TEXT

(Part 1240)

Part 1240 of Title 19 of the Official Compilation of Codes, Rules and Regulations of the State of New York is repealed.

Title 19 of the Official Compilation of Codes, Rules and Regulations of the State of New York is amended by adding a new Part 1240, to read as follows:

Part 1240. STATE ENERGY CONSERVATION CONSTRUCTION CODE

Section 1240.1 State Energy Conservation Construction Code.

This Part and the publications incorporated by reference in this Part constitute the State Energy Conservation Construction Code (the Energy Code) promulgated pursuant to article 11 of the Energy Law.

Section 1240.2 Definitions.

For the purposes of this Part, the following words and phrases shall have the following meanings unless a different meaning is plainly required by the context:

(a) 2020 ECCCNYS. The term "2020 ECCCNYS" means the publication entitled "2020 Energy Conservation Construction Code of New York State" (publication date: June 2019) published by the International Code Council, Inc.

(b) 2020 ECCCNYS Commercial Provisions. The term "2020 ECCCNYS Commercial Provisions" means that part of the 2020 ECCCNYS that is designated as the "ECCCNYS - Commercial Provisions."

(c) 2020 ECCCNYS Residential Provisions. The term "2020 ECCCNYS Residential Provisions" means that part of the 2020 ECCCNYS that is designated as the "ECCCNYS - Residential Provisions."

(d) ASHRAE 90.1-2016. The term "ASHRAE 90.1-2016" means the publication entitled "ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings" (October, 2016 printing) published by American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.

(e) ASHRAE 90.1-2016 (as amended). The term "ASHRAE 90.1-2016 (as amended)" means ASHRAE 90.1-2016, as said publication is deemed to be amended by Section 1240.3 of this Part.

(f) Commercial building. The term "commercial building" includes any building that is not a residential building (as defined in subdivision [i] of this section).

(g) Energy Code. The term "Energy Code" means the State Energy Conservation Construction Code.

(h) Historic building. The term "historic building" means an existing building or structure that:

(1) is listed in the New York State Register of Historic Places, either individually or as a contributing building to a historic district; or

(2) is listed in the National Register of Historic Places, either individually or as a contributing building to a historic district; or

(3) has been determined to be eligible for listing in either the New York State or National Register of Historic Places, either individually or as a contributing building to a historic district, by the New York State Commissioner of Parks, Recreation and Historic Preservation; or

(4) has been determined to be eligible for listing in the National Register of Historic Places, either individually or as a contributing building to a historic district, by the U.S. Secretary of the Interior.

(i) Residential building. The term "residential building" includes:

(1) detached one-family dwellings having not more than three stories above grade plane;

(2) detached two-family dwellings having not more than three stories above grade plane;

(3) townhouse units; and

(4) buildings that:

(i) are classified in accordance with chapter 3 of the publication entitled 2020 BCNYS in Group R-2, R-3 or R-4; and

(ii) have not more than three stories above grade plane;

(5) factory manufactured homes (as defined in section 372[8] of the Executive Law); and

(6) mobile homes (as defined in section 372[13] of the Executive Law).

(j) Townhouse unit. The term "townhouse unit" means a single-family dwelling unit constructed in a group of three or more attached units in which each unit:

(1) extends from the foundation to roof;

(2) has open space on at least two sides; and

(3) has a separate means of egress.

Section 1240.3 Amendments made to ASHRAE 90.1-2016

For the purposes of applying ASHRAE 90.1-2016 in New York State, ASHRAE 90.1-2016 shall be deemed to be amended in the following manner:

(a) Amendments to Section 3.2 (Definitions). The definitions of the terms "building," "historic," and "secondary sidelighted area" (which is included under the definition of "daylight area") in Section 3.2 of ASHRAE 90.1-2016 shall be deemed to be amended as follows:

(1) The definition of "building" shall be deemed to be amended and restated in its entirety to read as follows:

building: any structure used or intended for supporting or sheltering any use or occupancy or for affording shelter to persons, animals or property, together with (A) any equipment, mechanical systems, service water heating systems, and electric power and lighting systems located in such structure, and (B) any mechanical systems, service water heating systems, and electric power and lighting systems located on the site where such structure is located and supporting such structure. The term "building" shall include, but shall not be limited to, factory manufactured homes (as defined in section 372(8) of the Executive Law) and mobile homes (as defined in section 372(13) of the Executive Law).

(2) The definition of "historic" shall be deemed to be amended and restated in its entirety to read as follows:

historic (or *historic building*): any building that (1) is listed in the New York State Register of Historic Places, either individually or as a contributing building to a historic district; or (2) is listed in the National Register of Historic Places, either individually or as a contributing building to a historic district; or (3) has been determined to be eligible for listing in either the New York State or National Register of Historic Places, either individually or as a contributing building to a historic district, by the New York State Commissioner of Parks, Recreation and Historic Preservation; or (4) has been determined to be eligible for listing in the National Register of Historic Places, either individually or as a contributing building to a historic district, by the U.S. Secretary of the Interior.

(3) In the definition of "secondary sidelighted area" (which is included under the definition of "daylight area"), the phrase "5 ftor higher" in the last sentence shall be deemed to be amended to read as follows "5 ft. or higher".

(b) Amendment to Section 3.3 (Abbreviations and Acronyms). The meaning of "IES" in Section 3.3 of ASHRAE 90.1-2016 shall be deemed to be amended to read as follows: "Illuminating Engineering Society."

(c) Amendment to Section 4.2.1.3 (Alterations of existing buildings). The exception to Section 4.2.1.3 of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

Exception to 4.2.1.3

Historic buildings need not comply with these requirements.

(d) Amendment to Section 5.9.1 (Inspections). Section 5.9.1 of ASHRAE 90.1-2016 shall be deemed to be amended to add the following informative note immediately after the section:

Informative Note: See Appendix E for commissioning references.

(e) Amendment to Section 6.4.3.11.1 (Monitoring). The last sentence of Section 6.4.3.11.1 of ASHRAE 90.1-2016 shall be deemed to be amended to read as follows:

The *efficiency* shall be calculated in kW/ton (see Appendix E).

(f) Amendment to Section 6.4.4.2.2 (Duct Leakage Tests). The equation in Section 6.4.4.2.2 of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

$L_{max} = C_L P^{0.65}$

where

L_{max} = maximum permitted leakage, cfm per 100 ft² of duct surface area

C_L = 4, duct leakage class, cfm per 100 ft² of duct surface area per in. of water$^{0.65}$

P = test pressure, which shall be equal to the design duct pressure class rating, in. of water

(g) Amendment to Section 6.5.4.4 (Chilled- and Hot-Water Temperature Reset Controls). Exception 3 in the Exceptions to Section 6.5.4.4 of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

3. Water temperature *reset* is not required where the valve position is used to comply with Section 6.5.4.2.

(h) Amendment to Table 6.8.1-10 (Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps – Minimum *Efficiency* Requirements). The entry for equipment type subcategory "*VRF* groundwater source (cooling mode)" in Table 8.8.1-10 of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum *Efficiency*	Test Procedure
VRF groundwater source (cooling mode)	<135,000 Btu/h	All	*VRF* multisplit *system* 59°F entering water	16.2 *EER*	AHRI 1230
			VRF multisplit *system* with heat recovery 59°F entering water	16.0 *EER*	
	≥135,000 Btu/h		*VRF* multisplit *system* 59°F entering water	13.8 *EER*	
			VRF multisplit *system* with heat recovery 59°F entering water	13.6 *EER*	

(i) Amendment to Table 6.8.3-1 (Minimum *Piping* Insulation Thickness Heating and Hot Water Systems [Steam, Steam Condensate, Hot-Water Heating and Domestic Water *Systems*]). Note e of Table 6.8.3-1 of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

e. The table is based on steel pipe. Nonmetallic pipes schedule 80 thickness or less shall use the table values. For other nonmetallic pipes having *thermal resistance* greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per foot than a steel pipe of the same size with the insulation thickness shown in the table.

(j) Amendment to Section 9.4.1.1(g) (Interior Lighting Controls – *Automatic partial OFF* [*full Off complies*]). The Exception to Section 9.4.1.1(g) of ASHRAE 90.1-2016 shall be deemed to be amended and restated in its entirety to read as follows:

Exception to 9.4.1.1(g)

This requirement does not have to be complied with in *spaces* that meet all four of the following requirements:

1. The *space* has an installed *LPD* of no more than 0.80 W/ft^2.

2. The space is lighted by *HID* lamp.

3. The *general lighting* power in the *space* is automatically reduced by at least 30% within 20 minutes of all occupants leaving the *space*.

4. Lighting load does not exceed 0.02 W/ft^2 multiplied by the *gross lighted area* of the *building*.

(k) Amendment to Section 9.4.1.1(h) (Interior Lighting Controls – *Automatic full OFF*). The Exceptions to Section 9.4.1.1(h) of ASHRAE 90.1-2016 shall be deemed to be amended by adding a new exception 4, to read as follows:

4. Lighting load not exceeding 0.02 W/ft^2 multiplied by the *gross lighted area* of the *building*.

(l) Amendment to Section 12 (Normative References). The entry in the "Reference" column of Section 12 of ASHRAE 90.1-2016 that currently reads "AHRI 340/360-2015 (I-P) and AHRI 340/360-2015 (SI)" shall be deemed to be amended to read as follows: "AHRI 340/360-2015."

(m) Amendments to Informative Appendix E (Informative References). The table in Informative Appendix E of ASHRAE 90.1-2016 shall be deemed to be amended by adding two new rows for Subsection 5.9.1; amending the row for Subsection 6.7.2.3 by changing Subsection 6.7.2.3 to Subsection 6.7.2.4; amending the two rows for Subsection 6.7.2.3 by changing Subsection 6.7.2.3 to Subsection 6.7.2.3.1; and adding two new rows for Subsection 6.7.2.4, such new rows and such amended rows to read as follows:

Subsection No.	Reference	Title/Source
5.9.1	ASTM E2947-14	Standard Guide for Building Enclosure Commissioning
5.9.1	ASTM E2813-12	Standard Practice for Building Enclosure Commissioning
6.7.2.4	NEBB Procedural Standards—2013	Procedural Standards for Building Systems Commissioning
6.7.2.3.1	AABC 2002	Associated Air Balance Council, National Standards for Total System Balance
6.7.2.3.1	ASHRAE Standard 111-2008	Measurement, Testing, Adjusting and Balancing of Building HVAC Systems
6.7.2.4	ASHRAE Standard 202-2013	Commissioning Process for Buildings and Systems
6.7.2.4	ASHRAE Guideline 0-2013	The Commissioning Process

(n) Amendments to Section G3.1.3.11 (Heat Rejection [Systems 7, 8, 9, 12, and 13]). Section G3.1.3.11 in Normative Appendix G of ASHRAE 90.1-2016 shall be deemed to be amended by replacing the term "water-side economizer" with the term "fluid economizer" in each of the two places in Section G3.1.3.11 where the term "water-side economizer" appears.

(o) Amendments to Table G3.1.1-3 (Baseline *HVAC System* Types). Table G3.1.1-3 in Normative Appendix G of ASHRAE 90.1-2016 shall be deemed to be amended by replacing the term *residential* with the term *nonresidential* in each of the last three rows of the Table.

(p) Amendment to Table H-1 (Addenda to ANSI/ASHRAE/IES Standard 90.1-2013). Table H-1 in Informative Appendix H of ASHRAE 90.1-2016 shall be deemed to be amended by replacing the term "unlabled" with "unlabeled" in the entry for Addendum "ad."

(q) Amendment to Section Annex1-1: ASHRAE Standard 169-2013, Section A3: Climate Zone Definitions. The sentence immediately following item b.3 in "Section Annex1-1: ASHRAE Standard 169-2013, Section A3: Climate Zone Definitions" in Annex1-1 of ASHRAE 90.1-2016 shall be deemed to be

amended to read as follows: “Use the third criteria below for determining the Dry/Humid threshold if not Marine (C).”

(r) Amendments to Footnotes: Footnote 1 on page 10 and Footnote 2 on page 249 of ASHRAE 90.1-2016 shall be deemed to be amended to read as follows: “Schedules and internal loads by building area type are found at http://sspc901.ashraepcs.org/documents.php.”

Section 1240.4 Energy Code provisions applicable to commercial buildings.

(a) 2020 ECCCNYS Commercial Provisions. Except as otherwise provided in section 1240.6 of this Part, the construction of all new commercial buildings; all additions to, alterations of, and/or renovations of existing commercial buildings; and all additions to, alterations of, and/or renovations of building systems in existing commercial buildings shall comply with the requirements of the 2020 ECCCNYS Commercial Provisions. The 2020 ECCCNYS Commercial Provisions are incorporated herein by reference. Copies of the 2020 ECCCNYS (which includes the 2020 ECCCNYS Commercial Provisions) may be obtained from the publisher at the following address:

International Code Council, Inc.

500 New Jersey Avenue, NW, 6th Floor

Washington, DC 20001

The 2020 ECCCNYS is available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(b) ASHRAE 90.1-2016 (as amended). To the extent provided in the 2020 ECCCNYS Commercial Provisions, compliance with the requirements of ASHRAE 90.1-2016 (as amended) shall be permitted in lieu of compliance with specified sections of the 2020 ECCCNYS Commercial Provisions. ASHRAE 90.1-2016 (as amended) is ASHRAE 90.1-2016, as said publication is deemed to be amended by section 1240.3 of this Part.

