

'Stretch' Energy Code Outreach Forum

January 5, 2010



INTRODUCTION
ABOUT ENERGY CODES
STRETCH CODE
RESIDENTIAL
COMMERCIAL
COMPLIANCE
IMPLICATIONS
FREQUENTLY ASKED QUESTIONS
Q & A



Purpose of the Forum



- To provide information regarding the 'Stretch' Energy Code including: technical details; implications of adoption; and the adoption process.
- To help answer your questions about the Stretch Code.
- To solicit any questions/information requests that we can discuss with our DOER/BBRS colleagues.



DOER's Green Communities Program



- Provides up to \$10M annually in grants and loans to qualifying communities
- In order to be designated a Green Community, ALL 5 criteria below must be met:
 1. Adopt as-of-right siting, in designated locations, for RE/AE generation, or RE/AE R&D, or RE/AE manufacturing
 2. Adopt expedited (12 month) application/permitting process
 3. Establish an energy use baseline inventory with a program to reduce baseline by 20% in 5 years
 4. Purchase only fuel-efficient vehicles
 5. Require all new residential construction and new commercial and industrial real estate construction to minimize life-cycle energy costs – DOER RECOMMENDS 'STRETCH' ENERGY CODE ADOPTION

Why Now? Why Consider Change?



- Green Communities Grant Program \$\$\$
- Industry Support
 - Massachusetts Municipal Association – 1/2009

“Cities and towns support an option for local bylaws and ordinances that require higher development standards, and support the state offering an enhanced code option for local adoption (only if they are based upon protecting public health and safety and good science), ...”
- *Resolution on a Progressive Energy Plan for the Cities and Towns of Massachusetts*

- National Association of Home Builders – Press Release 9/2009

“More and more, our members are able to convince their clients of the benefits of a home built with efficiency and sustainability in mind,”
- *Joe Robson, NAHB Chairman*

Why Have Building Codes?



- **Safety**
- **Durability**
- **Preservation of Access**
- **Stabilization of the Marketplace**
- **Property Value**

What Informs Codes?



- Avoidance of Past Problems
- Available Technology and Materials
- Market Expectations
- Entrenched Interests
- Societal Goals (e.g. environmental policy)

Energy Code Administration



- Board of Building Regulations and Standards (BBRS)
- 6th Edition adopted in 1997
- 7th Edition adopted in October, 2008
- 8th Edition to be initiated in January, 2010
 - 2008 Green Communities Act: *Automatic energy code update every three years based on the latest IECC release*

8th Edition Standard Energy Code



- Initiated in January, 2010 with full compliance in July, 2010
- Based on IECC 2009 with ASHRAE 90.1-2007 as alternate path
- Slightly more stringent than 7th Edition (2008-2009) code
- Continues requiring commissioning for commercial buildings
- Stretch code is an appendix (120 AA), voluntary adoption on a town-wide basis

'Stretch' Energy Code



- Provides legal basis for a more stringent code voluntarily adopted by communities
- Goal of reducing energy use by 20% relative to 7th edition (2008-2009) code
- Residential – large change in compliance checking, more stringent envelope requirements
- Commercial - more stringent requirements for envelope, HVAC performance, and lighting
- Exemptions for registered historic buildings

