

780 CMR 51.00: International Residential Code

CHAPTER 11: ENERGY EFFICIENCY

N1100.1 Add the following sections as follows:

1100.1 Adoption. Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code 2015* (IECC), as amended by Chapter 11 of 780 CMR 51.00 *et seq.*

Exception. Applications for building permits and related construction and other documents filed through January 1, 2017, may comply either with amended Chapters 11, 51 and Appendix 115.AA of this code effective _____, or with the Eighth Edition versions of those provisions in effect immediately prior to amendment, but not a mix of both. After January 1, 2017, concurrency with the Eighth Edition ends, and all applications for building permits and related construction and other documents must comply with the amended provisions only.

N1101.1 Revise the section as follows:

N1101.1 Scope. This chapter regulates the energy efficiency for the design and construction of buildings regulated by this code. Municipalities which have adopted the Stretch Energy Code shall use the energy efficiency requirements of 780 CMR 115 Appendix AA (attached to this code).

N1101.6 (R202) Add and/or revise the following defined terms:

CLEAN BIOMASS STOVE. Wood- or pellet-fired stoves that are EPA certified; and have a particulate matter emissions rating of no more than 3.5 g/hr for non-catalytic wood and pellet stoves; or 2.0 g/hr for catalytic wood and pellet stoves.

CLEAN BIOMASS HEATING SYSTEMS. Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 80% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.15 lb/MMBtu PM heat output.

N1101.13 Revise the section as follows:

N1101.13 (R401.2) Compliance. Projects shall comply with one of the following:

1. Sections N1101.14 through N1104.
2. Section N1105 and the provisions of Sections N1101.14 through N1104 labeled “Mandatory.”
3. An energy rating index (ERI) approach, or approved alternative energy performance rating method in Section N1106.

Qualifying approaches include the following:

- a. Certified RESNET HERS rating with MA amendments.
- b. Certified Energy Star Homes, Version 3.1.
- c. Certified Passivehaus performance method.

N1101.14 (R401.3) Add the following to the end of the paragraph:

“The Certificate shall list the final HERS index when applicable.”

Table N1102.1.2 (R402.1.2) Revise the table as follows:

Climate Zone 5 and Marine 4 Fenestration *U* Factor shall be “0.30”.

Table N1102.1.4 (R402.1.4) Revise the table as follows:

Climate Zone 5 and Marine 4 Fenestration *U* Factor shall be “0.30”.

N1102.1.5.1 Add the subsection as follows:

N1102.1.5.1 Approved software for Total UA alternative: The following software is approved for demonstrating Total UA compliance:

1. REScheck Version 4.6.0 or later, available at <http://www.energycodes.gov/rescheck>
2. REScheck-Web available at <https://energycode.pnl.gov/REScheckWeb/>

N1103.3.3 (R403.3.3) Add the following paragraph before the exception:

Post-construction or rough-in testing and verification shall be done by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional.

N1103.6 (R403.6) Replace the section as follows:

N1103.6 (R403.6) Mechanical ventilation (Mandatory). Each *dwelling unit* of a *residential building* shall be provided with continuously operating exhaust, supply or balanced mechanical ventilation that has been site verified to meet a minimum airflow per:

1. the Energy Star Homes’ Version 3.1 or
2. ASHRAE 62.2 - 2013 or
3. the following formula for one- and two-family dwellings and townhouses of three or less *stories above grade plane*:

$$Q = .03 \times \text{CFA} + 7.5 \times (\text{N}_{\text{br}} + 1) - 0.052 \times Q_{50} \times S \times \text{WSF}$$

Where: CFA is the *conditioned floor area* in sq ft

N_{br} is the number of bedrooms

Q_{50} is the verified blower door air leakage rate in cfm measured at 50 Pascals

S is the building height factor determined by this table:

stories above grade plane	1	2	3
S	1.00	1.32	1.55

WSF is the shielded weather factor as determined by this table:

County	WSF
Barnstable	0.60
Berkshire	0.52
Bristol	0.54
Dukes	0.59
Essex	0.58
Franklin	0.52
Hampden	0.49
Hampshire	0.59
Middlesex	0.55
Nantucket	0.61
Norfolk	0.52
Plymouth	0.53
Suffolk	0.66
Worcester	0.59

N1103.6.2 (R403.6.2) through N1103.6.6 (R403.6.6) Add the subsections as follows:

N1103.6.2 (R403.6.2) Verification: Installed performance of the mechanical ventilation system shall be tested and verified by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional, and measured using a flow hood, flow grid, or other airflow measuring device in accordance with either RESNET Standard Chapter 8 or ACCA Standard 5.