ASHRAE 90.1-2016 is incorporated herein by reference. Copies of ASHRAE 90.1-2016 may be obtained from the publisher electronically at http://www.techstreet.com/ashrae?ashrae_auth_token, or at the following address:

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

ASHRAE 90.1-2016 is available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(c) Referenced standards. The referenced standards listed in Chapter 6 of the 2020 ECCCNYS Commercial Provisions are considered to be part of the 2020 ECCCNYS Commercial Provisions, subject to the provisions and limitations set forth in sections C107.l, C107.1.1, and C107.1.2 of the 2020 ECCCNYS Commercial Provisions. The following referenced standards are incorporated herein by reference and shall be considered to be part of the 2020 ECCCNYS Commercial Provisions, subject to the provisions and limitations set forth in sections C107.l, C107.1.1, and C107.1.2 of the 2020 ECCCNYS Commercial Provisions:

(1) AAMA. The following publication published by the American Architectural Manufacturers Association is incorporated herein by reference: North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights, publication date 2017 (AAMA/WDMA/CSA 101/I.S.2/A C440-17). Copies of said publication may be obtained from the publisher at the following address:

American Architectural Manufacturers Association

1827 Walden Office Square, Suite 550

Schaumburg, IL 60173-4268

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-000l.

(2) AHRI. The following publications published by the Air Conditioning, Heating, and Refrigeration Institute are incorporated herein by reference:

(i) Performance Rating of Room Fan Coils, publication date 2008 (AHRI 440-08); and

(ii) Performance Rating of Unit Ventilators, publication date 2015 (AHRI 840-15).

Copies of said publications may be obtained from the publisher at the following address:

Air Conditioning, Heating, and Refrigeration Institute

2111 Wilson Blvd, Suite 500

Arlington, VA 22201

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(3) ASHRAE. The following publications published by American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. are incorporated herein by reference:

(i) ASHRAE HVAC Systems and Equipment Handbook - 2016, publication date 2016 (ASHRAE-2016);

(ii) ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings, October 2016 printing (ASHRAE 90.1-2016) (NOTE: ASHRAE 90.1-2016 is published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., is jointly sponsored by the lluminating Engineering Society of North America and the American National Standards Institute, and is also known as ANSI/ASHRAE/IES 90.1-2016); and

(iii) Peak Cooling and Heating Load Calculations in Buildings, Except Low-Rise Residential Buildings, publication date 2014 (ANSI/ASHRAE/ACCA Standard 183-2007 [RA 2014]).

Copies of said publications may be obtained from the publisher at the following address:

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

1791 Tullie Circle NE

Atlanta, GA 30329

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(4) ASTM. The following publications published by ASTM International are incorporated herein by reference:

(i) Standard Test Method for Determining Air Leakage Rate by Fan Pressurization, publication date 2010 (ASTM E 779-10);

(ii) Specification for Air Barrier (AB) Material or System for Low-Rise Framed Building Walls, publication date 2011 (ASTM E 1677-11); and

(iii) Standard Test Methods for Determining Airtightness of Building Using an Orifice Blower Door, publication date 2011 (ASTM E1827-11).

Copies of said publications may be obtained from the publisher at the following address:

ASTM International

100 Barr Harbor Drive, P.O. Box C700

West Conshohocken, PA 19428-2859

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(5) ICC. The following publications published by International Code Council, Inc. are incorporated herein by reference:

(i) 2020 Building Code of New York State (publication date: June 2019);

(ii) 2020 Fire Code of New York State (publication date: June 2019);

(iii) 2020 Fuel Gas Code of New York State (publication date: June 2019);

(iv) 2020 Mechanical Code of New York State (publication date: June 2019);

(v) 2020 Plumbing Code of New York State (publication date: June 2019);

(vi) 2020 Property Maintenance Code of New York State (publication date: June 2019); and

(vii) 2020 Residential Code of New York State (publication date: June 2019).

Copies of said publications may be obtained from the publisher at the following address:

International Code Council, Inc.

500 New Jersey Avenue, NW, 6th floor

Washington, DC 20001

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(6) NFPA. The following publication published by National Fire Protection Association is incorporated hereby by reference: *National Electrical Code*, publication date 2017 (NFPA 70-17).

Copies of said publication may be obtained from the publisher at the following address:

National Fire Protection Association

One Batterymarch Park

Quincy, MA 02169-7471

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(7) SMACNA. The following publication published by Sheet Metal and Air Conditioning Contractors National Association, Inc. is incorporated herein by reference: HVAC Air Duct Leakage Test Manual Second Edition, publication date 2012 (SMACNA-2012).

Copies of said publication may be obtained from the published at the following address:

Sheet Metal and Air Conditioning Contractors' National Association, Inc.

4021 Lafayette Center Drive

Chantilly, VA 20151-1209

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(8) UL. The following publications published by Underwriters Laboratory are incorporated herein by reference:

(i) Oil-Fired Central Furnaces - with Revisions through October 2013, publication date 2013 (UL 727-06); and

(ii) Oil-fired Unit Heaters - with Revisions through October 2013, publication date 2013 (UL 731-95).

Copies of said publications may be obtained from the publisher at the following address:

Underwriters Laboratories

333 Pfingsten Road

Northbrook, IL 60062-2096

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

Section 1240.5 Energy Code provisions applicable to residential buildings.

(a) 2020 ECCCNYS Residential Provisions. Except as otherwise provided in section 1240.6 of this Part, the construction of all new residential buildings; all additions to, alterations of, and/or renovations of existing residential buildings; and all additions to, alterations of, and/or renovations of building systems in existing residential buildings shall comply with the requirements of the 2020 ECCCNYS Residential Provisions. The 2020 ECCCNYS Residential Provisions are incorporated herein by reference. Copies of the 2020 ECCCNYS

(which includes the 2020 ECCCNYS Residential Provisions) may be obtained from the publisher at the following address:

International Code Council, Inc.

500 New Jersey Avenue, NW, 6th Floor

Washington, DC 20001

The 2020 ECCCNYS is available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(b) Referenced standards. The referenced standards listed in Chapter 6 of the 2020 ECCCNYS Residential Provisions are considered to be part of the 2020 ECCCNYS Residential Provisions, subject to the provisions and limitations set forth in sections Rl07.1, Rl07.1.1, and R107.l.2 of the 2020 ECCCNYS Residential Provisions. The following referenced standards are incorporated herein by reference and shall be considered to be part of the 2020 ECCCNYS Residential Provisions, subject to the provisions and limitations set forth in sections Rl07.1, R107.1.1, and R107.1.2 of the 2020 ECCCNYS Residential Provisions:

(1) AAMA. The following publication published by the American Architectural Manufacturers Association is incorporated herein by reference: North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights, publication date 2017 (AAMA/WDMA/CSA 101/I.S.2/A C440-17). Copies of said publication may be obtained from the publisher at the following address:

American Architectural Manufacturers Association

1827 Walden Office Square, Suite 550

Schaumburg, IL 60173-4268

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-000l.

(2) ACCA. The following publications published by Air Conditioning Contractors of America are incorporated herein by reference:

(i) Residential Load Calculation, eighth edition, publication date 2011 (Manual J - 2011); and

(ii) Residential Equipment Selection, publication date 2013 (Manual S-13).

Copies of said publications may be obtained from the publisher at the following address:

Air Conditioning Contractors of America

2800 Shirlington Road, Suite 300

Arlington, VA 22206

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(3) ANSI. The following publication published by American National Standards Institute is hereby incorporated herein by reference: Method for Measuring Floor Area in Office Buildings, publication date 1996 (Z65-96). Copies of said publication may be obtained from the publisher at the following address:

American National Standards Institute

25 West 43rd Street, Fourth Floor

New York, NY 19936

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(4) ASHRAE. The following publications published by American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. are incorporated herein by reference:

(i) ASHRAE Handbook of Fundamentals - 2017, publication date 2017 (ASHRAE - 2017); and

(ii) 2001 ASHRAE Handbook of Fundamentals, publication date 2001 (ASHRAE - 2001).

Copies of said publications may be obtained from the publisher at the following address:

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc

1791 Tullie Circle, NE

Atlanta, GA 30329-2305

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

(5) ASTM. The following publications published by ASTM International are incorporated herein by reference:

(i) Standard Test Method for Determining Air Leakage Rate by Fan Pressurization, publication date 2010 (ASTM E 779-10); and

(ii) Standard Test Method for Determining Airtightness of Building Using an Orifice Blower Door, publication date 2011 (ASTM E 1827-11).

Copies of said publications may be obtained from the publisher at the following address:

ASTM International

100 Barr Harbor Drive, P.O. Box C700

West Conshohocken, PA 19428-2859

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington A venue, Albany, NY 12231-0001.

(6) ICC. The following publications published by International Code Council, Inc. are incorporated herein by reference:

(i) 2020 Building Code of New York State (publication date: June 2019);

(ii) 2020 Fire Code of New York State (publication date: June 2019);

(iii) 2020 Fuel Gas Code of New York State (publication date: June 2019);

(iv) 2020 Mechanical Code of New York State (publication date: June 2019);

(v) 2020 Plumbing Code of New York State (publication date: June 2019);

(vi) 2020 Property Maintenance Code of New York State (publication date: June 2019);

(vii) 2020 Residential Code of New York State (publication date: June 2019);

(viii) Standard for the Calculation and Labeling of the Energy Performance of Low-rise Residential Buildings using an Energy Rating Index First Published March 7, 2014, publication date January 2016 (ANSI/RESNET/ICC 301-2014);

(ix) Standard for Testing Airtightness for Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems and Airflow of Mechanical Ventilation Systems, publication date January 2016 (ANSI/RESNET/ICC 380-2016);

(x) 2015 International Energy Conservation Code, publication date 2015 (IECC-2015); and

(xi) Energy Conservation Construction Code of New York State, publication date 2010.

Copies of said publications may be obtained from the publisher at the following address:

International Code Council, Inc.

500 New Jersey Avenue, NW, 6th Floor

Washington, DC 20001

Copies of said publications are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 1223 1-0001.

(7) NFPA. The following publication published by National Fire Protection Association is incorporated herein by reference: National Electric Code, publication date 2017 (NFPA 70-17). Copies of said publication may be obtained from the publisher at the following address:

National Fire Protection Association

One Batterymarch Park

Quincy, MA 02169-7471

Copies of said publication are available for public inspection and copying at the Office of the New York State Department of State located at One Commerce Plaza, 99 Washington Avenue, Albany, NY 12231-0001.

Section 1240.6 Exceptions.

(a) Historic buildings. The Energy Code shall not apply to the alteration or renovation of an historic building.

(b) Certain alterations. The Energy Code shall not apply to the following alterations of existing buildings, provided that the alteration will not increase the energy usage of the building:

(1) storm windows installed over existing fenestration;

(2) glass only replacements in an existing sash and frame;

(3) existing ceiling, wall, or floor cavities exposed during construction provided that these cavities are filled with insulation;

(4) construction where the existing roof, wall, or floor cavity is not exposed;

(5) reroofing for roofs where neither the sheathing nor the insulation is exposed; roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing;

(6) replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates such conditioned space from the exterior shall not be removed;

(7) alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power; and

(8) alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the alteration does not increase the installed interior lighting power.

REGULATORY IMPACT STATEMENT
(Energy Code)

1. STATUTORY AUTHORITY.

This proposed rulemaking would repeal the current version of the State Energy Conservation Construction Code (Energy Code), the building energy code adopted by the State Fire Prevention and Building Code Council (Code Council) and adopt new text for the code pursuant to Article 11 of the Energy Law. The current version of the Energy Code is set forth in (1) the 2015 International Energy Conservation Code (the "2015 IECC"), (2) the 2013 edition of the *Energy Standard for Buildings Except Low Rise Residential Buildings* ("ASHRAE 90.1-2013"), and (3) the 2016 Supplement to the New York State Energy Conservation Construction Code (the "2016 Energy Code Supplement"). This proposed rule would repeal the existing text of the Energy Code and adopt new text set forth in (1) the 2020 Energy Conservation Construction Code of New York State, and (2) the 2016 edition of the *Energy Standard for Buildings Except Low Rise Residential Buildings* ("ASHRAE 90.1-2016"). For the purposes of applying ASHRAE 90.1-2016 in New York State, ASHRAE 90.1-2016 will be deemed to be amended in the manner provided in Part 1240 as proposed by this rule. This proposed rule is authorized by Energy Law §11-103(2).

2. LEGISLATIVE OBJECTIVES.

Energy Law §3-101(2) states that it shall be the energy policy of New York State "to encourage conservation of energy in the construction and operation of new commercial, industrial, and residential buildings, and in the rehabilitation of existing structures, through heating, cooling, ventilation, lighting, insulation and design techniques and the use of energy audits and life-cycle costing analyses."

Energy Law §11-101 provides that in furtherance of the above-quoted energy policy, an Energy Code shall be adopted "to protect the health, safety and security of the people of the State and to assure a continuing supply of energy for future generations." Energy Law §11-101 also provides that the Energy Code shall

"mandate that economically reasonable energy conservation techniques be used in the design and construction of all new public and private buildings in New York."

Energy Law §11-104 provides that the Energy Code shall be designed to satisfy specific criteria, including the following: (1) the Energy Code's standards and requirements, so far as may be practicable, shall be formulated in terms of performance objectives; (2) to the fullest extent feasible, use of modern technical methods, devices and improvements which tend to minimize consumption of energy and utilize to the greatest extent practical solar and other renewable sources of energy without affecting reasonable requirements for the health, safety and security of the occupants or users of buildings shall be permitted; (3) as far as may be practicable, the improvement of energy conservation construction practices, methods, equipment, materials and techniques shall be encouraged; and (4) the Energy Code shall provide reasonable uniform standards and requirements for construction and construction materials for the improvement of energy conservation construction practices.

Energy Law §11-103(2) provides that the Energy Code, as amended from time to time, should remain "cost effective" with respect to building construction. Energy Law §11-103(2) further provides that "[i]n determining whether the [Energy Code] remains cost effective, the code council shall consider whether the cost of materials and their installation to meet its standards would be equal to or less than the present value of energy savings that could be expected over a ten year period in the building in which such materials are installed."

