Summary of the Massachusetts Building Code Appendix 120.AA, 'Stretch' Energy Code

Appendix 120.AA known as the 'Stretch code', was adopted by the Massachusetts Board of Building Regulations and Standards in May 2009, as an optional appendix to the Massachusetts Building Code 780 CMR.

This optional 'stretch code' was developed in response to the call for improved building energy efficiency in Massachusetts. Towns and cities in the Commonwealth may adopt Appendix 120.AA in place of the energy efficiency requirements of the 'base' building code. In addition, the 'base' building energy code in Massachusetts will be updated in 2010 to the recently published IECC (International Energy Conservation Code) 2009 energy code[1]. The 'stretch code' is similarly based on the IECC 2009 energy code, but with approximately 20% greater building efficiency requirements, and a move towards 3rd party testing and rating of building energy performance.

The stretch code may be adopted by any town or city in the commonwealth, by decision of its governing body following a public hearing. In a city the governing body is the city manager and the city council, or the mayor and city council[2]. In towns the governing body is the board of selectmen. In order to be adopted, the appendix must be first considered at an appropriate municipal public hearing, subject to the municipality's existing public notice provisions.

Stretch code provisions

Residential - New Construction
New residential buildings 3 stories or less will be required to meet an energy performance standard using the Home Energy Rating System[3] (HERS). The HERS index scores a home on a scale where 0 is a zero-net-energy home, and 100 is a code compliant new home (currently based on the IECC 2006 code). The HERS index has been in use for many years by beyond code programs such as Energy Star Homes, and LEED for Homes, and by the Federal IRS for tax credits and energy efficient mortgages. HERS ratings are performed by an independent HERS rater, working with the home builder, and then submitted to the local building code official.

The MA stretch code requires a HERS index of 65 or less for new homes of 3,000 square feet or above, and 70 or less for new homes below 3,000 square feet (this includes multi-family units in buildings of 3 stories or less).
A HERS index of 65 means that the home is estimated to use 65% as much energy as the same home built to the 2006 energy code, or a 35% annual energy savings.

Residential – Home renovations
Home additions and renovations have two options to meet the stretch code:

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[1] The Green Communities Act of 2008 requires that Massachusetts adopt each new IECC within one year of its release, the IECC is updated on a 3 year cycle so the next version will be IECC 2012.
[2] Cities having a Plan D or Plan E charter have the City manager and city council as the governing body, other cities have a Mayor and city council.
[3] For a summary of the HERS index see: http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_HERS

i) The same "performance" approach as new construction but requiring a HERS index of 80 or less for significant changes to homes over 2,000 square feet, or 85 or less for homes below 2,000 square feet.

ii) A "prescriptive" approach, where specific efficiency measures are required rather than a HERS index number. This utilizes the Energy Star for Homes program prescriptive requirements, and insulation at least equal to IECC 2009.

Commercial –New Construction

The stretch code also applies a performance-based code to commercial buildings, with the option of a prescriptive code for small and medium-sized commercial buildings. Buildings smaller than 5,000 square feet are exempt, as are building renovations, and "specialty" buildings – supermarkets, laboratories, and warehouses – below 40,000 square feet in size, due to their widely differing energy needs. These exempt buildings remain subject to the 'base' Massachusetts energy code (IECC 2009 and ASHRAE 90.1-2007).

Large buildings of any type over 100,000 square feet, and 'specialty' buildings over 40,000 square feet are required to meet a performance standard set at 20% below the energy usage of the commonly used ASHRAE 90.1-2007 code[4], demonstrated through modeling by methods and software approved by the BBRS.

Medium-sized commercial buildings, which include residential buildings of 4 stories or more, but that are less than 100,000 square feet, have the option of meeting the same 20% better than ASHRAE 90.1-2007 performance standard, or using a simplified, prescriptive energy code.

The prescriptive code is based on Chapter 5 of the IECC 2009 energy code, and adds incremental efficiency improvements primarily through:

a. Building envelope elements (walls, roofs, windows, insulation, etc.)
b. Commissioning requirements to ensure that buildings' energy systems operate as designed.
c. More efficient lighting power densities and improved lighting controls.
d. A choice of one of three compliance paths: high efficiency HVAC equipment, further lighting energy reductions, or on-site renewable energy.

This prescriptive option for commercial buildings between 5,000 and 100,000 sq. ft. was developed from the Core Performance program of the New Buildings Institute. This program has been developed and used for utility incentive programs in Massachusetts for the past couple of years. The Core Performance program used over 30,000 energy modeling runs to evaluate and rank the most cost effective modifications to the ASHRAE 90.1 code, and has been run specifically with Boston climate data to represent Massachusetts. Certain areas of this prescriptive option were also updated to reflect recent energy code development for future iterations of ASHRAE and IECC codes and refined for specific application in Massachusetts where they are cost-effective.

[4] Energy modeling must show a 20% improvement relative to ASHRAE 90.1-2007 Appendix G.