N1103.6.3 (R403.6.3) Air-moving equipment, selection and installation. As referenced in ASHRAE Standard 62.2-2013, Section 7.1, ventilation devices and equipment shall be tested and certified by AMCA (Air Movement and Control Association) or HVI (Home Ventilating Institute) and the certification label shall be found on the product. Installation of systems or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions. Where multiple duct sizes and/or exterior hoods are standard options, the minimum size shall not be used.

N1103.6.4 (R403.6.4) Sound Rating. Sound ratings for fans used for whole building ventilation shall be rated at a maximum of 1.0 sone.

Exception: HVAC air handlers and remote-mounted fans need not meet sound requirements. There must be at least 4 ft of ductwork between the remote-mounted fan and intake grille.

N1103.6.5 (R403.6.5) Documentation. The owner and the occupant of the *dwelling unit* shall be provided with information on the ventilation design and systems installed, as well as instructions on the proper operation and maintenance of the ventilation systems. Ventilation controls shall be labeled with regard to their function, unless the function is obvious.

N1103.6.6 (R403.6.6) Air Inlets and Exhausts. All ventilation air inlets shall be located a minimum of 10 ft from vent openings for plumbing drainage systems, appliance vent outlets, exhaust hood outlets, vehicle exhaust, or other known contamination sources; and shall not be obstructed by snow, plantings, or any other material. Outdoor forced air inlets shall be covered with rodent screens having mesh openings not greater than ½ inch. *A whole house mechanical ventilation system shall not extract air from an unconditioned basement unless approved by a registered design professional.* Where wall inlet or exhaust vents are less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, a metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the vent terminal. The sign shall read, in print size no less than one-half (1/2) inch in size, "MECH. VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

Exceptions:

1. Ventilation air inlets in the wall \geq 3 ft. from dryer exhausts and contamination sources exiting through the roof.
2. No minimum separation distance shall be required between local exhaust outlets in kitchens/bathrooms and windows.
3. Vent terminations that meet the requirements of the *National Fuel Gas Code* (NFPA 54/ ANSI Z223 .1) or equivalent.

N1104.3 (R404.2) Add the section as follows:

N1104.2 (R404.2) Electric Vehicle Service Equipment (EVSE) Ready (Mandatory). In accordance with 527 CMR and this section, at least one minimum 40-ampere branch circuit shall be provided to garages and/or the exterior of the building to accommodate a future dedicated Society of Automotive Engineers (SAE) standard J1772-approved Level 2 EVSE. The circuits shall have no other outlets. The service panel shall provide sufficient capacity and space to accommodate the circuit and over-current protective device. A permanent and visible label stating "EV READY" shall be posted in a conspicuous place at both the service panel and the circuit termination point.

The location and number of “EV READY” parking spaces shall be identified on construction documents as follows:

Type of Building	Number of spaces
Single-family dwelling:	1
Two-family dwelling:	1
3 or more unit building:	1 per two units

N1106.1 (R406.1) through N1106.1.2 Revise and/or add the section and subsections as follows:

N1106.1 (R406.1) Scope. This section establishes criteria for compliance using an Energy Rating Index (ERI) analysis, or approved alternative energy performance rating methods.

N1106.1.1 (R406.1.1) Approved alternative energy performance methods.

The following rating threshold criteria are sufficient to demonstrate energy code compliance under section N1106 without calculation of a standard reference design. The *mandatory* provisions of subsection N1106.2 also apply:

1. **ENERGY STAR Homes 3.1 path.** New buildings or additions to an existing building, building system or portion thereof shall be certified to conform to the ENERGY STAR Certified Homes, Version 3.1 standard.
2. **Passive House Institute US (PHIUS) Approved Software.** PHIUS+ 2015: Passive Building Standard – North America, or another *approved* software by PHIUS, where Specific Space Heat Demand, as modeled by a Certified Passive House Consultant, is less than or equal to 10 kBTU/ft²/year. Compliance with this section requires that the criteria of C402.4, C403.2, C404 and C405 are met.
3. Any other software *approved* by the Board of Building Regulations and Standards.