Compliance Tracks

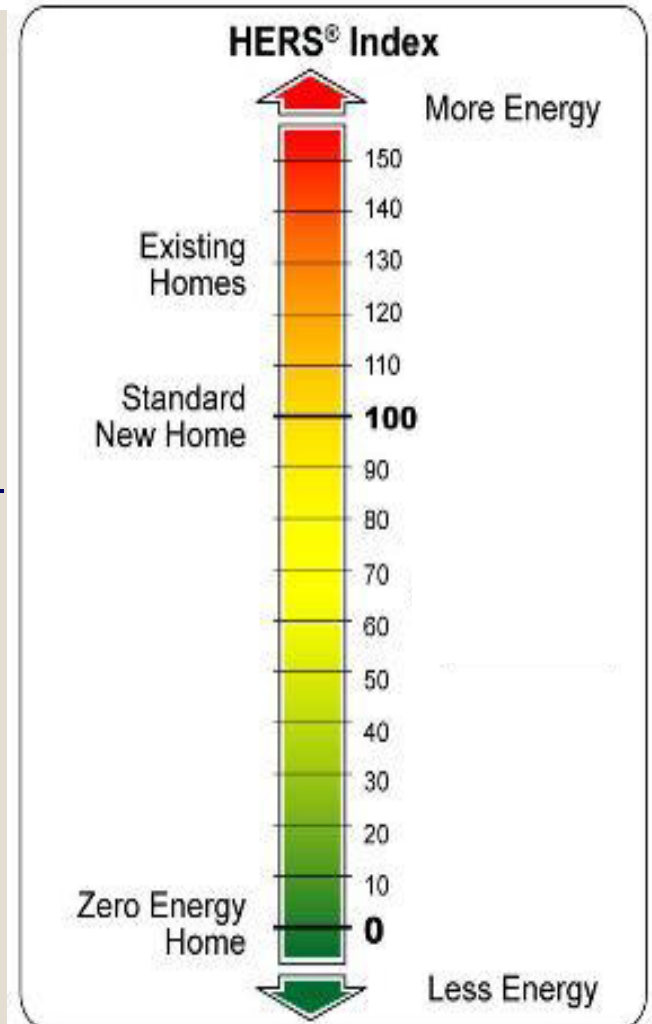


- **Prescriptive:** Compliance with specific building component requirements (typical of how codes have been managed in the past)
- **Performance:** Compliance approach that allows tradeoffs between different aspects of the design to achieve a performance standard

Residential: What is HERS?



- Home Energy Rating System (HERS)
- Uses a **performance** approach rather than individual **prescriptive** requirements
- HERS rating of 100 = Home meeting IECC 2006 (same as 7th edition, 2008-2009 code)
- HERS rater must be a third party and certified by the Residential Energy Services Network (RESNET)
- Rater is hired by the contractor



HERS Rater Activities



- Reviews plans prior to permit application
- 1 site visit during construction to perform envelope installation inspection
- 1 site visit near end of construction to perform blower door testing and final checkout
- Works with the builder over the course of the project to ensure rating is achieved and process does not delay delivery (provided, of course, that all the work passes inspection)

Residential: New Construction



- $\geq 3,000$ ft²: <65 HERS rating
- <3,000 ft²: <70 HERS rating
- Meet the Energy Star Thermal Bypass Inspection
- Residential buildings taller than 3 stories (except town houses) are covered by the commercial code
- No exemptions except for registered historic buildings

Residential: Additions



- **Performance Option:**
 - Meet the requirements for new construction
- **Prescriptive Option:**
 - Meet the most recent Energy Star for Homes Prescriptive Builders Option Package (BOP)
 - Meet the Energy Star Thermal Bypass Inspection
 - Meet IECC 2009 envelope requirements

Residential: Renovations



- Triggered by any access to envelope, but only applies to impacted area
- **Performance Option**
 - ≥2,000 ft²: ≤80 HERS rating
 - <2,000 ft²: ≤85 HERS rating
 - Energy Star Thermal Bypass Inspection
- **Prescriptive Option**
 - IECC 2009 envelope requirements OR fully fill stud cavities with >R-3.5/inch insulation

Implications of Adopting the 'Stretch' Energy Code



Residential

- Lower utility costs and decreased GHG emissions
- Modest increase in work on the part of inspector
- Small increase in labor and materials costs
- Small fee by contractor for HERS rater
- Potential utility incentive through Energy Star Homes program
- Potential federal tax credit

DOER's HERS Example

Improvements to 2,700 ft²
house design to achieve
HERS rating = 60

40% more efficient than 7th
Edition equivalent design

- Conditioned basement
- R10 foundation walls
- R22 above grade walls
- U-0.33 windows
- R-38 attic insulation
- <4 ACH50 infiltration
- 94% AFUE furnace
- 15 SEER air conditioner
- 62% eff gas water heater
- Programmable tstat
- 75% fluorescent lighting

Cost-Benefit Example



Costs

Materials & Labor Added	\$9,000
<u>HERS Rater</u>	<u>\$800</u>
Total	\$9,800

Increase in Mortgage payment – **Annual** **\$654**
(based on 30 yr mortgage, 6% interest)