Energy Law §11-103(2) also provides that the Energy Code for commercial buildings must meet or exceed the 2007 edition of the publication entitled "Energy Standard for Buildings Except Low-Rise Residential Buildings" (ASHRAE 90.1), or achieve equivalent or greater energy savings; and that the Energy Code for residential buildings must meet or exceed the then most recently published edition of the publication entitled "International Energy Conservation Code" ("IECC"), or achieve equivalent or greater energy savings.

The current version of the Energy Code for commercial buildings equals or exceeds the 2013 edition of ASHRAE 90.1 ("ASHRAE 90.1-2013"). The proposed rule will amend the Energy Code for commercial buildings to a code that equals or exceeds the 2016 edition of ASHRAE 90.1 ("ASHRAE 90.1-2016"). The United States Department of Energy (DOE) previously issued a determination indicating that ASHRAE 90.1-2013 exceeds the 2007 edition of ASHRAE 90.1 ("ASHRAE 90.1- 2007"). DOE recently issued a determination indicating that the ASHRAE 90.1-2016 exceeds ASHRAE 90.1-2013. Since ASHRAE 90.1-2016 exceeds ASHRAE 90.1-2013, and since ASHRAE 90.1-2013 exceeds ASHRAE 90.1-2007, ASHRAE 90.1-2016 exceeds ASHRAE 90.1-2007. Therefore, the Energy Code, as proposed by this rule, will satisfy that part of Energy Law §11- 103(2) that requires the Energy Code for commercial buildings to meet or exceed ASHRAE 90.1-2007.

The current version of the Energy Code for residential buildings is based on the 2015 edition of the IECC ("the "2015 IECC"). The proposed rule will amend the Energy Code for residential buildings to a code that includes the "Residential Provisions" of the 2020 Energy Conservation Construction Code of New York State (2020 ECCCNYS) based upon the most recent (2018) edition of the IECC (the "2018 IECC"). Therefore, the Energy Code, as proposed by this rule, will satisfy that part of Energy Law §11-103(2) that requires the Energy Code for residential buildings to meet or exceed the most recent edition of the IECC.

As more fully discussed below in Part 3 "General Needs, Benefits, and Costs" of this Regulatory Impact Statement, it is anticipated that (1) buildings that comply with the Energy Code, as proposed by this rule, will use less energy than buildings that comply with the current Energy Code; (2) on average, the Energy Code, as proposed by this rule, will be cost effective for commercial buildings and for residential buildings; and (3) on average, the increase in the cost of constructing a commercial or residential building according to the requirements of the Energy Code as proposed by this rule over the cost of constructing a similar commercial or residential building according to the requirements of the current version of the Energy Code

will be less than the present value of the of savings in energy costs that could be expected over a ten year period. Based on the foregoing, the Department of State and the Code Council believe that this proposed rule will encourage conservation of energy in the construction and operation of new commercial, industrial and residential buildings; protect the health, safety and security of the people of the State by helping to assure a continuing supply of energy for future generations; maximize the extent to which the use of modern technical methods, devices and improvements which tend to minimize consumption of energy will be permitted; encourage the improvement of energy conservation construction practices, methods, equipment, materials and techniques; mandate that economically reasonable energy conservation techniques be used; provide a cost effective building energy code for commercial buildings and residential buildings; and otherwise help achieve the legislative objectives described above in this Part 2 "Legislative Objectives."

In addition, this proposed rule will ensure that the Energy Code complies with Title III of the Federal Energy Conservation and Production Act (42 U.S.C. 6831, et. seq.).[1]

3. NEEDS AND BENEFITS.

Purpose.

The purpose of this proposed rule is to amend and update the Energy Code in its entirety. The provisions of the Energy Code that apply to commercial buildings will be updated from a code that equals or exceeds the requirements of ASHRAE 90.1-2013 to a code that equals or exceeds the requirements of ASHRAE 90.1-2016. The provisions of the Energy Code that apply to residential buildings will be updated from a code based on the 2015 IECC to a code based on the 2020 ECCCNYS (primarily based on the 2018

[1] 42 U.S.C. § 6833(b) provides that when the U.S. Department of Energy ("DOE") determines that commercial buildings constructed to a revised edition of ASHRAE 90.1 would achieve greater energy efficiency than buildings constructed to the prior edition of ASHRAE 90.1, states are required to update their energy codes for commercial buildings to codes that meet or exceed the revised edition of ASHRAE 90.1.

IECC).

Necessity.

This proposed rule is necessary to encourage conservation of energy in the construction and operation of new commercial and industrial buildings; to protect the health, safety and security of the people of the State by helping to assure a continuing supply of energy for future generations; to maximize the extent to which the use of modern technical methods, devices and improvements which tend to minimize consumption of energy will be permitted; to encourage the improvement of energy conservation construction practices, methods, equipment, materials and techniques; to mandate that economically reasonable energy conservation techniques be used; to provide a cost effective building energy code for commercial buildings; and to otherwise help achieve the legislative objectives described above in Part 2 "Legislative Objectives" of this Regulatory Impact Statement.

In addition, this proposed rule is necessary to ensure that the Energy Code will comply with Title III of the Federal Energy Conservation and Production Act.

The more significant changes to the Energy Code to be implemented by this proposed rule, and the needs and benefits associated with each such change, are discussed in greater detail below.

Benefits.

The principal benefits to be derived from this proposed rule will be (1) the reduction in the energy used by buildings that comply with the Energy Code as amended by this proposed rule, and (2) the savings in energy costs to be realized by owners of buildings that comply with the Energy Code as amended by this proposed rule. The Energy Code as amended by this proposed rule will also be more user friendly than the current Energy Code in that all provisions (if not using the ASHRAE 90.1 compliance option) will be contained within one publication, the 2020 ECCCNYS, as opposed to the current Energy Code which is comprised of both the 2015 IECC and the 2016 Supplement to the New York State Energy Conservation

Construction Code (Revised August 2016). For commercial buildings, the flexibility to utilize either the 2020 ECCCNYS or ASHRAE 90.1 is still available. The principal benefits to be derived from this proposed rule include the following:

Cost Effective. The Department of State anticipates that the Energy Code, as amended by this proposed rule will be cost effective, and that on average, building owners will receive a net economic benefit from this proposed rule. More specifically, the Department of State anticipates that, on average, when comparing a building constructed to the requirements of the Energy Code as amended by this proposed rule to a similar building constructed to the requirements of the current version of the Energy Code, the present value of the annual savings in energy costs over a 30-year period will exceed the sum of (1) the increase in initial construction costs, plus (2) the present value of the increase in maintenance costs over that 30-year period, plus (3) the present value of the increase in replacement costs over that 30-year period.

Pay-back. The Department of State also anticipates that, on average, the increase in initial construction costs resulting from constructing a building to the requirements of the Energy Code as amended by this proposed rule rather than the requirements of the current version of the Energy Code will be less than the present value of the savings in energy costs over 10 years.

Compliance with NYS Energy Law. This proposed rule will assure that the provisions of the Energy Code applicable to commercial buildings will continue to meet or exceed ASHRAE 90.1-2007 and that the provisions of the Energy Code applicable to residential buildings will continued to meet or exceed the most recent edition (now the 2018 edition) of the IECC, as required by NYS Energy Law §11-103(2).

Compliance with Federal Law. This proposed rule will ensure that the Energy Code complies with Title III of the Federal Energy Conservation and Production Act.

Consistency with National Practices. This proposed rule will also ensure that energy conservation construction practices in New York State remain consistent with national practices. It is expected that many

other States will (1) update their building energy codes for commercial buildings to codes that meet or exceed ASHRAE 90.1-2016 and (2) update their building energy codes for residential buildings to codes that meet or exceed the "Residential Provisions" of the 2018 IECC. The Department of State and the Code Council believe that maintaining consistency with national practices will make it easier and less expensive for regulated parties to comply with the Energy Code.

Reduced Demand for Energy from Non-renewable Sources. By reducing energy demands in a cost effective manner, as required by Energy Law §11-103, this proposed rule will reduce demand for energy from nonrenewable sources. As new buildings constructed in accordance with the amended Energy Code for commercial buildings replace older, less energy efficient buildings, energy use should be further reduced. New York State will benefit from the consequent reductions of dependence on imported fossil fuels and the reduction in associated emissions produced by their use.

The more significant changes to the Energy Code to be implemented by this proposed rule, and the needs and benefits associated with each such change, are discussed in greater detail below.

Commercial Provisions of 2020 ECCCNYS

Studies Used

The studies, reports, and analyses which served as the basis for the part of this proposed rule that applies to commercial buildings include:

(1) Notice of Determination. Issued by the U.S. Department of Energy ("DOE") and published in the Federal Register on February 27, 2018 in 83 Federal Register at 8463.[2] This Notice (hereafter referred to as the "DOE Commercial Notice of Determination") indicates that DOE has determined that buildings constructed to the requirements of ASHRAE 90.1-2016 would improve overall energy efficiency in buildings

[2] https://www.govinfo.gov/content/pkg/FR-2018-02-27/pdf/2018-03931.pdf

subject to the energy code compared to the requirements of ASHRAE 90.1-2013. See 83 Federal Register 8463 (February 27, 2018) at 8464.

(2) Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2016. Prepared by Pacific Northwest National Laboratory ("PNNL"), Richland, WA (R. Hart, R. Athalye, Y. Xie, J. Zhang, M. Halverson, M. Rosenberg, B. Liu, V. Mendon, S. Goel, Y. Chen, and M. Zhao, publication date October 2017).[3] According to this most recent national analysis of ASHRAE 90.1-2016, new commercial buildings meeting the requirements of the updated standard will experience on average, an 8.3 % energy costs savings over new commercial buildings designed to ASHRAE 90.1 -2013. The prototypes selected for this analysis are those used by PNNL in previous NYS specific analyses to determine the cost effectiveness of ASHRAE 90.1 for its national and NYS specific analyses. Specifically, the PNNL "Energy Savings Analysis" considered six commercial building prototypes (small office, large office, standalone retail, primary school, small hotel, and mid-rise apartment) in five climate zones, including two of the three climate zones found in New York State (4A and 5A). Also noted, the cities selected for climate zones 4A and 5A were also the same cities previously used by PNNL in both the 2016 and 2013 reports; namely, New York City, and Buffalo, NY.

(3) Rulemaking Support to the NYS Department of State for the Commercial Provisions of the Proposed NYS Energy Conservation Construction Code and the 2018 International Energy Conservation Code. Prepared for the New York State Energy Research and Development Authority (NYSERDA) on behalf of the Department of State Division of Building Standards and Codes by Vidaris, Inc., dated April 8, 2019. This report (hereinafter referred to as the "Vidaris Report") makes the following refinements to the information set forth in the PNNL National Energy Savings Analysis Study in an effort to better reflect the impact this proposed rule will have in New York State.

Explanation of how studies were used – commercial buildings.

[3] https://www.energycodes.gov/sites/default/files/documents/02222018_Standard_90.1-2016_Determination_TSD.pdf

The Department of State used the DOE Notice of Determination to determine (1) that this proposed rule will reduce energy use by commercial buildings, and (2) that the Energy Code, as proposed by this rule, will satisfy that part of Energy Law § 11-103(2) that requires the Energy Code for commercial buildings to meet or exceed ASHRAE 90.1-2007.

The Department of State used the PNNL National Energy Savings Analysis Study and the Vidaris Report to determine (1) that this proposed rule will reduce energy use by commercial buildings; (2) that the Energy Code for commercial buildings, as proposed by this rule, will be cost effective; and (3) that using the weighting factors developed by DOE based on construction volume by building type and climate zone, the aggregate "first costs" associated with compliance with the Energy Code for commercial buildings, as proposed by this rule, will be less than the aggregate present value of the energy cost savings that can be expected in a ten-year period.

The Department of State also used the PNNL National Energy Savings Analysis Study and the Vidaris Report to determine the initial costs of compliance with this proposed rule and the ongoing costs of continuing to comply with this proposed rule.

Energy Usage Savings – Commercial Buildings.

The DOE and PNNL anticipate that commercial buildings constructed to the requirements of ASHRAE 90.1-2016 rather than ASHRAE 90.1-2013 will improve overall energy efficiency in buildings subject to the code. See the DOE Commercial Notice of Determination, 83 Federal Register 8463 (February 27, 2018) at 8464.[4]

Energy Cost Savings – Commercial Buildings. PNNL anticipates that that the energy costs for commercial buildings constructed to the requirements of ASHRAE 90.1-2016 will be approximately 8.3 percent lower than the energy costs for commercial buildings constructed to the requirements of ASHRAE

[4] https://www.govinfo.gov/content/pkg/FR-2018-02-27/pdf/2018-03931.pdf

90.1-2013. See *Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2016*, prepared by PNNL, Richland, WA.[5]

Cost Effectiveness – Commercial Buildings. The Energy Code for commercial buildings, as proposed by this rule, will be cost effective. Specifically, when comparing a building constructed to the requirements of ASHRAE 90.1-2016 to a similar building constructed to the requirements of ASHRAE 90.1-2013, it is anticipated that for each of the six commercial building prototypes analyzed in the PNNL Energy Savings Analysis in the climate zones covered by that study that are located in New York State, the present value of the energy cost savings over 30 years will exceed the sum of (1) the first costs (i.e., the increase or decrease in the initial costs of construction), (2) present value of the differences in replacement costs over 30 years, plus the present value of the differences in maintenance costs over 30 years.

Ten-Year Cost Payback – Commercial Buildings. Pursuant to Energy Law §11-103(2), in determining that the Energy Code for commercial buildings, as proposed by this rule, will be cost effective (as indicated above), the Department of State and the Code Council considered whether "the cost of materials and their installation to meet [the amended Energy Code's] standards would be equal to or less than the present value of energy savings that could be expected over a ten year period in the building in which such materials are installed." This consideration consisted of comparing the first costs (i.e., the increase or decrease in the cost of constructing a building to the requirements of ASHRAE 90.1-2016 compared to the cost of constructing a building to the requirements of ASHRAE 90.1-2013) to the present value of the expected annual energy savings over ten years.

