



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

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TO: Robert W. Healy, City Manager

FROM: Beth Rubenstein, Assistant City Manager for Community
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John Bolduc, Environmental Planner

DATE: November 6, 2009

RE: City Council Order O-5 dated September 14, 2009 concerning the
Stretch Energy Code

The City Council requested that the Community Development Department conduct a public information process concerning the Commonwealth's Stretch Energy Code and report back to the City Council by December 1, 2009. We provide the following update.

Stretch Energy Code Appendix

The Stretch Energy Code is an appendix to the state energy code for buildings, created by the Massachusetts Board of Building Regulations and Standards (BBRS), that provides a more energy efficient option for cities and towns than the base code, otherwise mandatory for municipalities across the state.

For commercial buildings, the Stretch Energy Code is similar to the latest International Energy Conservation Code (IECC 2009), with enhancements that require about 20% greater building energy efficiency. For residential buildings it is roughly equivalent to meeting the Massachusetts requirements of the National Energy Star Homes (Tier 2) standard for new buildings and the Energy Star base standard for building renovations, and includes provisions for third party testing and rating of building energy performance.

In Massachusetts, cities and towns are legally required to follow the state building and energy codes. Local codes are not permitted. The BBRS created the Stretch Energy Code because many municipalities have asked the state for a stronger state energy code or the right to adopt stronger codes at the local level as concerns mount about rising energy costs, climate change, and national dependence on foreign energy sources. On the other hand, the state and the development community are concerned about having multiple inconsistent building and energy standards at the local level. In balancing these tensions, the BBRS decided to adopt one alternative energy code, based on national standards, expert analysis



and cost effectiveness to give communities an option to require stronger energy performance in buildings.

Adoption Process

For the Stretch Energy Code to take effect in Cambridge, the City Council must hold a public hearing on the matter, subject to normal public notification, and then vote to adopt it.

Upon local approval, the Stretch Energy Code would not take immediate effect. The BBRs regulations require a six-month concurrency period between adoption and implementation and allows for only two dates during a calendar year on which the code can take effect, January 1 and July 1. In order for the stretch energy code to go into effect on July 1, adoption must take place by January 1 of that same year. To take effect on January 1 of any year, it must have been adopted by the City Council by July 1 of the previous year. The BBRs is limiting adoption dates to two a year to avoid confusion in the development community. Property owners may voluntarily choose to follow the Stretch Energy Code during the concurrency period, but building inspectors would allow use of either the base code or the stretch code during that period.

Cambridge Public Information Process

Two public information sessions were held. The first focused on the Stretch Energy Code as it relates to residential buildings and was held at the Senior Center on October 15, 2009. The session consisted of presentations and then a question and answer period with responses from City staff and a panel of experts. The residential panel was composed of Marc Breslow and Ian Finlayson of the Massachusetts Executive Office of Energy and Environmental Affairs, Matt Root (a HERS rater) of Conservation Services Group, Jane Carbone (an affordable housing developer) of Homeowner's Rehab, Jamie Leef (a contractor) of S&H Construction, and Ranjit Singanayagam, Commissioner of Inspectional Services. The session was moderated by Susan Glazer, Deputy Director of the Community Development Department. Approximately 35 members of the public attended. Attendees included citizens, architects, contractors, state agency staff, and residents of other communities.

A second session was held on October 20, 2009 at City Hall and focused on commercial buildings. The same format was followed. The panel included Messrs. Finlayson and Breslow, Ravi Srivinasan (an energy modeler) of The Green Roundtable, Chris Schaffner (an engineer and LEED Accredited Professional) of The Green Engineer; and Commissioner Singanayagam. Approximately 45 members of the public attended. Attendees included staff from Harvard, MIT, and Lesley University, commercial property owners and managers, architects, and citizens.

A meeting of City departments was also held to ensure awareness among agencies dealing with municipal construction projects and administration of building regulations.

Printed information was distributed at each session including Frequently Asked Questions, text and table summaries of the Stretch Energy Code, commercial building case studies prepared by

the state, and a memo on energy modeling of a Cambridge triple decker prepared for the Community Development Department. Subsequent to the meetings a webpage was established under the Community Development Department where the written materials and links to more information were posted.

How the Stretch Energy Code Works

The Stretch Energy Code works somewhat differently for residential buildings and commercial buildings. A “performance track” (i.e., based on testing or energy modeling) and “prescriptive track” (i.e., based on a checklist of measures) are provided for each type of building.

Residential Buildings

In the case of residential buildings, new construction can only use the performance track. To comply, a project would have to achieve certain Home Energy Rating System (HERS) scores depending on the size of the building as determined by a certified HERS rater. HERS is a system for evaluating energy efficiency based on a standardized index that was developed by the Residential Energy Services Network (RESNET), a national non-profit organization. HERS is incorporated in other programs, including the federal Energy Star Homes and LEED Homes. The HERS standards and protocols are readily available to the public. Software used by HERS raters must be purchased at a cost in the range of a few hundred dollars. HERS raters are certified by RESNET after undergoing a training program and apprenticing with a certified rater on at least 5 projects. Continuing education requirements apply and there is a code of ethics and a complaint resolution process.

