

ATTACHMENT A

12.



CITY OF CAMBRIDGE • EXECUTIVE DEPARTMENT

Robert W. Healy, City Manager Richard C. Rossi, Deputy City Manager

795 Massachusetts Avenue, Cambridge, Massachusetts 02139

Voice: 617.349.4300 Fax: 617.349.4307 TTY: 617.349.4242 Web: www.cambridgema.gov

June 8, 2009

To the Honorable, the City Council:

Please find attached a response to Awaiting Report Item Number 09-57, regarding a report on the method by which the City can adopt the state's Stretch Energy Code, received from City Solicitor Donald A. Drisdell.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Robert W. Healy".

Robert W. Healy
City Manager

RWH/mec
Attachment

Donald A. Drisdell
City Solicitor

Nancy E. Glowa
Deputy City Solicitor

Arthur J. Goldberg
First Assistant
City Solicitor



Assistant City Solicitors

Vali Buland
Paul S. Kawai
Elizabeth A. Shaw
Samuel A. Aylesworth
Amy L. Witts

CITY OF CAMBRIDGE

Office of the City Solicitor
795 Massachusetts Avenue
Cambridge, Massachusetts 02139

June 4, 2009

Robert W. Healy
City Manager
City Hall
795 Massachusetts Avenue
Cambridge, MA 02139

Re: Adoption Process for Stretch Energy Code

Dear Mr. Healy:

In response to the inquiry as to the timeframe for a municipality's adoption of the "Stretch Energy Code" approved by the Board of Building Regulations and Standards (BBRS), please be advised as follows.

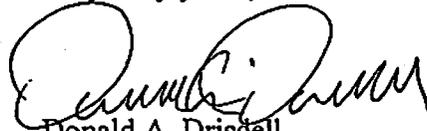
The BBRS approved a code change proposal to the State Building Code (780 CMR et seq.) at their May 12, 2009 meeting. The code change proposal will become Appendix 120.AA ("Stretch Energy Code") to the State Building Code. The adopted Stretch Energy Code does not become effective until it is promulgated and first appears published in the bi-weekly Massachusetts Register, which is published by the Secretary of the Commonwealth. Only after that first publication may a municipality begin the local process of adoption of the code amendment. The local process requires an appropriate public hearing prior to adoption.

In a telephone conversation this week with Mike Guigli of the Massachusetts Department of Public Safety, I was informed that the Department's goal is to promulgate and publish the Stretch Energy Code amendment to the State Building Code on July 1, 2009.

The BBRS also decided at its May 12, 2009 meeting that there will be a six month "concurrency period" in which a property owner has the right to decide whether to follow the existing Building Code or the Stretch Energy Code. A municipality that adopts the Stretch Energy Code is not permitted to compel compliance with that code during the concurrency period. Such six month concurrency period may only start on January 1st or

July 1st of any given year. Thus, assuming that the Stretch Energy Code is promulgated and published in the Massachusetts Register on July 1, 2009, a municipality may commence the process for adoption of the Stretch Energy Code thereafter. The minimum six month concurrency period may start no sooner than January 1, 2010, and the earliest date by which the Stretch Energy Code could be enforced would be July 1, 2010.

Very truly yours,

A handwritten signature in black ink, appearing to read "Donald A. Drisdell", written in a cursive style.

Donald A. Drisdell
City Solicitor

ATTACHMENT B

MA 'Stretch Code' and other Building Energy Codes

Marc Breslow and Ian Finlayson
Executive Office of Energy & Environmental Affairs

Green Communities Act

- Energy 2.0 legislation for MA
- Legislated latest IECC code
 - Plus other energy measures
 - Building commissioning
 - Building code training
- Green Communities Program
 - \$10m/year in funding to towns & cities
 - Requires life-cycle building energy efficiency
 - 5 other requirements too

IECC 2009 and 'I' codes

- MA required to move to IECC 2009 energy code in Jan 2010
- Takes effect as sole code in Jul 2010
- MA BBRs also proposing other ICC codes
 - International Building Code (IBC)
 - International Mechanical Code (IMC)
 - International Existing Bldg. Code (IEBC)
- BBRs public hearing is in Sept or Oct 09