The Vidaris Report provides the following documentation as a part of their Rulemaking support:

1. An Equivalency Study to (a) provide a determination that the Commercial provisions of 2020 ECCCNYS are at least as stringent as ASHRAE 90.1-2016 and (b) address the requirements of the New York State

[5] https://www.energycodes.gov/sites/default/files/documents/02222018_Standard_90.1-2016_Determination_TSD.pdf

Energy Law, Article 11. This study has determined that, with three proposed code modifications (proposed as part of this study and more fully described below), the Commercial provisions of 2020 ECCCNYS are as stringent as ASHRAE 90.1-2016.

2. A Cost Effectiveness Study to satisfy (a) the economic impact analysis required by New York State Energy Law §11-103(2) and (b) to determine the continued cost of compliance. This study has determined that ASHRAE 90.1-2016 is cost effective per New York States requirement criteria for both the ten-year simple payback consideration, and also for the continuing cost of compliance with the updated energy code.

To date, DOE *has not* released their cost effectiveness analysis for ASHRAE 90.1-2016. However, direct communication between Vidaris and PNNL confirms that the current national cost effectiveness analysis is based upon the same six prototype buildings used for the previous national analysis (PNNL.23824: *National Cost-effectiveness of ANSI/ASHRAE/IES Standard 90.1-2013*, January 2015) and NY state specific analysis (PNNL.24223 Rev-1: *Cost-Effectiveness of ASHRAE Standard 90.1-2013 for the State of New York*, December 2015), which represents more than 75% of the projected new construction by floor-space accounted for in the full suite of 16 DOE prototypes. Therefore, it is appropriate to use these six prototypes for this NYS Cost Effectiveness analysis.

As in PNNL's previous national analysis (PNNL.23824), PNNL shared with Vidaris the national cost data related to the differences in first cost, maintenance cost, and replacement cost over 30 years between ASHRAE 90.1-2013 and ASHRAE 90.1-2016. Note that cost data was only available for two of New York's climate zones: 4A and 5A. Therefore, the cost-effectiveness analysis is limited to two cities: New York City (4A) and Buffalo (5A).

Vidaris included as part of its analysis statewide-average utility rates available from the Energy Information Administration (EIA). This cost data was modified to reflect city specific cost factors from RS Means. For consistency, the EIA rate data and RS Means cost factors were selected from 2017, the most recent

year for which complete annual average utility data was available from the EIA. The costs used for this calculation of energy cost savings were $0.1475 per kWh for electricity and $6.87 per 1,000 cubic feet (or $0.687 per therm) for natural gas.[6]

Regarding the life-cycle cost, PNNL's analysis is based upon *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis* published by the National Institute of Standards and Technology (NIST). NIST data for 2017 was selected to be consistent with the other cost data being used. NIST identifies the real discount rate for non-energy related expenses (i.e., maintenance and replacement costs) and delineates Uniform Present Value Factors (UPV Factors) to be used for life-cycle periods from one to 30 years, by energy type, for Census Region 1 (which includes New York State), and based upon a DOE discount rate of 3.0%.[7] The UPV Factor is multiplied by the annual energy cost to determine the life-cycle value of energy cost over the life-cycle period. The city cost factors (indices), which are prefixed by their respective climate design zones as used in the analysis are as follows: (4A) New York City -1.346, (5A) Buffalo 1.057, and (6A) Watertown .995.[8]

In the publication entitled *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2017 Annual Supplement to NIST Handbook 135* (P. Lavappa, J. Kneifel, and E. O'Rear), published by the NIST, the Table indicates that for the commercial sector, the factors to be used to compute the present value of electrical energy cost savings are 9.22 (for 10 years) and 22.72 (for 30 years), and the factors to be used to compute the present value of natural gas energy cost savings are 10.57 (for 10 years) and 26.00 (for 30 years).[9]

To determine the stringency of 2018 IECC[10] relative to ASHRAE 90.1-2016, the Vidaris Report

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[6,7,9] Information taken from U.S. Energy Information Administration Table Ba.1: Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis – 2017, (Lavappa, et.al.) https://nvlpubs.nist.gov/nistpubs/ir/2017/NIST.IR.85-3273-32.pdf

[8] RS Means Building Construction Cost Data (2017).

[10] Although the Vidaris Report reviewed the 2018 IECC commercial provisions, the technical code requirements of the 2020 ECCCNYS commercial provisions are consistent with the 2018 IECC commercial provisions. The Department has

includes a quantified difference in annual energy performance between 2018 IECC and ASHRAE 90.1-2016 using Energy Plus models for the six DOE prototype buildings in three of the New York cities representing the three NY climates zones shown in Table 1 below.

The prototypes selected for this analysis are those used by PNNL to determine the cost effectiveness of ASHRAE 90.1 for its national and previous NYS specific analyses.[11] The cities selected for climate zones 4A and 5A were also the same cities used by PNNL in its most recent national analysis of ASHRAE 90.1-2016 (*Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2016,* October 2017). Note also that the shift in representative cities is in part due to changes to the climate zone map in 90.1-2016. Some cities in CZ 6A were reclassified to CZ 5A, including Buffalo, NY. Consequently, for CZ 5A Buffalo replaced Albany which had been used in previous state specific analyses for CZ 5A. Moving Buffalo meant selecting another city for CZ 6A since *PNNL 2017* used Rochester, MN to represent CZ 6A. Based on consultation with NYSERDA and NY DOS, Watertown, NY was selected to represent CZ 6A for this analysis.

TABLE 1: PROTOTYPES AND NEW YORK CLIMATE ZONES

DOE Prototype	**Climate Zone: City** (Weather file)
Small Office Building	**CZ 4A: New York** (USA_NY_New.York-J.F.Kennedy.Intl.AP.744860_TMY3.epw)
Large Office Building	
Stand-alone Retail	**CZ 5A: Buffalo** (USA_NY_Buffalo-Greater.Buffalo.Intl.AP.725280_TMY3.epw)
Primary School	
Small Hotel	**CZ 6A: Watertown**

determined that any modifications to the 2018 IECC commercial provisions as set forth within the 2020 ECCCNYS will not have any negative impact with respect to the energy savings analysis or cost-effective analysis.

[11] Direct communication between Vidaris and PNNL confirms that the analysis is still based on the same six prototype buildings used for previous national analysis (PNNL.23824: *National Cost-effectiveness of ANSI/ASHRAE/IES Standard 90.1-2013,* January 2015) and NY State specific analysis (PNNL.24223 Rev-1: *Cost-Effectiveness of ASHRAE Standard 90.1-2013 for the State of New York*, December 2015).

Mid-rise Apartment Building	(USA_NY_Watertown.AP.726227_TMY3.epw)

Data from the DOE national cost effectiveness analysis was the basis for the cost estimates in this report, and the data does not include incremental cost data for Climate Zone (CZ) 6A. However, a few factors indicate that not including CZ 6A will not materially affect the analysis and conclusion in this report.

First, the changes in the code specific to CZ 6A are limited to changes in the envelope for the prototype buildings included in this study. Additionally, the changes in the requirements for the envelope in CZs 5A and 6A are the same, except for the changes related to fenestration. Although the fenestration differences aren't the same, they are very similar. Therefore, it is reasonable to assume that the incremental costs for CZ 6A will be similar.

Second, the City Cost Index for Watertown (CZ 6A) is only 5.9% less than for Buffalo (CZ 5A). Thus, location will not significantly affect the cost relative to CZ 5A.

Third, the savings for each of the prototypes is similar regardless of climate zone. Thus, the simple payback, 10 yr and 30 yr life cycle cost will all be similar between CZ 5A and 6A. The analysis further shows that for CZ 5A the 10 yr and 30 yr present value of energy cost savings is more than the first, maintenance, and replacement costs need to achieve these savings. The same trend is expected to hold true for CZ 6A and any differences in the results based on CZ 5A would be small.

Finally, CZ 6A only represents 9.1% of the expected construction activity statewide. Thus, any small cost difference between CZ 5A and CZ 6A would not materially affect the conclusion that ASHRAE 90.1-2016 is cost effective over 10 years relative to ASHRAE 90.1-2013.

The Vidaris Report includes a review of the 2018 IECC and ASHRAE 90.1-2016 as written and categorized the differences applicable to the prototype buildings within each NY climate zone. Depending on building type and climate zones, there are differences relative to roof/ceiling, above-grade walls, below-grade

walls, slab-on-grade, vertical fenestration, lighting power densities, and lighting controls. Regarding HVAC systems, for the prototypes used in this analysis, the differences were limited to economizer requirements. There was no difference for service hot water for the buildings analyzed. Each prototype was revised by climate zone to address all the differences found between 2018 IECC as written and ASHRAE 90.1-2016.

DOE's EnergyPlus prototype models and weather files were downloaded directly from the DOE's Energy Efficiency and Renewable Energy (EERE) website for this analysis.[12] Vidaris modified these files based upon the energy code requirement differences found between ASHRAE 90.1-2016 and 2018 IECC (as written) specific to each prototype and applicable in each climate zone.

The Vidaris Report used EnergyPlus v8.0.0 and generated the results for each prototype under both codes and for each climate zone. The aggregated results by code and by climate zone are presented in Table 2a below.

TABLE 2a: Aggregated Differences in Energy Performance and Annual Energy Cost between ASHRAE 90.1-2016 and 2018 IECC "As Written"

		Total (kBtu)		Energy Cost	EUI (kBtu/sf)		ECI	Weighting
		Site	Source	Total	Site	Source	$/sf	Factors
Aggregate Values	ASHRAE 90.1-2016	31,481,074	92,609,879	$ 1,160,959	46.3	136.3	$ 1.71	
	2018 IECC	32,128,263	94,799,557	$ 1,189,385	47.3	139.5	$ 1.75	
	Savings	**(647,189)**	**(2,189,678)**	**$ (28,425)**	**(1.0)**	**(3.2)**	**$ (0.04)**	
		-2.06%	**-2.36%**	**-2.45%**	**-2.06%**	**-2.36%**	**-2.45%**	
Savings by CZ	4A	(552,637)	(1,872,603)	$ (24,318)	(0.8)	(2.8)	$ (0.04)	62.5%
	5A	(918,200)	(3,122,611)	$ (40,584)	(1.4)	(4.6)	$ (0.06)	28.4%
	6A	(448,855)	(1,449,057)	$ (18,605)	(0.7)	(2.1)	$ (0.03)	9.1%
	Combined	**(647,189)**	**(2,189,678)**	**$ (28,425)**	**(1.0)**	**(3.2)**	**$ (0.04)**	

Under 2018 IECC as written, all building types in each climate zone show increased annual energy use and increased energy cost as compared to ASHRAE 90.1-2016. To determine the statewide difference between

[12] www.energycodes.gov/development/commercial/90.1_models

the codes, weighting factors for each building result were used to determine the aggregate difference. The weighting factors used in this analysis were developed by DOE, based on construction volume by building type and climate zone and are presented in PNNL's NYS specific analysis report (PNNL.24223, Rev. 1). The weighted average of the results demonstrates that 2018 IECC *as written* is **2.45%.** less stringent than ASHRAE 90.1-2016. This result is found in Table 2a above, under the "Energy Cost" heading in the "Savings" line.

Therefore, possible amendments to 2018 IECC were analyzed to close the stringency gap within 1% or less of the stringency of ASHRAE 90.1-2016. Based on this review, the following list of potential amendments to the 2018 IECC was developed:

1. Expand requirement for daylight-responsive controls.

   To expand the requirement for daylight-responsive lighting controls beyond the four listed space types (i.e., offices, classrooms, laboratories and library reading rooms) to include all spaces. Additionally, the change establishes lighting power shall be reduced to 40% of full design lighting power. The language proposed would amend subparagraph 4 of C405.2.3.1 in the 2020 ECCCNYS.

2. Require additional outdoor parking area lighting controls.

   To add language from ASHRAE 90.1-2016 related to outdoor parking area lighting controls into 2018 IECC. The language proposed would add a new subparagraph under C405.2.5.3 Lighting Setback in the 2020 ECCCNYS.

3. Revise the Solar Heat Gain Coefficient (SHGC) requirement for North facing fenestration.

   To modify SHGC requirements to be equivalent for all fenestration regardless of orientation.

   The language proposed would amend Table C402.4.

TABLE 2b: Aggregated Differences in Energy Performance and Annual Energy Cost between ASHRAE 90.1-2016 and 2018 IECC with suggested efficiency modifications

		EUI (kBtu/sf)				ECI	
		Site	Savings	Source	Savings	$/sf	Savings
Aggregate Values	ASHRAE 90.1-2016	46.32		136.3		$ 1.708	
	2018 IECC	47.27	**-2.06%**	139.5	**-2.36%**	$ 1.750	**-2.45%**
	PLUS Expand continuous daylight dimming requirements	46.91	**-1.27%**	138.2	**-1.40%**	$ 1.733	**-1.43%**
	PLUS Add activity sensor control for outdoor parking area lighitng	46.55	**-0.50%**	137.0	**-0.52%**	$ 1.717	**-0.53%**
	PLUS Revise SHGC for North facing fenestration	46.54	**-0.48%**	136.8	**-0.38%**	$ 1.714	**-0.36%**

The aggregate differences and savings by Climate design zone incorporating each of the above proposed modifications are displayed in Table 2b below.

The result of all three proposed modifications combined are summarized below in Table 3 below. The analysis results shown in Table 3 below provide evidence that the 2018 IECC as modified in Table 2b above is within less than a 1% difference in stringency with ASHRAE 90.1-2016. Under Energy Cost Total, the aggregate values of energy savings result are noted as – 0.36%.