N1106.1.2 (R406.1.2) Documentation. The following documentation is required for energy code compliance under subsection N1106.1.1:

1. If using ENERGY STAR Homes, Version 3.1 path:
 - a. Prior to the issuance of a building *permit*, the following items(s) must be provided to the *Building Official*:
 - i. A copy of the preliminary HERS rating, based on plans
 - b. Prior to the issuance of a certificate of occupancy, the following items must be provided to the *Building Official*:
 - i. A copy of the final ENERGY STAR Homes certificate;
 - ii. A copy of the certified HERS rating; and

- iii. A copy of the signed ENERGY STAR Thermal Enclosure System Checklist.
2. If using the PHIUS software:
- a. Prior to the issuance of a building *permit*, the following items(s) must be provided to the *Building Official*:
 - i. A list of compliance features; and
 - ii. A statement that the estimated Specific Space Heat Demand is “based on plans”
 - b. Prior to the issuance of a certificate of occupancy, the following item must be provided to the *building official*:
 - i. A copy of the final report, submitted on a form that is *approved* to document compliance with PHIUS+ 2015 standards. Said report must indicate that the finished building achieves a Certified Passive House Consultant-verified Specific Space Heat Demand of less than or equal to 10kBTU/ft²/year.

N1106.3 (R406.3) Add the following sentence to the end of the paragraph:

“The RESNET Home Energy Rating System (HERS) index is the approved ERI approach in Massachusetts.”

N1106.4 (R406.4) Revise the section as follows:

N1106.4 (R406.4) ERI-based compliance. Compliance based on an ERI analysis requires that the *rated design* be shown to have an ERI less than or equal to the appropriate value listed in Table N1106.4 when compared to the *ERI reference design* prior to credit for onsite renewable electric generation.

N1106.4.1 (R406.4.1) Add the subsection, and associated table, as follows:

N1106.4.1 (R406.4.1) Trade-off for onsite renewable energy systems. New construction following N1106.3 or existing buildings and additions following N1107.4 may use any combination of the following renewable energy trade-offs to increase the maximum allowable HERS rating for each unit separately served by any combination of the following:

- 1. Solar photovoltaic array rated at 2.5kW or higher shall offset 5 HERS points.
- 2. *Clean Biomass Heating System*, solar thermal array, or geothermal heat pump, or a combination of these systems, operating as the primary heating system shall offset 5 HERS points.
- 3. Solar thermal array for primary domestic hot water heating or a *Clean Biomass Stove* shall offset 2 HERS points.

Note: A *Clean Biomass Stove* offset may not be combined with a primary heating system offset.

Table N1106.4.1 (R406.4.1). Maximum HERS ratings with onsite renewable energy systems

Renewable Energy Source	Maximum HERS index	
	New construction	Whole house renovations; additions
None	55	65
Solar PV > 2.5kW; Renewable primary heating system	60	70
Solar PV; Renewable primary heating & solar thermal DHW	62	72
Solar PV & Renewable primary heating & solar thermal DHW	67	77

N1106.5 (R406.5) Revise the section as follows:

N1106.5 (R406.5) Verification by approved agency. Verification of compliance with Section N1106 shall be completed by an *approved* third party. For compliance using a HERS rating or Energy Star Homes 3.1 certification, verification of compliance shall be completed by the certified HERS rater. For compliance using PHIUS+ 2015, verification of compliance shall be completed by a certified Passive House consultant.

N1108.1.2 (R502.1.2) Add an exception to the subsection as follows:

Exception: Alternatively, the addition and any alterations that are part of the project shall comply with N1106 and shall achieve a maximum HERS index using Table N1106.4.1.

APPENDIX U: SOLAR-READY PROVISIONS – DETACHED ONE- AND TWO-FAMILY DWELLINGS, MULTIPLE SINGLE-FAMILY DWELLINGS (TOWNHOUSES)
(Adopted as amended)

AU101.1 Revise the section as follows:

AU101.1 General. These provisions shall be applicable for new construction, except additions.