HERS raters inspect projects to ensure that measures are properly installed through visual inspections and verification techniques including blower door tests for air leakage and use of infrared cameras for heat loss.

For residential renovation projects, the owner has the option of using HERS or a prescriptive track to comply. The prescriptive track involves a checklist of measures that must be installed. In renovation projects, the Stretch Energy Code only applies to the work that is being undertaken. For example, if only windows are being replaced, then the windows must meet the energy efficiency requirements for windows (e.g., Energy Star rated windows, increased insulation and air sealing around the windows) and the work would not trigger requirements to upgrade other parts of the building. The Stretch Energy Code would not come into play for minor renovation work such as painting, minor repairs, or other projects that do not involve opening up walls.

Commercial Buildings

Commercial renovation projects are not subject to the Stretch Energy Code. For commercial buildings, the Stretch Energy Code only applies to new construction that is over 5,000 square feet in area. Multi-family residential buildings that are 4 stories and taller are treated as commercial buildings.

Commercial buildings that are 100,000 square or larger and specialty commercial buildings (e.g., laboratories, supermarkets, warehouses) larger than 40,000 square feet must use energy modeling to demonstrate that the design will achieve a 20 percent better energy efficiency level than the standard contained in ASHRAE 90.1 2007, a national building energy standard. Documentation will be required by the Inspectional Services Department to show compliance.

Commercial building projects that are between 5,000 and 100,000 square feet in area and are not specialty buildings, may choose to comply through a prescriptive path (i.e., checklist) involving measures based on the New Building Institute Core Performance Standards, a nationally recognized standard for commercial buildings.

Summary of Applicability of Stretch Energy Code

	<i>New Construction</i>	<i>Renovations</i>
Residential	Performance track (HERS testing)	Performance or Prescriptive track (checklist)
Commercial	<ul style="list-style-type: none"> • Larger than 100,000 sf – Performance track only (energy modeling) • 5,000 to 100,000 sf – Performance (modeling) or Prescriptive track (checklist) • Specialty buildings (labs, supermarkets, warehouses) larger than 40,000 sf – performance track only (energy modeling) • Under 5,000 sf – Stretch energy code not applicable/base code applies 	Stretch energy code not applicable/base code applies

Public Response

Based on the public information sessions, discussion with property owners and citizens, and City advisory committees' recommendations, we heard general support for the goals and concept of the Stretch Energy Code. We also note that two City advisory committees – the Climate Protection Action Committee and the Green Building/Zoning Task Force – have recommended adoption of the Stretch Energy Code. However, a number of issues and concerns that have been raised which are summarized and addressed below.

Most of the issues raised concern the implementation of the Stretch Energy Code, cost impacts, and impact on the construction process.

HERS - Commenters asked whether there are sufficient numbers of certified raters to administer the Home Energy Rating System (HERS) that would be required in new residential construction. In response, panelists stated that there are at least nine firms and organizations in Massachusetts that have HERS raters on staff, usually more than one. In the case of Conservation Services Group, there are 15 HERS raters on staff. State staff responds as follows: "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. The majority of these homes used HERS raters and testing equipment to achieve a HERS rating. Several states surrounding Massachusetts have higher percentages of new construction using HERS ratings on a voluntary basis. This means that 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. That said, the growing interest in HERS ratings has led to more building professionals going through HERS training and certification and expanded sales of blower door and duct testing equipment. This is a good sign of a market response to our growing green economy, and we don't anticipate demand for HERS raters exceeding supply in towns and cities adopting the stretch code."

Concern was also raised that the HERS protocols and standards are not transparent to the general public, that only certified HERS raters can access the details behind the system. In response, the standards and protocols are readily available to the public through RESNET. Various software packages are used to administer HERS, which must be purchased, but the cost is on the scale of a few hundred dollars.

There was also concern among contractors that a HERS rater might force a change and create uncertainty over where liability would rest. In response, HERS raters do not require specific measures to be installed to pass a test, although they might suggest options. The contractor would continue to hold the liability and be responsible for meeting standards.

Cost – The Stretch Energy Code generally is expected to add costs to projects up front, but will be recouped through savings on utility and fuel bills in a relatively short period of time. In addition, utility energy efficiency rebates and incentives and federal tax incentives may further offset the cost and accelerate the payback.