TABLE 3: Aggregated Differences in Energy Performance and Annual Energy Cost between ASHRAE 90.1-2016 and 2018 IECC with suggested efficiency modifications

		Total (kBtu)			Energy Cost	EUI (kBtu/sf)			ECI	Weighting
		Site	Source		Total	Site	Source		$/sf	Factors
Aggregate Values	ASHRAE 90.1-2016	31,481,074	92,609,879	$	1,160,959	46.32	136.25	$	1.708	
	2018 IECC	31,632,780	92,964,522	$	1,165,092	46.54	136.77	$	1.714	
	Savings	**(151,706)**	**(354,644)**	**$**	**(4,133)**	**(0.22)**	**(0.52)**	**$**	**(0.006)**	
		-0.48%	**-0.38%**		**-0.36%**	**-0.48%**	**-0.38%**		**-0.36%**	
Savings by CZ	4A	(148,999)	(344,673)	$	(4,001)	(0.22)	(0.51)	$	(0.006)	62.5%
	5A	(153,897)	(346,072)	$	(3,974)	(0.23)	(0.51)	$	(0.006)	28.4%
	6A	(163,471)	(450,081)	$	(5,537)	(0.24)	(0.66)	$	(0.008)	9.1%
	Combined	**(151,706)**	**(354,644)**	**$**	**(4,133)**	**(0.22)**	**(0.52)**	**$**	**(0.006)**	

Since this group of changes was sufficient to achieve equivalent stringency (within 1%), the following code language is recommended to be adopted by NYS and incorporated into the commercial provisions of the 2020 ECCCNYS:

1. Expand requirement for daylight-responsive controls

   The following changes to subparagraph 4 of C405.2.3.1 were recommended:

   > ~~4. Where located in offices, classrooms, laboratories and library reading rooms, d~~daylight responsive controls shall dim lights continuously from full <u>design</u> light ~~output~~ power to ~~15~~ 40 percent of full <u>design</u> light ~~output~~ <u>power</u> or lower.

2. Require additional outdoor parking area lighting controls

   The following changes to add a new subparagraph to C405.2.5.3 were recommended:

   > <u>Luminaires serving outdoor parking areas and having a rated input wattage of greater than 78 W and a mounting height of 24 ft or less above the ground shall be controlled to automatically reduce the power of each luminaire by a minimum of 50% when no activity has been detected in the area illuminated by the controlled luminaires for a time of no longer than 15 minutes. No more than 1500 W of lighting power shall be controlled together.</u>

3. Revise the Solar Heat Gain Coefficient (SHGC) requirement for North facing fenestration

The following changes to amend Table C402.4 were recommended:

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

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
Vertical fenestration																
***U*-factor**																
Fixed fenestration	0.50		0.50		0.46		0.38		0.38		0.36		0.29		0.29	
Operable fenestration	0.65		0.65		0.60		0.45		0.45		0.43		0.37		0.37	
Entrance doors	1.10		0.83		0.77		0.77		0.77		0.77		0.77		0.77	
SHGC																
Orientation[a]	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N
PF < 0.2	0.25	0.33	0.25	0.33	0.25	0.33	0.36	0.48	0.38	0.51	0.40	0.53	0.45	NR	0.45	N
0.2 ≤ PF < 0.5	0.30	0.37	0.30	0.37	0.30	0.37	0.43	0.53	0.46	0.56	0.48	0.58	NR	NR	NR	NR
PF ≥ 0.5	0.40	0.40	0.40	0.40	0.40	0.40	0.58	0.58	0.61	0.61	0.64	0.64	NR	NR	NR	NR
Skylights																
U-factor	0.75		0.65		0.55		0.50		0.50		0.50		0.50		0.50	
SHGC	0.35		0.35		0.35		0.40		0.40		0.40		NR		NR	

NR = No Requirement. PF = Projection Factor.
a. "N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N." For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.

These three preceding recommendations have been incorporated into the 2020 ECCCNYS as part of this proposed rule making, thereby bringing the stringency level of the 2020 ECCCNYS commercial provisions to less than a 1% differential in energy stringency with the 2016 version of ASHRAE 90.1. Therefore, this proposed rule will assure that the Energy Code, as amended, complies with Title III of the Federal Energy Conservation and Production Act (42 U.S.C. 6831, et. seq.).[13]

Comparison of stringency of ASHRAE 90.1-2013 and ASHRAE 90.1-2016. The Vidaris Report's cost-effectiveness analysis, compares the performance of the six DOE prototype buildings in the three NY climate zones that were analyzed for both ASHRAE 90.1-2013 and ASHRAE 90.1-2016. The results in Table 4 below

[13] 42 U.S.C. § 6833(b) provides that when the U.S. Department of Energy ("DOE") determines that commercial buildings constructed to a revised edition of ASHRAE 90.1 would achieve greater energy efficiency than buildings constructed to the prior edition of ASHRAE 90.1, states are required to update their energy codes for commercial buildings to codes that meet or exceed the revised edition of ASHRAE 90.1.

demonstrate that ASHRAE 90.1-2016 will save 7.4% in energy cost, and 7.2% and 7.3% in site and source energy use, respectively, on a statewide floor-space-weighted average.

TABLE 4: NY Statewide Differences in Site and Source Energy Use Index (EUI), Annual Energy Cost and Energy Cost Index (ECI) between ASHRAE 90.1-2013 and 90.1-2016

ASHRAE Standard	EUI (kBtu/sf)		Annual Energy Cost	
	Site	Source	Total	ECI ($/sf)
90.1-2013	49.91	147.05	$ 1,253,482	$ 1.844
90.1-2016	46.32	136.25	$ 1,160,959	$ 1.708
Savings	3.59	10.79	$ 92,523	$ 0.136
	7.2%	7.3%		7.4%

Ten-year studies: 10-year Life Cycle Energy Cost, Net Savings over 10 years (simple cost payback) The results of the 10-year life-cycle energy cost savings are presented against the incremental first cost in Table 6 below. The results show that the 10-year present value of energy savings for building prototypes constructed to ASHRAE 90.1-2016 versus ASHRAE 90.1-2013 is greater than the installed cost of materials for the majority of building types in each of the climate zones examined with the exception of building type Large Office in climate zone 4A. Consequently, the net savings was examined in aggregate based on the floor-space based weighting factors developed by DOE based on projected construction volume by building type and climate zone. The weighting factors used in this analysis are from PNNL's NY specific analysis (PNNL.24223 Rev-1).[14] The weighting factors demonstrate that the projected construction volumes for climate zones 4A and 5A represent over 90% by floor-space for these building types statewide. The resulting aggregate energy cost savings, by climate zone and overall, is greater than the installed cost of materials to achieve the savings. The simple payback period for incremental cost is presented in Table 8 below. Note that the payback period varies

[14] https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24223rev1.pdf

from being immediate (i.e., 90.1-2016 results in lower incremental cost and lower annual energy cost than 90.1-2013), to 12.8 years for Large Office in CZ 4A. In aggregate, the state-wide area weighted payback period is only 0.92 years.

30 Year Life Cycle Cost, or the continuing cost of compliance. The net present value over 30 years is presented in Table 7 below (note that in Table 7 positive values represent *increased cost*). Negative values or *reduced cost* translates to cost savings. The results show that over 30 years the present value of the energy savings is worth more than the first, maintenance, and replacement costs for each of the buildings in each of the climate zones examined.

TABLE 6: 10 Year Present value of differences in Annual Energy Performance, Energy Cost and First Cost between ASHRAE 90.1-2013 and 2016 by CZ and Building Type

Climate Zone	ASHRAE Standard	Energy Usage kWh	Energy Usage therms	Energy Cost Total	10 yr Life Cycle Energy Cost Electricity	10 yr Life Cycle Energy Cost Gas	10 yr Life Cycle Energy Cost Total	10 yr Life Cycle Energy Cost Savings	Incremental First Cost	Net Savings over 10 yr Total	Net Savings over 10 yr Cost Index ($/sf)	Weighting Factors
Small Office		5,500	square feet									
4A	90.1-2013	44,054	15	$ 6,508	$ 59,911	$ 107	$ 60,018					
4A	90.1-2016	38,599	17	$ 5,705	$ 52,493	$ 118	$ 52,611	$ 7,407	$ 3,928	$ 3,479	$ 0.63	3.3%
5A	90.1-2013	43,968	65	$ 6,529	$ 59,795	$ 458	$ 60,252					
5A	90.1-2016	38,645	68	$ 5,745	$ 52,556	$ 478	$ 53,033	$ 7,219	$ 1,736	$ 5,483	$ 1.00	4.0%
Large Office		498,588	square feet									
4A	90.1-2013	9,453,334	45,967	$ 1,424,967	$ 12,856,062	$ 323,442	$ 13,179,505					
4A	90.1-2016	9,203,896	30,637	$ 1,377,970	$ 12,516,838	$ 215,578	$ 12,732,415	$ 447,089	$ 601,949	$ (154,860)	$ (0.31)	16.2%
5A	90.1-2013	9,267,606	68,218	$ 1,412,385	$ 12,603,481	$ 480,014	$ 13,083,494					
5A	90.1-2016	9,065,143	46,208	$ 1,367,869	$ 12,328,141	$ 325,136	$ 12,653,276	$ 430,218	$ 297,906	$ 132,312	$ 0.27	2.0%
Standalone Retail		24,690	square feet									
4A	90.1-2013	254,263	2,070	$ 38,882	$ 345,786	$ 14,563	$ 360,349					
4A	90.1-2016	226,595	2,140	$ 34,847	$ 308,157	$ 15,059	$ 323,217	$ 37,132	$ 35,315	$ 1,817	$ 0.07	10.4%
5A	90.1-2013	240,006	2,883	$ 37,320	$ 326,397	$ 20,289	$ 346,686					
5A	90.1-2016	212,524	2,939	$ 33,304	$ 289,022	$ 20,678	$ 309,701	$ 36,985	$ 27,882	$ 9,104	$ 0.37	15.1%
Primary School		73,970	square feet									
4A	90.1-2013	761,266	9,943	$ 118,906	$ 1,035,284	$ 69,960	$ 1,105,244					
4A	90.1-2016	628,017	9,690	$ 99,083	$ 854,072	$ 68,182	$ 922,254	$ 182,991	$ (162,110)	$ 345,100	$ 4.67	2.2%
5A	90.1-2013	728,420	11,937	$ 115,389	$ 990,615	$ 83,997	$ 1,074,612					
5A	90.1-2016	596,032	11,653	$ 95,672	$ 810,574	$ 81,994	$ 892,567	$ 182,044	$ (165,677)	$ 347,721	$ 4.70	1.8%
Small Hotel		43,210	square feet									
4A	90.1-2013	454,219	10,467	$ 73,965	$ 617,716	$ 73,652	$ 691,367					
4A	90.1-2016	387,583	10,444	$ 64,121	$ 527,094	$ 73,486	$ 600,580	$ 90,788	$ (183,450)	$ 274,238	$ 6.35	1.8%
5A	90.1-2013	465,529	11,305	$ 76,191	$ 633,096	$ 79,550	$ 712,645					
5A	90.1-2016	391,833	11,287	$ 65,309	$ 532,873	$ 79,419	$ 612,292	$ 100,354	$ (146,510)	$ 246,864	$ 5.71	2.1%
Mid-rise Apartment		33,740	square feet									
4A	90.1-2013	397,713	1,163	$ 59,437	$ 540,870	$ 8,183	$ 549,054					
4A	90.1-2016	376,757	1,192	$ 56,365	$ 512,370	$ 8,385	$ 520,755	$ 28,299	$ (21,598)	$ 49,897	$ 1.48	28.6%
5A	90.1-2013	393,176	2,130	$ 59,411	$ 534,700	$ 14,988	$ 549,688					
5A	90.1-2016	374,437	2,071	$ 56,608	$ 509,216	$ 14,575	$ 523,791	$ 25,897	$ (33,457)	$ 59,354	$ 1.76	3.5%
										4A	$ 0.99	62.5%
									Weighted Average Savings by Climate Zone	**5A**	$ 1.29	28.4%
										Combined	**$ 1.08**	**90.9%**

TABLE 7: Present Value over 30 years of differences between ASHRAE 90.1-2013 and 90.1-2016 by Climate Zone and Building Type

30 Year Present Values	Small Office		Large Office		Standalone Retail		Primary School		Small Hotel		Mid-rise Apartment	
	4A	**5A**	**4A**	**5A**	**4A**	**5A**	**4A**	**5A**	**4A**	**5A**	**4A**	**5A**
First Cost	$3,928	$1,736	$601,949	$297,906	$35,315	$27,882	($162,110)	($165,677)	($183,450)	($146,510)	($21,598)	($33,457)
Replacement	($1,531)	($1,250)	$94,250	$9,559	($455,435)	($358,324)	$96,115	$63,143	($6,891)	($4,922)	($24,165)	($29,376)
Maintenance	$0	$0	$21,607	$0	$0	$0	$245	$642	$0	$0	$0	$0
Energy Cost	($18,252)	($17,789)	($1,101,244)	($1,059,463)	($91,504)	($91,141)	($450,919)	($448,586)	($223,719)	($247,292)	($69,735)	($63,813)
Net Present Value	($15,856)	($17,303)	($383,438)	($751,998)	($511,624)	($421,584)	($516,668)	($550,478)	($414,060)	($398,724)	($115,498)	($126,646)

TABLE 8: Payback Period of Incremental First Cost between ASHRAE 90.1-2013 and 2016 by CZ and Building Type

