factor	U-0.27	NFRC SHGC	0.36	
Opaque Door		U-0.32		0.35	
Skylight		U-0.5		0.36	
AIR LEAKAGE TEST RESULTS					
Blower Door	2.7	ACH/50Pascals	**Duct Testing**	4.0	cfm/100ft²
EQUIPMENT PERFORMANCE					
Heating System	Gas-fueled Hot Water Boiler	140,000 Btu/h	**Efficiency**	91.4%	AFUE
Cooling System	Split System Air Conditioner	54,000 Btu/h		16	SEER
Water Heater	Gas-fueled Water Heater	75,100 Btu/h ~ 98 gallon storage		0.49	EF
Indicate if the following have been installed (an efficiency shall not be listed)					
☐ Electric Furnace	☐ Gas-Fire Unvented Room Heater	☐ Baseboard Electric Heater	☐ Other:		
NOTES:					

2. **R402.4.1.2 – Air Leakage testing**: this building, unless it was greater than 10,000 sqft would not be required to comply with blower door testing under the commercial provisions
3. **R403.6.2 – Mechanical ventilation** – this building would not be required to have mechanical supply ventilation unless under the residential provisions, as the NYC MC does not require ventilation.

Stringency: This change increases the stringency by requiring three additional requirements for commercial buildings that are 1- or 2-family homes.

Takeaway: This requirement aligns the energy code provisions for R-3 buildings that may fall within either the commercial provisions or the residential provisions, depending on the height of the building.

26. C403 HVAC Efficiency

Description: The U.S. Department of Energy regulates the minimum efficiency of HVAC equipment that manufacturers are allowed to produce. Manufacturers are still allowed to sell equipment that is below the minimum efficiency, but they can no longer produce equipment below the minimum. During the 2018 IECC code adoption cycle, the federal minimum efficiencies were NOT updated to reflect the minimum federal efficiencies. The energy code adoption process occurs 3-5 years prior to jurisdictions adopting the code or standard. During this time, the federal government changes the minimum efficiency requirements of certain equipment. This code change aligns the minimum equipment efficiencies with the federal requirements as of June 2019.

Stringency: This code change increases the stringency by requiring a higher efficiency on certain HVAC systems.

Takeaway: This code change aligns the minimum efficiency requirements in our code with those set at the federal government for manufacturers. This ensures that lower efficiency equipment that may exist on the market, but can no longer be manufactured, does not end up in our buildings.

III. Stretch Code Items not Adopted

C403.8.1 Allowable Fan Power

1.13 Amendments to Section C403.8.1 Allowable Fan Horsepower

C403.8.1 Allowable fan horsepower (Mandatory). Each HVAC system having a total fan system motor nameplate horsepower exceeding 5 hp (3.7 kW) at fan system design conditions shall not exceed the allowable *fan system motor nameplate hp* (Option 1) or *fan system bhp* (Option 2) shown in Table C403.8.1(1). This includes supply fans, exhaust fans, return/relief fans, and fan-powered terminal units associated with systems providing heating or cooling capability. Single-zone variable air volume systems shall comply with the constant volume fan power limitation.

Exceptions:

1. Hospital, vivarium and laboratory systems that utilize flow control devices on exhaust or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.
2. Individual exhaust fans with motor nameplate horsepower of 1 hp (0.746 kW) or less are exempt from the allowable fan horsepower requirement.
3. Fans supplying air to active chilled beams.

1.14 Amendments to Table C403.8.1(1) Fan Power Limitation

Table C403.8.1(1)
Fan Power Limitation

	Limit	Constant volume	Variable volume
Option 1: Fan system motor nameplate hp	Allowable nameplate motor hp	hp ≤ CFM_s*0.0009	hp ≤ CFM_s* 0.0011
Option 2: Fan system bhp	Allowable fan system bhp	bhp ≤ CFM_s X 0.00088 + A	bhp ≤ CFM_s X 0.0010 + A

For SI: 1 bhp = 735.5 W, 1 hp = 745.5 W, 1 cfm = 0.4719 L/S
Where:
CFM_s = The maximum design supply airflow rate to conditioned spaces served by the system in cubic feet per minute.
hp = The maximum combined motor nameplate horsepower.
bhp = The maximum combined fan brake horsepower.
A = Sum of [PD X CFM_D/4131]
Where:
PD = Each applicable pressure drop adjustment from Table C403.8.1 (2) in. w.c.
CFM_D = The design airflow through each applicable device from Table C403.8.1(2) in cubic feet per minute.

The Stretch Code reduced allowable fan power energy usage by approximately 25% compared to the 2020 ECCCNYS. The design engineering community on the Energy Code Advisory Committee felt that this reduction in fan power was not a feasible limit, as the current equipment on the market exceeds these limits. Since this is a prescriptive requirement, projects would be forced to comply using energy modeling.

In October 2019, NYSERDA received concerns from Ingersoll-Rand (the parent company of Trane, an HVAC manufacturer) regarding the low fan power limits.

Takeaway: The NYCECC adopted the State's fan power limit requirement without amendment. The engineering community in NYC expressed concern that current HVAC equipment available on the market could not achieve the Stretch Code limits.

