



June 28, 2016

The Massachusetts Department of Public Safety
Attn: Mr. Stephen Carley

RE: Comments on 780 CMR 9th Edition Proposed Changes

Per request for comments to the proposed changes to the energy efficiency provisions of the state building code, please find our comments below.

Residential Code

Table N1102.1.2 (R402.1.2) We support lowering maximum fenestration U-factor to 0.30.

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." It seems implied that the installing contractor should not test their own system, so why not make that explicit. Recommendation to add language at the beginning of what is being proposed: "Testing shall not be performed by the installing contractor."

N1103.6 (R403.6) Adding the ventilation rate formulas is a good idea, and we believe that it is good to have the guidance right in the energy code so that users do not need to acquire ASHRAE 62.2. But we have a few reservations.

It would be more direct to simply reference ASHRAE 62.2-2010 instead of ENERGY STAR Homes v3.1 which leads to 62.2-2010 anyway.

While it is good to have the ventilation rate formulas right in the code, they are complex looking and we think they will confuse many users. Is there a simpler prescriptive approach that could be offered? At minimum, DOER or DPS should commit to developing a free calculation tool and posting it online.

We are concerned that by removing the reference to IRC and IMC, there are other aspects of the mechanical ventilation requirements that would be removed. Specifically: Efficacy Tables, automatic damper requirement, general prohibition to re-circulate exhaust air to somewhere else in the building or a buffer space, requirement for a manual over ride switch.

N1103.6.6 (R403.6.6) Air Inlets and Exhausts. There should be an exception to allow for manufactured intake/exhaust systems that have demonstrated no re-entrainment. (For example, Venmar's Tandem Dual Hood - <http://www.venmar.ca/218-accessories-transition-tandem.html>)

N1104.2 (R404.2) Electric Vehicle Service Equipment (EVSE) Ready (Mandatory). Is the intent to have a dedicated 40 amps available in the service panel, or to actually run a branch circuit to a dedicated receptacle? There could be considerable extra cost associated with running the circuit to a receptacle



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depending on the location of the service panel and the logical location of the charging station. We recommend following an approach similar to what is proposed for solar readiness. (i.e., that the electrical service panel have space and capacity to accommodate 40 amps for Eversource charging, and that a conduit be run to a suitable location. But not that the conductors or terminal necessarily be installed.) There is language in force in Denver that provides more flexibility and also has the advantage of having been adopted. See below and

https://www.denvergov.org/content/dam/denvergov/Portals/696/documents/BuildingCode/2015_public_amendment_proposal_IRC_SectionR324_2_ElectricVehicleChargingOptions.pdf

R324.1 Electric Vehicle Charging Options.

For one- or two- family dwellings and townhouses, provide a minimum of:

- a. One 208/240 V 40 amp, grounded AC outlet, for each dwelling unit; or
- b. Panel capacity and conduit for the future installation of a 208/240 V 40 amp, grounded AC outlet, for each dwelling unit.

The electrical outlet or conduit termination shall be located adjacent to the parking area.

R324.2 For residential occupancies where there is a common parking area, provide one of the following:

- a. A minimum number of 208/240 V 40 amp, grounded AC outlets equal to 5 percent of the total number of parking spaces. The outlets shall be located within the parking area; or
- b. Panel capacity and conduit for future installation of electrical outlets. The panel capacity and conduit size shall be designed to accommodate the future installation, and allow the simultaneous charging, of a minimum number of 208/240 V 40 amp, grounded AC outlets, that is equal to 5 percent of the total number of parking spaces. The conduit shall terminate within the parking area. When the application of the 5 percent results in a fractional space, round up to the next whole number.

Exception: If the electric panel is located in the parking area conduit does not need to be installed.

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

The first option (ENERGY STAR Homes 3.1) should not allowed for "...additions to an existing building, building system or portion thereof..." because ENERGY STAR eligibility is limited to new construction, so there is no mechanism for achieving status under v3.1.

The third option presented ("Any other software approved by the Board of Building Regulations and Standards:") is not a "rating threshold criteria" as noted in the introductory language in the section.

N1106.1.2 (R406.1.2) Documentation. For Option 1a (ENERGY STAR Homes v3.1 path), submitting for a permit, applicants should also submit the ENERGY STAR v3.1 *Home Report* and the *Rater Design Review Checklist*. For Option 1b iii, submitting for C of O, they should submit the *Rater Field Checklist* rather than the TEC. Also, the ENERGY STAR Home certificate does not add value beyond the other two documents requested and could be left off the list of required documentation.

N1106.4.1 (R406.4.1) Trade-off for onsite renewable energy systems. #2. Clean Biomass Heating System

The term "geothermal" heat pump should be replaced by "ground source heat pump."



There is no efficiency performance criteria for heat pumps, which presumes that any GSHP is "efficient", which is simply not true. Also, given advancements in air source heat pumps, these should also be allowed assuming they meet explicit performance criteria which should be established. NEEP's work on ccASHP criteria is available to include or to reference.