Climate Zone	ASHRAE Standard	Energy Usage kWh	Energy Usage therms	Annual NYS Energy Cost Electricity	Annual NYS Energy Cost Gas	Annual NYS Energy Cost Total	Annual Savings Total	Annual Savings ($/sf)	Incremental First Cost Total	Incremental First Cost ($/sf)	Payback Period (Years)	Weighting Factors
Small Office		5,500 square feet										
4A	90.1-2013	44,054	15	$ 6,498	$ 10	$ 6,508						
4A	90.1-2016	38,599	17	$ 5,693	$ 11	$ 5,705	$ 804	$ 0.146	$ 3,928	$ 0.714	4.9	3.3%
5A	90.1-2013	43,968	65	$ 6,485	$ 43	$ 6,529						
5A	90.1-2016	38,645	68	$ 5,700	$ 45	$ 5,745	$ 783	$ 0.142	$ 1,736	$ 0.316	2.2	4.0%
Large Office		498,588 square feet										
4A	90.1-2013	9,453,334	45,967	$ 1,394,367	$ 30,600	$ 1,424,967						
4A	90.1-2016	9,203,896	30,637	$ 1,357,575	$ 20,395	$ 1,377,970	$ 46,997	$ 0.094	$ 601,949	$ 1.207	12.8	16.2%
5A	90.1-2013	9,267,606	68,218	$ 1,366,972	$ 45,413	$ 1,412,385						
5A	90.1-2016	9,065,143	46,208	$ 1,337,109	$ 30,760	$ 1,367,869	$ 44,516	$ 0.089	$ 297,906	$ 0.597	6.7	2.0%
Standalone Retail		24,690 square feet										
4A	90.1-2013	254,263	2,070	$ 37,504	$ 1,378	$ 38,882						
4A	90.1-2016	226,595	2,140	$ 33,423	$ 1,425	$ 34,847	$ 4,034	$ 0.163	$ 35,315	$ 1.430	8.8	10.4%
5A	90.1-2013	240,006	2,883	$ 35,401	$ 1,920	$ 37,320						
5A	90.1-2016	212,524	2,939	$ 31,347	$ 1,956	$ 33,304	$ 4,017	$ 0.163	$ 27,882	$ 1.129	6.9	15.1%
Primary School		73,970 square feet										
4A	90.1-2013	761,266	9,943	$ 112,287	$ 6,619	$ 118,906						
4A	90.1-2016	628,017	9,690	$ 92,633	$ 6,450	$ 99,083	$ 19,823	$ 0.268	$ (162,110)	$ (2.192)	Immediate	2.2%
5A	90.1-2013	728,420	11,937	$ 107,442	$ 7,947	$ 115,389						
5A	90.1-2016	596,032	11,653	$ 87,915	$ 7,757	$ 95,672	$ 19,717	$ 0.267	$ (165,677)	$ (2.240)	Immediate	1.8%
Small Hotel		43,210 square feet										
4A	90.1-2013	454,219	10,467	$ 66,997	$ 6,968	$ 73,965						
4A	90.1-2016	387,583	10,444	$ 57,169	$ 6,952	$ 64,121	$ 9,845	$ 0.228	$ (183,450)	$ (4.246)	Immediate	1.8%
5A	90.1-2013	465,529	11,305	$ 68,666	$ 7,526	$ 76,191						
5A	90.1-2016	391,833	11,287	$ 57,795	$ 7,514	$ 65,309	$ 10,883	$ 0.252	$ (146,510)	$ (3.391)	Immediate	2.1%
Mid-rise Apartment		33,740 square feet										
4A	90.1-2013	397,713	1,163	$ 58,663	$ 774	$ 59,437						
4A	90.1-2016	376,757	1,192	$ 55,572	$ 793	$ 56,365	$ 3,072	$ 0.091	$ (21,598)	$ (0.640)	Immediate	28.6%
5A	90.1-2013	393,176	2,130	$ 57,994	$ 1,418	$ 59,411						
5A	90.1-2016	374,437	2,071	$ 55,230	$ 1,379	$ 56,608	$ 2,803	$ 0.083	$ (33,457)	$ (0.992)	Immediate	3.5%
				Weighted Averages by Climate Zone			**4A**	**$ 0.117**		**$ 0.095**	**0.81**	**62.5%**
							5A	**$ 0.158**		**$ 0.171**	**1.08**	**28.4%**
							Combined	**$ 0.130**		**$ 0.119**	**0.92**	**90.9%**

SIGNIFICANT CHANGES - COMMERCIAL BUILDINGS

Some of the more significant changes to the Energy Code for commercial buildings to be implemented by this proposed rule, and the needs and benefits associated with these changes, are as follows:

1. Building Fenestration Solar Heat Gain Coefficient

Description of change

This modification increases in stringency the maximum Solar Heat Gain Coefficient (SHGC) requirement in climate zones 4A and 5A by 5% to 10%. This represents a reasonable increase in stringency for these zones with mixed heating and cooling and is consistent with the SHGC values in addendum "ai" for ASHRAE 90.1-2016. While this proposal does restrict certain glazing products, the lowest cost low -e glazing products will comply, and therefore this change will not significantly impact construction cost. The modification has the effect of increasing the sustainability of the structure.

Needs and Benefits

Building fenestration, or glazing areas are probably the weakest point of the building envelope in terms of heat loss and heat gain. In many high-rise structures, the building fenestration consists of the majority of the exterior building envelope. The modest increase introduced by this code change has the effect of greatly reducing the heat load on a building envelope. Most importantly, the modification maintains consistency with ASHRAE 90.1-2016, in accordance with Energy Law §11-103(2).

2. Heated or Cooled Vestibules

Description of change

The change adds a new requirement for Heated/Cooled Vestibules. A control is required to turn off heat source when outdoor air temperature is above 45° F. Also, the control will limit heating temperature to maximum 60° F and cooling temperature to not less than 85° F. The code change maintains consistency with ASHRAE Standard 90.1-2016, addendum "ag" to ASHRAE Standard 90.1-2013. This change has the effect

of increasing the sustainability of the structure.

Needs and Benefits

The change has the potential of saving a significant amount of building energy by creating a temperature buffer zone between the exterior ambient temperature and the conditioned interior of the building. Most importantly, the modification maintains consistency with ASHRAE 90.1-2016, in accordance with Energy Law §11-103(2).

3. Automatic Control of HVAC in Group R1 Guestrooms

Description of change

This new code provision reduces energy use by thermostat setback and ventilation control in unrented guestrooms. The provision requires that heating and cooling setpoints to be lowered (or raised) 4 degrees (seasonally dependent) within 30 minutes after occupants have left the guestroom. Additionally, the controls will automatically lower the heat set point to not higher than 60° F and cooling set point to not lower than 80° F when the guestroom has not been continually occupied for over 16 hours. The control can be configured to indicate whether the room is scheduled to be occupied and the setbacks and ventilation can be turned off earlier when the guest room is scheduled to be unoccupied and the networked control can return setpoints to their default levels 60 minutes in advance of scheduled check-in. The code also allows for an automatic daily ventilation purge during unrented periods.

Needs and benefits

The proposed additional criteria provide the ability to reduce building energy use through deeper thermostat setups/setbacks and ventilation control in unrented guestrooms without affecting occupant comfort or creating a conflict with the provisions of the Mechanical Code. This modification has the effect of greatly decreasing heating and cooling loads, therefore having a large impact of sustainability for the buildings of this occupancy type.

4. Energy Recovery Requirement on Fan systems

Description of change

This addendum increases the minimum threshold for use of Energy Recovery Ventilation requirements to a reasonable minimum amount for smaller sized Ventilation, HVAC, and PTAC units. The purpose of Energy Recovery Ventilation reduces the load on the HVAC equipment by reclaiming a portion of the energy of the conditioned air, rather than simply exhausting it to the outdoors.

Needs and benefits

Within the addendum, the supply air requirements are adjusted so that at least 40 cfm of outside air is available for recovery for continuous ventilation systems in the coldest climate zones. This change represents a large modification to the threshold at which Energy Recovery Ventilation considerations are required. The newer standard requires Energy Recovery on markedly smaller building systems (in the 2015 IECC this amount was set at zero cfm of outside air for these same zones). This change has the effect of increasing the sustainability of the structure.

5. Occupant Sensor Lighting Control in Open Plan Office Area

Description of change

This new code section adds occupant sensor lighting controls to open plan office areas. These areas were not previously included in occupant sensor control requirements because there were not readily available controls to switch off small groups of work stations while maintaining a minimum background illumination in the overall area. Multiple manufacturers now have those controls available, so they can now be included in the code requirements. Additionally, advances in occupant sensor controls have been made more reliable, not solely dependent on motion of occupants.

Needs and benefits

There are potentially significant energy savings, especially during after-hours by lighting only the workstation areas in actual use rather than the entire open office. The lighting load on commercial buildings far outweighs the HVAC systems in the demand for energy. This modification has the effect of greatly increasing the sustainability of the structure.

6. Interior Lighting Power Allowances

Description of change

This code change revises (makes more stringent) the Lighting Power Density (LPD) allowances to be appropriate for currently available lighting technology. The values in this proposal are identical to those in Addendum" ch" to ASHRAE/IES Standard 90.1 after the second public review draft. These values were developed by PNNL/DOE and approved by the ASHRAE/IES 90.1 Lighting Subcommittee for inclusion in Standard 90.1-2016.

Needs and benefits

Even though the *initial* cost of construction may be higher, the use of higher efficacy fixtures will be cost effective due to the lower energy use and reduced maintenance/replacement costs of higher efficacy fixtures as compared to alternative lighting types. Additionally, the change matches the level of stringency with ASHRAE Standard 90.1-2016. This change has the effect of increasing the sustainability of the structure.

7. Exterior Lighting Power Allowances

Description of change

This code change removes "Tradeable" surfaces from the allowable power densities. Exceptions have been removed for several lighting types which are individually controlled. Allowable lighting power densities are slightly reduced across the board. Added exemptions make the 2020 ECCCNYS consistent with ANSI/ASHRAE/IES Standard 90.1-2016.

Needs and benefits

The current Energy Code does not explicitly state that the connected exterior lighting power must be less than or equal to the exterior lighting power allowance. The language above, and the proposed restructuring of this section, replicates the interior lighting power requirements as closely as possible. The change matches the level of stringency with ASHRAE Standard 90.1-2016. This change has the effect of increasing the sustainability of the structure.

Residential Provisions of 2020 ECCCNYS

Citations to and summaries of studies used – residential buildings. The studies, reports, and analyses which served as the basis for the part of this proposed rule that applies to residential buildings include:

1. Notice of Preliminary Analysis. Issued by DOE and published in the Federal Register on May 2, 2019 in 84 Federal Register at 18833.[15] The Notice announces the availability of a *Preliminary Energy Savings Analysis: 2018 IECC Residential Requirements,* published by PNNL. T. Taylor, V. Mendon, M. Zhao, and B. Liu - publication date May 2019. (Hereinafter referred to as the "PNNL Preliminary Analysis"). The PNNL Preliminary Analysis indicates that (1) DOE has reviewed the 2018 IECC and the updated model code will increase energy efficiency in residential buildings and found that residential buildings meeting the 2018 IECC (compared to the previous 2015 IECC) are expected to incur the following savings on a weighted national average basis: (1) 1.68 percent of annual site energy use intensity (EUI), (2) 1.91 percent of annual source EUI, and (3) 1.97 percent of annual energy costs.[16]

Explanation of how studies were used – residential buildings. The Department of State used the PNNL Preliminary Analysis to determine that the proposed rule would (1) reduce energy use by residential buildings, and (2) that adoption of this proposed rule will assure that the provisions of the Energy Code

[15] https://www.govinfo.gov/content/pkg/FR-2019-05-02/pdf/2019-08942.pdf
[16] https://www.energycodes.gov/sites/default/files/documents/2018_IECC_PreliminaryDetermination_TSD.pdf

applicable to residential buildings will comply with Title III of the Federal Energy Conservation and Production Act.

Energy Usage Savings – Residential Buildings. Based on the PNNL Preliminary Analysis, it is anticipated that residential buildings constructed to the requirements of the 2018 IECC rather than the 2015 IECC will use approximately 1.91 percent less energy, on a national basis.

Energy Cost Savings – Residential Buildings. Based on the PNNL Preliminary Analysis it is anticipated that the energy costs for residential buildings constructed to the requirements of the 2018 IECC will be approximately 1.97 percent lower on a national basis than the energy costs for residential buildings constructed to the requirements of the 2015 IECC.

Cost Effectiveness – Residential Buildings. Based on the PNNL Preliminary Analysis it is anticipated that the Energy Code for residential buildings, as amended by this proposed rule, will be cost effective.

PNNL's Preliminary Analysis identified two key changes which result in the bulk of the energy savings associated with the updated code:

- Fenestration: Lowers (improves) fenestration U-factors in climate zones 3-8
- Lighting: Increases high-efficacy lighting from 75% to 90% of permanently installed fixtures in all homes.

These changes are expected to have a significant and measurable impact on energy efficiency in residential buildings, increase energy savings, impact a significant fraction of new homes, and can be reasonably quantified through the established methodology.

2. *Energy Savings and Cost-Effectiveness Analysis of the Residential Provisions of the 2018 International Energy Conservation Code, as Modified for the Provisions of the 2020 Energy Conservation Construction Code of New York State Report.* Prepared for the New York State Energy Research and Development Authority (NYSERDA) on behalf of the Department of State Division of Building Standards

and Codes, by Resource Refocus LLC. V. Mendon, Dr. C Brown, and M. Pigman - April 2019 (Referred to herein as the "Resource Refocus Report").

Firstly, the report includes a *qualitative* assessment of the prescriptive and mandatory residential provisions of the residential provisions of the current Energy Code which is the 2015 IECC residential provisions as modified by the 2016 Supplement to the New York State Energy Conservation Construction Code,[17] and the proposed residential provisions of the 2020 ECCCNYS. The qualitative assessment includes an evaluation of the expected energy impact of each code change and whether the change will be captured through energy modeling during the *quantitative* analysis. In summary, two code changes, related to (1) reduced fenestration "U" values and (2) high efficacy lighting are expected to have the largest energy impacts and can be captured using energy modeling in the quantitative analysis.