Final 'Stretch Code' Appendix

- Residential New Construction
 - HERS rating of 70 or less < 3,000 sq ft.
 - HERS rating of 65 or less > 3,000 sq ft.
- Renovations & Additions
 - Energy Star for homes prescriptive option
 - HERS rating performance option

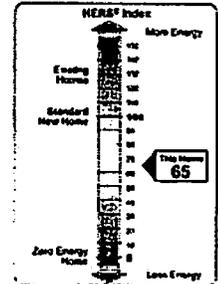


Image source: www.lexingtoninfrared.com/hers-ratings.php

Final 'Stretch Code' Appendix

- Commercial New Construction
 - > 100,000 ft² - 20% below ASHRAE 90.1-2007
 - 5,000-100,000 ft² - 20% below or Prescriptive option (alternative to IECC Chapter 5)
- Special cases
 - > 40,000 ft² - 20% below Supermarkets, Labs, Warehouses
- Exemptions
 - < 5,000 ft² or special cases < 40,000 ft²
 - Commercial renovations

Adoption by Towns and Cities

- Adoption Process
 - Municipal public hearing
 - Vote of Board of Selectmen or City Manager, Mayor and City Council
- Timing of Adoption
 - 6-12 months after
 - Start Jan 1 or Jul 1



Image source: <http://www.zachalenge.com/StephensClark-updata.htm>

Base and Stretch code

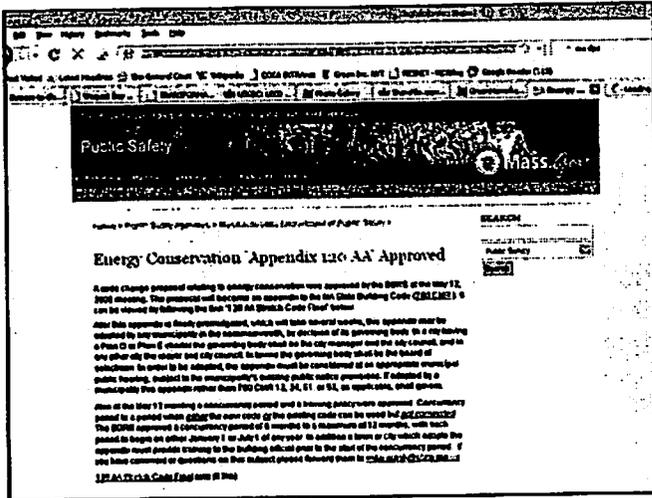
- Integrated language – Stretch appendix is IECC 2009 just with more amendments
- Integrated timing – Jan 1, 2010 to Jul 1, 2010
- Energy Star Homes & Federal incentives
- ResCheck training & DOER training
- HERS raters and Code officials

Incentives

- Towns and Cities – Green Communities
 - Grant round out soon
- Builders – Energy Star Homes
 - ICF international manage on behalf of utilities
 - Federal \$2k tax credit
- Code officials
 - Free training Oct-Jul
 - Others welcome to host and attend



Image source: <http://www.transformations-inc.us/zero-energy-homes.html>



Questions ?

Contacts:

Dept. of Public Safety
 Mike Guigli (617) 826-5215
mike.guigli@state.ma.us

Energy & Environment (EOEEA)
 Ian Finlayson (617) 626-4910
ian.finlayson@state.ma.us

Marc Breslow (617) 626-1105
Marc.breslow@state.ma.us



Image source: Wisdom Way Solar Village – Greenfield, MA:
http://www.ruraldevelopmentinc.org/WWSV/wsv_update_current.htm

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 code¹. 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 council². 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 System³ (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:

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 code⁴, 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.