Benefits

Utility Cost Savings – **Annual** **\$1,364**

Net Cash Flow - Annual **\$710**

Additional **One-Time** Benefits

Utility Energy Star Homes Rebate	\$1,250
Federal Tax Credit	\$2,000

Commercial: New Construction



- Applies to buildings $>5,000$ ft²
- **Performance Option**
 - Use energy modeling to estimate energy use (kBtu/ft²) is 20% less than an ASHRAE 90.1-2007 Appendix G building
 - Buildings $>100,000$ ft² and additions to these large buildings $>30\%$ of original conditioned floor area
 - Supermarkets, warehouses, and laboratories $>40,000$ ft² must use this option (smaller buildings of these types follow standard 8th Edition code)

Commercial: New Construction



Prescriptive Option

- Buildings <100,000 ft² and additions >30% of original conditioned area where addition has its own heating system
- Meet prescriptive requirements of 8th Edition code with 'Stretch' Energy Code (Appendix 120AA) modifications
- Must meet one of three alternate prescriptive paths
 1. Efficient Mechanical Equipment; *or*
 2. Reduced Lighting Power Density; *or*
 3. On-site Supply of Renewable Energy

Implications of Adopting the 'Stretch' Energy Code



Commercial

- Lower utility costs and reduced GHG emissions
- Increased building plan review effort on the part of the code official (no HERS rater)
- Increased effort on the part of the Applicant's designers to meet performance option goal of 20% reduction
- Impact on construction cost is highly variable but can be offset by incentives from utilities and federal tax credits

Adoption Process & Timeline



- **Requires a public hearing and a vote***
 - Towns: vote by Board of Selectmen
 - Cities: vote by Mayor and City Council
- **Adopt stretch code in its entirety**
- **Stretch code initiation can only take place on January 1 or July 1**
- **Full enforcement begins 6 months after the date of initiation**

* The BBRS is meeting on January 12th to review and confirm adoption procedures.

The Big Picture



- **Base code will become more stringent and closer to stretch code over time (3-year update cycle)**
- **Gradually transforms the marketplace**
- **Greater intrinsic value than standard compliance buildings**
- **Many builders already exceed code**
- **Lower utility costs and reduced GHG emissions**
- **Enables Green Communities grants (Criteria #5)**

Frequently Asked Questions



- Increased work load on town inspectors
- Increased costs to builders
- Concern that project completion could be held up by HERS rating process
- Concern that there is a lack of qualified HERS raters and testing equipment
- Perceived risk of compromised competitiveness relative to neighboring towns

Frequently Asked Questions



Q: How would the ‘Stretch’ Energy Code be implemented and enforced?

A: Implementation and enforcement of the code is similar to existing code, where the developer is responsible for submitting documentation of compliance to the building inspector for review, and the building inspector conducts a site review.

Frequently Asked Questions



Q: What is the role of Building Code Officials in a code that includes 3rd party verification?

A: Residential buildings meeting the stretch code through a HERS rating and thermal bypass checklist require independent certification by a HERS rater. The required documentation must be submitted to the local building inspector prior to receiving a certificate of occupancy. In this way the local inspector retains their oversight role but the additional compliance requirements do not create a significant additional burden.

Frequently Asked Questions



Q: What is the anticipated cost of implementing a more stringent energy code?

A: Initial adoption of a higher performance standard for buildings is likely to result in slightly higher first costs for construction. However, after energy cost savings on heating and electricity are included these higher performance standards save money. In addition, the electric and gas utilities in the state provide financial incentives that further reduce the upfront costs of high performance buildings, and allow for faster returns on the investment in energy saving measures.

Frequently Asked Questions



Q: What training and materials are available on the 'Stretch' Energy Code standards?

A: Training on the IECC 2009 base energy code and an introduction to the stretch code appendix will be provided to all municipal code officials (at no cost), as well as to interested building professionals (at a cost). The existing MA Energy Star Homes program provides regular training covering HERS and other requirements of the residential stretch code. Major MA electric and gas utilities offer training on NBI Core Performance for commercial buildings.

Frequently Asked Questions



Q: How do I find a HERS rater and are there enough HERS raters and testing equipment available?

A: HERS raters can be identified through the Energy Star Home Program. In 2008, over 15 percent of all new homes in Massachusetts were built through the Energy Star for Homes program, a percentage that is steadily increasing. There is already in place an active market for HERS raters and testing equipment and the gradual adoption of the stretch energy code is not likely to cause a dramatic increase in demand for these services.

Resources/Contact Information



DOER Stretch Code Webinar

<http://www.mass.gov/Eoeea/docs/doer/gca/MA%20stretch%20code%20Wed19%20webinar.pdf>

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