Secondly, the report produces an overall *quantitative* analysis to assess the stringency and cost-effectiveness of the residential provisions of the proposed 2020 ECCCNYS. The methodology is based on DOE's methodology for determining the cost-effectiveness of residential code changes (Taylor et al. 2012) and similar work conducted by PNNL in previous code cycles (Mendon et al. 2016). Additionally, the analysis leverages the DOE residential prototype building models developed by PNNL for the 2015 IECC code development process, which were provided by NYSERDA as part of the bid. The *quantitative* analysis contains:

- A stringency comparison of the residential provisions of the current Energy Code versus the proposed residential provisions of the 2020 ECCCNYS as it applies to the three climate design zones in the State of New York (4A, 5A, and 6A).
- An assessment of energy cost savings from the proposed residential provisions of the 2020 ECCCNYS over the residential provisions of the current Energy Code calculated in the energy analysis into energy cost savings using average fuel prices for NY state.

[17] https://www.dos.ny.gov/dcea/pdf/2016%20EC%20Supp-Revised-2016-08-12-approved%20bycouncil%20V-A.pdf

- Calculation of the associated incremental construction costs for the requirements of the residential provisions of the proposed 2020 ECCCNYS over the provisions of the current Energy Code.
- Calculating a simple payback, 10-year Net Present Value (NPV) of energy cost savings including replacement costs, and a 30-year Lifecycle Cost (LCC) savings analysis from the perspective of the homeowner.

Beginning with the PNNL prototype models, a suite of custom *Energy Plus* models were created to match the specific requirements for the current and proposed residential provisions of the 2020 ECCCNYS in climate design zones 4A, 5A, and 6A. The study utilizes the mandatory and prescriptive provisions of the code in its analysis. The Performance and ERI provisions of the code are not examined in the analysis, simply due to the number of variables contained in these methods for a study of this type. However, both the Performance method and ERI method of compliance paths are predicated on the mandatory and prescriptive provisions.

The analysis includes a qualitative assessment to evaluate anticipated energy impact of code changes proposed by the 2020 ECCCNYS, including a determination of which impacts could be quantified through an energy analysis. An energy analysis was then conducted by leveraging the 2015 IECC PNNL models to create customized energy models tailored to the code requirements for the State of New York. The energy savings from the energy analysis were then combined with the incremental construction costs associated with the changes to determine the simple payback, the 10-year net present value (NPV) of energy cost savings and the 30-year life cycle cost (LCC) savings.

Fuel Prices- The fuel price escalation rates used in the analysis are the average escalation rates for the 2018-2050 period reported by EIA in its 2019 Annual Energy Outlook for the Mid Atlantic census region. The escalation rate for electricity is assumed to be 0.6%, that for natural gas is assumed to be 0.9%, and that for fuel oil is assumed to be 1%.

Energy Usage Stringency – Based on the Resource Refocus Report, it is anticipated that residential buildings constructed to the requirements of the 2020 ECCCNYS rather than the 2015 IECC will use approximately 1.6 percent less energy, on a state-wide basis.

Energy Cost Savings – Based on the Resource Refocus Report, is anticipated that the energy costs for residential buildings constructed to the requirements of the 2020 ECCCNYS will be approximately 2.0 percent lower than the energy costs for residential buildings constructed to the requirements of the 2015 IECC.

Cost Effectiveness Simple payback – Based on the Resource Refocus Report it is anticipated that the Energy Code for residential buildings, as amended by this proposed rule, will be cost effective. The report result finds a simple cost payback of 3.1 years.

Net Present Value and Lifecycle Cost savings – The 10-year Net Present Value (NPV) of energy cost savings including replacement costs, and a 30-year Lifecycle Cost (LCC) savings analysis found by the report are both positive in terms of savings for the homeowner.

Energy Usage Stringency. The results of the energy savings analysis of the proposed residential provisions of the 2020 ECCCNYS over the current Energy Code by end-use at the climate zone and state level are included. These results have been aggregated over the entire set of building types, foundation types, and heating systems using the construction weights matrix, and the results for climate zone 6A have been averaged over the two alternative options. In summary, the results show 1.6% site energy savings at the state level as set forth in the Tables below.

Weighted Average Annual Energy Savings – 2020 ECCCNYS vs. Current Energy Code

Climate Design Zone 4A						
	Heating Energy (kBtu/home)	Cooling Energy (kBtu/home)	Lighting Energy (kBtu/home)	Fan Energy (kBtu/home)	DHW Energy (kBtu/home)	Total Regulated Energy (kBtu/home)

Current Energy Code	17,103.2	4,557.1	3,879.6	2,166.5	13,686.9	41,393.3
Proposed 2020 ECCCNYS	16,626.5	4,560.1	3610.7	2,147.1	13,686.3	40,640.2
Savings (%)	2.8%	-0.3%	6.9%	0.9%	0.0%	1.8%

Climate Design Zone 5A						
	Heating Energy (kBtu/home)	Cooling Energy (kBtu/home)	Lighting Energy (kBtu/home)	Fan Energy (kBtu/home)	DHW Energy (kBtu/home)	Total Regulated Energy (kBtu/home)
Current Energy Code	40,558.2	3,748.5	5,129.5	3,029.8	17,368.2	69,834.1
Proposed 2020 ECCCNYS	39,915.6	3,756.1	4,774.2	3,012.1	17,367.5	68,825.5
Savings (%)	1.6%	-0.2%	6.9%	0.6%	0.0%	1.4%

Climate Design Zone 6A Avg						
	Heating Energy (kBtu/home)	Cooling Energy (kBtu/home)	Lighting Energy (kBtu/home)	Fan Energy (kBtu/home)	DHW Energy (kBtu/home)	Total Regulated Energy (kBtu/home)
Current Energy Code	46,398.0	3,694.1	5,461.7	2,947.9	19,016.1	77,517.8
Proposed 2020 ECCCNYS	45,554.7	3,665.4	5,083.3	2,887.7	19,015.2	76,206.3
Savings (%)	1.8%	0.8%	6.9%	2.0%	0.0%	1.7%

New York State Average						
	Heating Energy (kBtu/home)	Cooling Energy (kBtu/home)	Lighting Energy (kBtu/home)	Fan Energy (kBtu/home)	DHW Energy (kBtu/home)	Total Regulated Energy (kBtu/home)

Current Energy Code	33,758.8	4,008.9	4,770.9	2,726.9	16,430.6	61,696.1
Proposed 2020 ECCCNYS	33,136.0	4,011.8	4,440.3	2,701.1	16,429.9	60,719.2
Savings (%)	1.8%	0.0%	7.5%	1.0%	0.0%	1.6%

Energy Cost Savings. The energy cost savings from the proposed residential provisions of the 2020 ECCCNYS over the current Energy Code by fuel type at the climate zone and state level are included below. These results have been aggregated over the entire set of building types, foundation types, and heating systems using the construction weights matrix, and the results for climate zone 6A have been averaged over the two alternative options. In summary, the results show 1.9% energy cost savings at the state level as set forth in the Tables below.

Climate Design Zone 4A				
	Electricity Cost ($/home)	Natural Gas Cost ($/home)	Fuel Oil Cost ($/home)	Total Energy Cost ($/home)
Current Energy Code	$886.9	$278.0	$21.7	$1,186.6
Proposed 2020 ECCCNYS	$869.2	$273.2	$21.4	$1,163.8
Savings (%)	2.0%	1.7%	1.5%	1.9%

Climate Design Zone 5A				
	Electricity Cost ($/home)	Natural Gas Cost ($/home)	Fuel Oil Cost ($/home)	Total Energy Cost ($/home)
Current Energy Code	$ 1,094.8	$ 541.8	$ 74.1	$ 1,710.8

Proposed 2020 ECCCNYS	$ 1,071.0	$ 535.7	$ 73.3	$ 1,680.0
Savings (%)	2.2%	1.1%	1.1%	1.8%

Climate Design Zone 6A Avg				
	Electricity Cost ($/home)	Natural Gas Cost ($/home)	Fuel Oil Cost ($/home)	Total Energy Cost ($/home)
Current Energy Code	$1,153.2	$631.6	$43.2	$1,828.0
Proposed 2020 ECCCNYS	$1,123.6	$623.1	$42.6	$1,789.3
Savings (%)	2.6%	1.3%	1.4%	2.1%

New York State Average				
	Electricity Cost ($/home)	Natural Gas Cost ($/home)	Fuel Oil Cost ($/home)	Total Energy Cost ($/home)
Current Energy Code	$1,035.7	$469.6	$51.1	$1,556.5
Proposed 2020 ECCCNYS	$1,012.9	$463.6	$50.5	$1,526.9
Savings (%)	2.2%	1.3%	1.2%	1.9%

Simple Payback. The following Table shows the weighted average annual energy cost savings, the associated total incremental costs, and the resulting simple payback for the proposed residential provisions of the 2020 ECCCNYS compared to the current Energy Code. The negative incremental cost, or cost reduction, in climate zone 6A is due to the lower exterior wall insulation and slab-edge insulation in Option 2 of the prescriptive envelope requirements in the proposed 2020 ECCCNYS compared to the current Energy Code. The lower insulation requirements are also associated with an increase in energy use. In determining that the residential provisions of the Energy Code, as amended by this proposed rule, will be cost effective in accordance with Energy Law §11-103(2), the State average of 3.3 years found by the study is well below the 10-year limitation cited by statute.

Climate Design Zone	Total Annual Energy Cost Savings ($/home)	Total Incremental Costs ($/home)	Simple Payback (Years)
4A	$22.81	$102.60	4.5
5A	$30.82	$176.09	5.7
6A Avg	$38.79	$(133.44)	0.0
NY State Avg	$29.55	$96.70	3.3

Ten-year Net Present value of Energy Cost Savings**.** The Table below summarizes the 10-year net present value (NPV) of energy cost savings for the proposed residential provisions of the 2020 ECCCNYS compared to the current Energy Code. Results for pure energy cost savings are shown in the second column while the next two columns show the cumulative effect of including replacement costs and residual values. The results have been aggregated over the entire set of building types, foundation types, and heating systems using the construction weights matrix, and the results for climate zone 6A have been averaged over the two alternative options. In all cases, the energy cost savings comfortably exceed the first-year incremental costs.

Weighted Average Present Value of Energy Cost Savings over 10 Years – 2020 ECCCNYS vs. Current Energy Code

Climate Design Zone	Total First Year Incremental Costs ($/home)	10-Year NPV of Energy Cost Savings ($/home)	10-Year NPV of Cost Savings Including Replacement Costs ($/home)	10-Year NPV of Cost Savings Including Replacement Costs and Residual Values ($/home)
4A	$ 102.60	$185.59	$171.02	$176.73
5A	$ 176.09	$249.18	$232.95	$239.31
6A Avg	$ (133.44)	$314.06	$296.91	$303.63
NY State Avg	$ 96.70	$239.24	$223.40	$229.61

30-year Life Cycle Cost (LCC) Savings. The Table below summarizes the LCC savings of the proposed residential provisions of the 2020 ECCCNYS over the current Energy Code at the climate zone and state level. The results have been aggregated over the entire set of building types, foundation types, and heating systems using the construction weights matrix, and the results for climate zone 6A have been averaged over the two alternative options. The residential provisions of the proposed 2020 ECCCNYS are found to be cost-effective for the home-owner and yield positive savings over the life of the dwelling.

Average 30-Year LCC Savings – 2020 ECCCNYS vs. Current Energy Code

Climate Design Zone	30 Year Life Cycle Cost Savings ($/home)
4A	$139.09
5A	$117.04
6A Avg	$747.67
NY State Avg	$235.81

SIGNIFICANT CHANGES – RESIDENTIAL BUILDINGS

1. Building Thermal Envelope exemption for Log Homes

Description of change

This code change now exempts log homes from the prescriptive building thermal envelope requirements when designed in accordance with ICC-400, Standard on the Design and Construction of Log Structures. This code change places the compliance path for log homes in a more applicable standard which will now provide a prescriptive compliance path for the log home industry. We see this as a positive change for the industry allowing for greater flexibility.

Needs and benefits

Historically, log home acceptance has been challenging based on the difference in its intrinsic envelope makeup. Code enforcement personnel have been confused or at a loss as to how to accept this type of construction as compliant under the Energy Code. This modification paves the way for a fair and logical acceptance of this alternative construction type.

2. Fenestration Requirements

Description of change

The prescriptive U-factors for fenestration have been made more stringent in all climate zones improving the energy efficiency of dwellings.

Needs and benefits

This code change provides a code upgrade to U-factors for windows. U-factors will only slightly increase. This change increases stringency of the code with products that are currently readily available in the market and has the effect of increasing the sustainability of the structure.

3. Acceptance of RESNET standard for Testing for Air Leakage

Description of change

RESNET/ICC 380 is now referenced in the current residential provisions of the 2020 ECCCNYS to provide flexibility for air-leakage testing in lieu of generic listed standards. This change provides air testing flexibility, allowing a nationally recognized testing standard.

Needs and benefits

Until the acceptance of this nationally administered program for professional building raters, code enforcement personnel have been confused or at a loss as to how to accept credentials for raters of this type. This modification grants clarity to accept a nationally recognized standard.

4. Air Barrier and Insulation Installation Table

Description of change

This code change modifies the table for insulation installation and air barrier details and contains several wording clarifications and modifications to more clearly describe the requirements for air sealing in several cases. For example, there had been confusion surrounding what constitutes the terms “Air Barrier” and “Vapor Retarder,” as well as where they are to be located and how they are to be installed.

Needs and benefits

The modifications to this Table increase understanding of installation details for the design professional, code enforcement personnel, contactors, and installers. The benefits are recognized across the industry and ensure, to some degree, that building envelopes are more correctly installed, insulated, and air sealed.