To understand the cost impact better on typical Cambridge residential projects, the Community Development Department commissioned an energy modeling and financial analysis by the Vermont Energy Investment Corporation, a non-profit organization that the state has used for similar purposes. The analysis was performed on a triple decker located on Magazine Street for which we obtained plans from a local architect. The analysis assumed a gut rehab of 3 units and that the project would follow the performance track and achieve a HERS rating of 85. To comply with the Stretch Energy Code, the rehab would need to install additional insulation, conduct more rigorous air sealing, and install mechanical ventilation (e.g., bathroom fan). The project would add \$14,847 to the cost of the rehab. Without assuming any utility energy efficiency incentives, the improvements would yield \$2,727 in annual energy savings. Assuming a 30 year loan at 6% interest rate, the annual savings would exceed the annual financing cost by \$1,648 for a positive cash flow. In strict payback terms, the savings would cover the initial costs in approximately 5 years. The utility incentives would significantly improve the financial picture.

The cost of HERS raters is typically \$400 to \$1,200 per unit depending on the nature of the project. All of this cost will be covered by a utility rebate in most cases.

One commenter raised a concern that by increasing standards and initial costs of compliance, the City might unintentionally cause property owners to postpone or avoid projects that they would otherwise pursue. For new construction, the additional initial costs would be a small portion of the total project costs and would be paid back in relatively short order to the owner or occupant of the building through savings on utility and fuel bills. In addition, utility energy efficiency incentives will offset many costs.

For commercial buildings, utilities' case studies of projects illustrate the costs and benefits of achieving higher energy performance. The state anticipates that any additional upfront costs incurred in construction should be recovered from energy savings with a payback after rebates of less than three years. Often the payback after utility incentives will be closer to one year.

LEED – For commercial buildings, compliance with the Stretch Energy Code would result in credits under the LEED green building standards without requiring additional work. According to the state, “if pursuing the performance approach, then achieving the stretch code standard of 20% below ASHRAE 90.1-2007 uses the same baseline and modeling as the 2009 LEED program and qualifies for 5 out of 19 LEED energy and atmosphere points. Many LEED buildings will go significantly beyond these energy efficiency requirements, in order to obtain additional LEED points. Similarly meeting the stretch code through the Core Performance-based prescriptive approach qualifies for LEED points.”

Historic Buildings – Concerns were raised that the Stretch Energy Code might force incompatible alterations on historic buildings. According to the state, “the stretch code appendix, similar to the base energy code, allows an exemption for listed historic buildings. More specifically, historic buildings listed in state or national registers, or designated as a historic property under local or state designation law or survey, or with an opinion or certification that the property is eligible to be listed, are exempt from both the base energy code and the stretch appendix to the energy code.” In addition, projects can request waivers from the Board of Building Regulations and Standards.

Utility Incentives - A concern was raised that in communities that adopt the stretch code, state rules would force utilities to use a higher base case when determining energy efficiency financial incentive levels and cause those incentives to be less than in communities that do not adopt the stretch code. State officials acknowledged that this is a technical issue that is being addressed. State regulatory officials intend that energy efficiency incentives will be the same across communities whether they adopt the Stretch Energy Code or not. Language has been included in the proposed state energy efficiency plans and utility plans that were filed with the Public Utilities Commission on October 30th. These plans with the language must be adopted by the end of January 2010.

Implementation – Concerns were raised about preparing contractors, owners, and inspectors in the event the City adopts the Stretch Energy Code. The specific concern about the availability of enough HERS raters was addressed above. Also in response, the BBRB created a 6 month concurrency period during which preparations can be made to smooth the transition to the Stretch Energy Code. The state will provide free state-wide training of building inspectors on

the upcoming new base energy code which will also include the Stretch Energy Code. The trainings will be open to contractors and other interested parties at a nominal fee.

Administration and Enforcement - For new residential construction, the Inspectional Services Department will rely on certified HERS raters to provide third party verification of compliance with the stretch code. Some concern was raised that since performance is tested by a blower door test near the end of a project, there is some jeopardy in terms of the cost and difficulty of addressing deficiencies for the contractor if the project does not pass. The response was that this kind of issue is dealt with typically in Energy Star Homes and LEED Homes projects. As a result, contractors will build in some margin for error to avoid problems when it comes to passing the blower door test.

For residential projects that follow the prescriptive option under the stretch code (i.e., installing a checklist of measures), inspections will resemble current procedures. For projects that follow the prescriptive path, the Inspectional Services Division would look for compliance with the check list of measures. The timing of inspections and forms may be adjusted.

For commercial projects, stamped documents would be provided to ISD to demonstrate that energy modeling has been performed and demonstrates the design will achieve a 20 percent energy efficiency improvement. This is a similar administrative procedure used for other building code standards.

Changes to the Stretch Energy Code - As required by the Massachusetts Green Communities Act, the state must adopt the International Energy Conservation Code. The code comes up for review and revisions every three years, with 2012 being the next time that the code may be updated. Commenters noted that in communities that adopt the stretch code, subsequent revisions to the stretch code would be adopted automatically. In response, it was noted that communities may opt out of the Stretch Energy Code at any time. In Cambridge this could occur through a vote of the City Council.