C405.10 Electric Vehicle Charging Station Capable

1.26 Addition of New Section C405.10 Electric Vehicle Charging Station Capable

C405.10 Electric vehicle charging station capable. New parking garages and new parking lots powered by the energy services for a building, and with 10 or greater parking spaces, shall provide either:

1. Panel capacity and conduit for the future installation of minimum 208/240V 40-amp outlets for 5 percent of the total parking spaces and not less than two parking spaces; or
2. Minimum 208/240V 40-amp outlets for 5 percent of the total parking spaces and not less than two parking spaces.

The Stretch Code added a requirement that all new parking garages and lots with 10 or more parking spaces shall provide the infrastructure for the future installation of electric vehicle charging stations for a minimum of 5% of the total spaces. A similar, although more stringent, requirement has been in the NYC Building Code since 2013, and requires that 20% of the spaces have electric vehicle charging station capability.

Excerpts from the 2014 NYC Building Code

406.2.11 Electric vehicle charging stations. Parking garages shall be capable of supporting electrical vehicle charging stations in accordance with this section. Electrical raceway to the electrical supply panel serving the garage shall be capable of providing a minimum of 3.1 kW of electrical capacity to at least 20 percent of the parking spaces of the garage. The electrical room supplying the garage must have the physical space for an electrical supply panel sufficient to provide 3.1kW of electrical capacity to at least 20 percent of the parking spaces of the garage. Such raceway and all components and work appurtenant thereto shall be in accordance with the *New York City Electrical Code*.

Exceptions:

1. The provisions of this section shall not apply to parking garages for buildings of Occupancy Group M (Mercantile).
2. The commissioner may waive compliance with this section if the commissioner determines that the parking garage is a temporary facility that will be in service no longer than 3 years.
3. The provisions of this section shall not apply to parking garages for buildings in which not less than fifty percent of the residential units are for households earning up to sixty percent of the area median income as determined by the United States Department of Housing and Urban Development.

406.7.11 Electric vehicle charging stations. Open parking lots shall be capable of supporting electric vehicle charging stations in accordance with this section. A minimum of 20 percent of the parking spaces in an open parking lot shall be equipped with electrical raceway capable of providing a minimum supply of 11.5 kVA to electrical vehicle supply equipment (EVSE) from an electrical supply panel. The raceways shall be no smaller than 1 inch (25 mm). The electrical supply panel serving such parking spaces must have at least 3.1 kW of available capacity for each stall connected to it with raceway. Such raceway and all components and work appurtenant thereto shall be in accordance with the *New York City Electrical Code*.

Exceptions:

1. The provisions of this section shall not apply to open parking lots for buildings of Occupancy Group M (Mercantile).
2. The commissioner may waive compliance with this section if the commissioner determines that the open parking lot is a temporary facility that will be in service no longer than 3 years.
3. The provisions of this section shall not apply to open parking lots for buildings in which not less than fifty percent of the residential units are for households earning up to sixty percent of the area median income as determined by the United States Department of Housing and Urban Development.

Takeaway: The Stretch Code amendment for electric vehicle charging station capability was not adopted because NYC has more stringent requirements. The 2014 NYCBC requires that parking garages and parking lots be equipped with the infrastructure for the future installation of electric vehicle charging stations in 20% of the spaces, whereas the Stretch Code requires only 5% of the spaces have this capability.

C405.11 Solar-Ready Zone

1.27 Addition of New Section C405.11
Solar-Ready Zone

C405.11 Solar-ready zone (Mandatory). New *buildings* shall comply with the provisions of Appendix CA.

This Stretch Code amendment requires that all new buildings comply with the requirements in Appendix CA – which, in the Stretch Code, requires that roofs be installed with the infrastructure to support the future installation of solar panels. These requirements apply only to buildings 5 stories or less in height.

This provisions was not adopted because NYC has more stringent requirements for solar. The recently adopted Local Laws 92 and 94 of 2019 require the installation of solar panels or green roofs on all new buildings and additions.

Takeaway: The Solar-Ready provisions of the Stretch Code were not adopted because NYC has more stringent requirements. Local Laws 92 and 94 of 2019 require that solar panels or green roofs are installed on every new building, whereas the Stretch Code only requires the infrastructure for the future installation of solar.

Appendix CC Additional Power Distribution System Packages

1.46 Addition of New Appendix CC
Additional Power Distribution System Packages—Commercial

Appendix CC
Additional power distribution system packages – Commercial

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

Section CC101
Scope

CC101.1 General. These provisions shall be applicable for new construction where additional power distribution system packages are required.

Section CC102
Additional Power Distribution System Packages

CC102.1 General (Mandatory). New buildings shall comply with at least one of the following:

1. Additional *on-site renewable energy* in accordance with Section CC102.2.
2. Electrical energy monitoring in accordance with Section CC102.3.
3. Interoperable automated demand-response (AutoDR) infrastructure in accordance with Section CC102.4.
4. Electric vehicle charging stations in accordance with Section CC102.5.
5. Automatic receptacle controls in accordance with CC102.6.

Appendix CC of the Stretch Code is a non-mandatory appendix that contains a list of 5 options that would be required for new buildings, if the jurisdiction adopted the appendix as mandatory. The NYC Advisory Committee strongly opposed adopting this appendix as they felt it would add additional cost to the project without savings additional energy. Additionally, with the adoption of Local Laws 92 and 94 of 2019, the 1st item in the list would be satisfied.

Takeaway: The Additional Power Distribution Packages in optional Appendix CC of the Stretch Code were not adopted. The NYC Energy Code Advisory Committee felt strongly that these provisions would cost additional money without energy savings. Additionally, Item 1 will be required by Local Laws 92 and 94 of 2019.