5. ERI Methodology

Description of change

RESNET/ICC 301 is now referenced in the residential provisions of the 2020 ECCCNYS to provide an industry wide standard for computation of the Maximum ERI index rating for use in Section R406. In the current Energy Code there is no recognized standard for computation of the Maximum ERI index rating.

Needs and benefits

This code modification will have the effect of increasing the use of the ERI methodology and will create standardizes practices. Code enforcement personnel will now have an industry recognized methodology to accept this code path standard.

4. COSTS.

(a) Costs to Regulated Parties.

Implementation Costs – "First Costs". In general, the costs to regulated parties for implementing this rule will include the "first costs," i.e. the increase (or decrease) in the costs of constructing a building to the requirements of the proposed Energy Code rather than the requirements of the current Energy Code.

For the six commercial building prototypes studied in Climate Zones 4A and 5A, the "first costs" range from a decrease of $183,450 (for a small hotel in Zone 4A) to an increase of $601,949 (for a large office building in Zone 4A).

For the residential building prototypes studied, the "first costs" average ranges from an increase of $176.09 (for a residential building in Zone 5A) to a decrease of $133.44 (for a residential building in Zone 6A). The cost reduction in Climate Zone 6A is partly due to the lower exterior wall insulation and slab-edge insulation in Option 2 of the prescriptive envelope requirements in the proposed 2020 ECCCNYS compared to the current Energy Code.

Other Implementation Costs. A copy of the 2020 ECCCNYS costs approximately $124 to $172 and a copy of ASHRAE 90.1-2016 costs approximately $133 to $157.

Continuing Compliance Costs. In general, the on-going costs of continuing to comply with this rule will consist of the change (increase or decrease) in (1) the cost of maintaining energy-related systems and equipment, (2) the cost of periodic replacement of energy-related systems and equipment, and (3) a decrease in average energy use cost of 8.3% for commercial buildings and 1.97% for residential buildings.

(b) Costs to the Department of State, the State, and Local Governments.

Costs to the Department of State. The Department of State's Division of Building Standards and Codes ("DBSC") will offer training on the Energy Code, as revised by this proposed rule, to code enforcement personnel, registered design professional, and other interested parties. However, offering such training is part of the DBSC's core mission, and the Department of State anticipates that DBSC will be able to offer such training using its existing staff and facilities, at no significant additional cost to the agency.

Costs to Local Governments – Enforcement. Most local governments (cities, towns, and villages) and some counties are required by existing law to administer and enforce the Energy Code within their boundaries. Most counties and certain State agencies are required by existing law to administer and enforce the Energy Code with respect to buildings in their custody and control. These existing administration and enforcement obligations will continue with respect to the Energy Code as amended by this proposed rule. It is not anticipated that this proposed rule will have any significant impact on the existing code administration and enforcement obligations of local governments, counties, and State agencies.

Local governments, counties, and State agencies that currently administer and enforce the Energy Code will be required to ensure that their code enforcement personnel receive training on the new Energy Code for commercial buildings and residential buildings. However, code enforcement personnel are already required by regulation to receive annual "in-service" code training, and the Department of State and the Code Council anticipate that code enforcement personnel will be able to receive training on the new Energy Code for commercial buildings and residential buildings as part of the already required in-service training. Furthermore, the Department of State's Division of Building Standards and Codes has a program in place for training local government code enforcement officials. The staff of the Division of Building Standards and Codes will provide training to assist local governments in an understanding of the requirements of the new Energy Code for commercial buildings.

Local governments, counties, and State agencies that currently administer and enforce the Energy Code will be required to purchase one or more copies of the 2020 ECCCNYS (about $124 to $174) and one or more copies of ASHRAE 90.1-2016 (about $133 to $157).

Costs to Local Governments – Compliance. Local governments, counties, and State agencies that construct commercial buildings and residential buildings for their own use will be required to comply with the Energy Code for commercial buildings and residential buildings, as amended by this proposed rule. When a local government, county or State agency constructs a commercial building or a residential building for its own use, it will be a regulated party, and it will be subject to the same costs of implementation and continuing compliance as private parties, as discussed in Part 4(a) ("Costs to Regulated Parties") of this Regulatory Impact Statement.

5. LOCAL GOVERNMENT MANDATES.

Enforcement Mandate. As discussed in Part 4(b) "Costs to the Department of State, the State, and local governments" of this Regulatory Impact Statement, existing law makes most local governments (cities, towns, and villages) and certain counties responsible for enforcing the Energy Code. This proposed rule will not change the existing code enforcement responsibilities of any local government or county.

As discussed in Part 4(b) of this Regulatory Impact Statement, local governments and counties that currently administer and enforce the Energy Code will be required to ensure that their code enforcement personnel receive training on the new Energy Code for commercial buildings and residential buildings. However, code enforcement personnel are already required by regulation to receive annual "in-service" code training, and the Department of State and the Code Council anticipate that code enforcement personnel will be able to receive training on the new Energy Code for commercial buildings and residential buildings as part of the already required in-service training. Furthermore, the Department of State's Division of Building Standards and Codes has a program in place for training local government code enforcement officials. The

staff of the Division of Building Standards and Code will provide training to assist local governments in an understanding of the requirements of the new Energy Code for commercial buildings and residential buildings.

Compliance Mandate. Local governments and counties that construct buildings for their own use are required to comply with the current Energy Code and will be required to comply with the Energy Code as amended by this proposed rule. The requirement that local governments and counties comply with the current Energy Code, and with the Energy Code as amended by this proposed rule, is imposed by existing provisions of the Energy Law, and will not be a new requirement imposed by this proposed rule. Local governments and counties that construct buildings for their own use are regulated parties, and as such can expect to see the same benefits described in Part 3 ("Needs and Benefits") of this Regulatory Impact Statement and to incur the costs described in Part 4(a) ("Costs to Regulated Parties") of this Regulatory Impact Statement.

6. PAPERWORK.

Regulated parties are required by other, existing law to prepare plans and specifications documenting compliance with the current version of the Energy Code and to submit such plans and specifications to the governmental unit or agency responsible for enforcing the Energy Code with the application for a building permit. Governmental units or agencies that enforce the Energy Code are required by other, exiting law to review such plans and specifications, to determine compliance with the current version of the Energy Code, to issue permits, to conduct and document construction inspections, and to issue certificates of occupancy. These obligations will continue with respect to the Energy Code as amended by this proposed rule. This proposed rule will not add any new or additional reporting or paperwork requirements.

7. RELEVANT RULES AND LEGAL REQUIREMENTS / DUPLICATION.

Rules and other legal requirements of the New York State and Federal governments that are relevant to this proposed rule include the following:

NYS Energy Law §11-103(2) provides that the provisions of the Energy Code applicable to residential buildings must meet or exceed the most recent edition of the IECC. Adoption of this proposed rule will assure that the provisions of the Energy Code applicable to residential buildings meet or exceed the 2018 edition of the IECC.

NYS Energy Law §11-103(2) provides that the provisions of the Energy Code applicable to commercial buildings must meet or exceed ASHRAE 90.1-2007. The current Energy Code for commercial buildings meet or exceed ASHRAE 90.1-2007. The Energy Code for commercial buildings as amended by this proposed rule will continued to meet or exceed ASHRAE 90.1-2007.

Title III of the Federal Energy Conservation and Production Act provides that when DOE determines that buildings constructed to a revised edition of the ASHRAE 90.1 Standard would achieve greater energy efficiency than buildings constructed to the prior edition of ASHRAE 90.1, states are required to update their energy codes for commercial buildings to codes that meet or exceed the revised edition of ASHRAE 90.1. On February 27, 2018, the DOE published the DOE Notice of Determination in the Federal Register, indicating that DOE has determined that buildings constructed to the requirements of ASHRAE 90.1-2016 would achieve greater energy efficiency than buildings constructed to the requirements of ASHRAE 90.1-2013. See 83 Federal Register 8463 (February 27, 2018).[18] This proposed rule would amend the Energy Code for commercial buildings from one that meets or exceeds ASHRAE 90.1-2013 to one than meets or exceeds ASHRAE 90.1-2016.

[18] https://www.govinfo.gov/content/pkg/FR-2018-02-27/pdf/2018-03931.pdf

Title III of the Energy Conservation and Production Act, in 42 U.S.C. 6833(a), provides that when the DOE determines that buildings constructed to a revised edition of the 1992 Model Energy Code (MEC) or any successor to that code, would achieve greater energy efficiency than buildings constructed to the prior edition of the MEC or any successor to that code, states are required to review their energy codes for residential buildings and make a determination as to whether it is appropriate to revise such codes to one that meets or exceeds the revised edition of the MEC, or any successor to that code. States may revise their residential building energy codes such that they meet or exceed the revised edition of the MEC, or any successor to that code, or determine that it is not appropriate for the state to revise its residential building energy code.

Article 11 of the New York State Energy Law requires the adoption of the Energy Code and contemplates that the Energy Code be amended from time to time to achieve the objectives described in Part 2 ("Legislative Objectives") of this Regulatory Impact Statement.

Energy Law §11-103(3) provides that any regulation of any other State agency pertaining to energy conservation is superseded by the Energy Code and will be superseded by the Energy Code as amended by this proposed rule.

Based on the foregoing, the Department of State believes that this proposed rule does not duplicate or conflict with any rule or other legal requirement of the State or the Federal government.

8. ALTERNATIVES.

Alternative - Commercial Buildings

The following is a significant alternative to the portion of this proposed rule that applies to commercial buildings that was considered by the Department of State and the Code Council:

ALTERNATIVE: ADOPTION OF ASHRAE 90.1-2016 ONLY

In essence, this proposed rule will adopt the "Commercial Provisions" of the 2020 ECCCNYS

(primarily based on the 2018 IECC Commercial Provisions) as the new Energy Code for commercial buildings ("2020 ECCCNYS Commercial Provisions"). Simply adopting ASHRAE 90.1-2016 as the new Energy Code for commercial buildings was considered as an alternative. However, this alternative was not incorporated into this proposed rule for the following reasons:

1. The 2020 ECCCNYS Commercial Provisions allow a building owner and design professional to choose between complying with (1) ASHRAE 90.1-2016 or (2) one of two alternative compliance paths set forth in the 2020 ECCCNYS Commercial Provisions.

2. The building owners and design professionals typically find that the alternative compliance paths set forth in the 2020 ECCCNYS Commercial Provisions are easier to understand and to apply to smaller, less sophisticated (complex) commercial buildings. The application of ASHRAE 90.1 as a compliance path is generally best utilized by design professionals, in High rise building design, in highly glazed buildings, and also is more applicable and compatible with sustainable building design. ASHRAE 90.1 -2016 contains an alternative compliance path (Normative Appendix G) identified as a LEED compliance methodology.[19]

3. The Department of State believes that each of the two alternative compliance paths set forth in the 2020 ECCCNYS Commercial Provisions meets or exceeds ASHRAE 90.1-2016, or results is equal or greater energy savings.

Based on the foregoing, the Department of State and the Code Council determined that adopting the 2020 ECCCNYS Commercial Provisions provides greater flexibility to building owners and design professionals, while still assuring that the New York State Energy Code for commercial buildings meets or exceeds ASHRAE 90.1-2016 or results in equal or greater energy savings.

Alternative - Commercial Buildings and Residential Buildings

The following is a significant alternative to the portion of this proposed rule that applies to both commercial and residential buildings that was considered by the Department of State and the Code Council:

[19] https://www.usgbc.org/articles/new-guidance-leed-projects-subject-alternative-energy-codes

ALTERNATIVE: ADOPTION OF 2018 IECC AND A SEPARATE SUPPLEMENT TO THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE

This proposed rule will adopt the "Commercial Provisions" and "Residential Provisions" of the 2020 ECCCNYS (primarily based on the 2018 IECC Commercial Provisions) as the new Energy Code. Simply adopting the 2018 IECC and also adopting a separate publication (similar to the 2016 Supplement to the New York State Energy Conservation Construction Code) was considered as an alternative. However, this alternative was not incorporated into this proposed rule because having all provisions contained in one publication, the 2020 ECCCNYS, was found to be more user friendly than the current Energy Code comprised of both the 2015 IECC and the 2016 Supplement to the New York State Energy Conservation Construction Code. It is anticipated that compliance with the Energy Code will increase with a consolidated, and more user-friendly, code book.

9. FEDERAL STANDARDS.

As discussed above in Part 7 "Relevant Rules and Legal Requirements / Duplication" of this Regulatory Impact Statement, Title III of the Energy Conservation and Production Act (ECPA) provides that states' building energy codes for commercial buildings be updated to meet or exceed updated versions of ASHRAE 90.1 when the DOE determines that the updated version of ASHRAE 90.1 will improve energy efficiency in commercial buildings. Furthermore, Title III of the Energy Conservation and Production Act (ECPA) provides that when the DOE determines that the updated version of the 1992 Model Energy Code (MEC) or its successor code will improve energy efficiency in residential buildings, states are required to review their energy codes for residential buildings and make a determination as to whether it is appropriate to revise such codes to one that meets or exceeds the revised edition of the MEC, or any successor to that code. States may revise their residential building energy codes such that they meet or exceed the revised edition of the MEC, or any successor to that code, or determine that it is not appropriate for the state to revise its residential building energy code. Where the state makes a determination to not revise said code, it

shall submit to the Secretary of Energy, in writing, the reasons for such determination, and such statement shall be made available to the public. This proposed rule will cause New York State's building energy code for commercial buildings to meet or exceed ASHRAE 90.1-2016, consistent with Federal standards as established by the ECPA and by the determination regarding ASHRAE 90.1-2016 published by DOE in the Federal Register on February 27, 2018.

10. COMPLIANCE SCHEDULE.

This proposed rule and the amendment of the Energy Code to be implemented by this proposed rule will become effective 90 days after the date of publication of the Notice of Adoption. The Department of State and the Code Council anticipate that regulated parties will be able to comply with the amended provisions of the Energy Code immediately upon this proposed rule becoming effective.