**Cash-Flow Scenarios for Stretch Code: 2,672 square foot, 3-bedroom home
New construction and gut rehab**

Task A – New Home	
HERS Index Modeled in REM/Rate	60 (energy use 40% below 2006 IECC code)
Improvement Measures (changes relative to base case)	<ul style="list-style-type: none"> - Conditioned basement - Foundation Walls R10 insulation - Above grade walls R22 insulation - Window U-factor .33 - Attic ceiling R38 cellulose insulation - Slope ceiling R32 cellulose insulation - Infiltration 4 ACH50 - Natural Gas Furnace 94 AFUE, 65kBtuh - Central Air Conditioner 3 ton 15 SEER - Domestic Hot Water .62 natural gas tank - Programmable thermostat - 75% Fluorescent lighting
Improvement Costs	\$ 8,103
Mortgage Interest Rate	5%
Loan Term (Years)	30
Annual Incremental Mortgage Payment	\$527
Annual Energy Costs	\$ 3,103
Annual Energy Savings from Baseline	\$1,364
Annual Cash Flow Gain	\$ 837
Task B – Gut Rehab of Existing Home	
HERS Index Modeled in REM/Rate	70 (energy use 30% below 2006 IECC code)
Improvement Measures (changes relative to base case)	<ul style="list-style-type: none"> - Conditioned basement - Grade 1 rigid foundation wall insulation - Grade 1 R12 cellulose wall insulation - Grade 1 R44 cellulose ceiling insulation - Gas boiler .94 AFUE - Gas indirect fire water tank .86 EF - Exhaust only mechanical ventilation - 75% CFL lighting
Improvement Costs	\$ 10,168
Mortgage Interest Rate	5%
Loan Term (Years)	30
Annual Incremental Mortgage Payment	\$661
Annual Energy Costs	\$ 3,363
Annual Energy Savings from Baseline	\$ 701
Annual Cash Flow Gain	\$ 40

Summary of "Stretch" Appendix to Mass. Energy Code, Adopted by BBRS May 2009

Building category	Definition	Requirements based on energy performance (can do prescriptive instead where shown)	Alternative "prescriptive" requirement – specific efficiency measures	Source, comments	Benefit-cost modeling results
New residential	Single-family, multi-family of 3 stories or less	HERS index 65 above 3,000 ft ² , 70 below 3,000 ft ² , certified by HERS rater; follow Energy Star thermal bypass checklist	None	HERS rating = energy use as % of use under IECC code. Current Mass. code ~ HERS 99; soon-to-be-adopted IECC 2009 ~ HERS 92	Sample 3 bedroom home, estimate \$837/year savings (\$8,103 extra construction cost = \$527/year higher mortgage, but save \$1,364/year energy costs)
Residential additions	Expansions of existing living space	HERS 65 over 3,000 ft ² , HERS 70 below 3,000 ft ² ; certified by HERS rater (or can choose prescriptive option at right)	Prescriptive option of Energy Star Homes program - same as residential rehab below		3-bed home, estimate \$40/year savings (\$10,168 extra construction cost = \$661/year, but energy costs \$701/year lower)
Major residential rehab/alterations	Major alterations as in existing code – excludes storm windows, reroofing, doors, etc.	HERS 80 over 2,000 ft ² , HERS 85 under 2,000 ft ² ; certified by HERS rater (or prescriptive option)	Prescriptive option of Energy Star Homes program; insulation equal to IECC 2009	Quality air-sealing and insulation, EnergyStar windows	
Large commercial and large residential multi-family	Commercial above 100,000 ft ² ; residential 4 stories or more and 100,000 ft ²	Energy use 20% below ASHRAE 90.1 2007, determined by modeling	None	DOE, NGRID modeling show energy savings greater than 20%	
Medium commercial and residential multi-family	Commercial 5,000 to 100,000 ft ² , residential 4 stories or more and below 100,000 ft ²	Energy use 20% below ASHRAE 90.1 2007, determined by modeling	IECC 2009 with NBI Core performance: improved air sealing, insulation, lighting, etc.	Prescriptive based on New Buildings Institute program; used by utilities now for incentive programs	NGRID, NSTAR case studies. Example – 60,000 ft ² office bldg., \$91,000 extra cost, \$29,500 annual energy savings; and \$63,100 NGRID rebate
Medium & large specialty commercial	Supermarkets, labs, warehouses above 40,000 ft ²	Energy use 20% below ASHRAE 90.1 2007, determined by modeling	None		
Small commercial & small specialty	Below 5,000 ft ² or specialty commercial below 40,000 ft ²	Exempt	Exempt	Other specialty buildings can apply for waiver	
Commercial alterations		Exempt	Exempt		

* IECC is the International Energy Conservation Code. The Green Communities Act passed in June, 2008 requires that Massachusetts adopt the latest version of this Code within one year of its publication. IECC 2009 was published in January, 2009.

* ASHRAE is the American Society of Heating, Refrigeration and Air Conditioning Engineers.

ATTACHMENT

Cash-Flow Scenarios for Stretch Code: 2,672 square foot, 3-bedroom home New construction and gut rehab

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