Table N1106.4.1 (R406.4.1). Maximum HERS ratings with onsite renewable energy systems. We think that the Renewable Energy Source cell that reads "Solar PV; Renewable primary heating & solar thermal DHW" would be clarified if the semicolon were replaced with a comma and the word "or" so that it reads "Solar PV, or Renewable primary heating & solar thermal DHW."

Base Code

[E] 1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the 2015 International Energy Conservation Code (IECC) with Massachusetts Amendments contained herein. These amendments are intended to expressly apply to the IECC, and are also to applicable, in intent, to ANSI/ASHRAE/IESNA 90.1. This language is unclear, although we believe we understand the intent. Recommend rephrasing second sentence to read "These amendments are intended to apply to the IECC and also to ANSI/ASHRAE/IESNA 90.1."

Proposed Addition: C402.2.5.1 Slabs in contact with the ground. All slabs in contact with the ground shall be fully insulated with a minimum of R 5 rigid insulation in the following buildings: buildings of use group E, including daycare; buildings of use groups R-1, R-2, I-1 and I-2, and; college and university buildings of B and A use groups. Massachusetts has had this requirement since the sixth edition but lost it in the eighth. The reason for insulating under the entire slab is that ground temperature and (hence the slab) will be at 50 550 F. This is lower than summer dew-point temperatures of the air, which causes condensation and mold in buildings that shut down their HVAC systems in the summer. A 20 degree temperature gradient across the slab is also significant in a heating-dominated climate from an energy perspective.

C402.3 Rooftop solar readiness. New low-rise commercial buildings and additions of less than 4 stories above grade, with not less than 2,400 square feet of roof area that is either flat or oriented between 110 degrees and 270 degrees of true north shall comply with Sections C402.3.1 through C402.3.6. The term "low-rise" is not defined in the Base Code chapter 2, although "high-rise" is defined as buildings more than 70 feet above grade. While it might seem overly meticulous, we suggest adding a definition of "low-rise".

Exception #4. The proposed language is contradictory because a solar ready zone that is shaded is not a solar ready zone; if the roof area is too shaded for a SR zone, then the exemption should apply. We recommend the following modification: "Buildings with a solar ready zone that is shaded for more than Buildings where roof area does not provide sufficient square footage for a solar ready zone that is shaded at least 50 percent of daylight hours annually."

C407.6.1.4.1 Trade-off for onsite renewable energy systems. New construction following C407.6.1.3, and existing buildings and additions following C501.4 may use any combination of the following renewable trade-offs to increase the maximum allowable HERS rating index for each unit separately served by any combination of the following:...

"Rating" should be changed to "index".



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Option 1 Solar photovoltaic array, rated at 2.5kW or higher, shall offset 5 HERS points. We feel that the number of HERS points is too high for a 2.5 kWh array on a MF building. Either limit the credit to 2 or 3 points, or require systems sized to meet 5% of building electrical capacity if the credit is to remain 5 points.

C407.6.1.4.1 Trade-off for onsite renewable energy systems.

Option 2 should have the same criteria as stated in 406.5 Option 3: 3. "Provide not less than 65 percent of the total annual energy used within the building for building space and service water heating with biomass fuel using direct vented combustion mechanical equipment rated at a minimum of 80 AFUE. The biomass fuel shall meet the eligible fuel and emission criteria under M.G.L. c. 25A, §11F 1/2 (Massachusetts alternative energy portfolio standard)."

Option 3 should be included in Option 2, with a maximum total of 5 HERS Index points.

C401.2 Application, Option 4 allows residential buildings up to 5 stories, but the stretch code (AA 103.1) limits height to 4 stories, and the IRC (R101.2) limits height to 3 stories. While these three are not absolutely contradictory, they are certainly confusing. We recommend modifications to make them all consistent.

C406.1 Exception 1: We are concerned with possible future effects of referencing Mass Save as a criterion; there could be program changes that significantly reduce incentives, and would thereby put participating communities at a disadvantage.

C406.5 #4 and C407.6.1.4.1 – See notes on N1106.4.1 (R406.4.1) - comment 8 - above.

C407.6.1.1 through 407.6.1.5 – Update based on accepted comments to residential section

Stretch Code

AA101 Purpose and Adoption. As written is refers only to "new construction". This should be modified as follows (additions in *underlined italics*): "The purpose of the stretch energy code is to provide a more energy efficient code alternative for new *and existing* buildings. The stretch energy code may be adopted or rescinded by any municipality in the commonwealth in the manner prescribed by law."

AA 103.1 R-use buildings specifies that the code applies to building 4 stories or less in height. See comment on C401.2 above in Base Code section.

On behalf of the Massachusetts' Program Administrators,

Sincerely,

Eric Beaton

Massachusetts Code Compliance Support Initiative