

Stretch Energy Code Residential Buildings FAQ

What is the stretch energy code appendix?

Chapter 115 Appendix AA of the Massachusetts State Building Code (MSBC) is referred to as the stretch energy code, created by the [Massachusetts Board of Building Regulations and Standards \(BBRS\)](#). The stretch energy code provides the option for cities and towns to have an energy code for buildings that results in more energy efficient buildings than the base code that is otherwise mandatory for municipalities across the state.

How is the stretch energy code different than the existing energy code?

The stretch energy code is more stringent than the state's base building code. The most recent [August 12, 2016 amendments](#) made to Chapter 13, Chapter 51, and Chapter 115 Appendix AA of the MSBC 8th Edition came into effect on January 1, 2017. These amendments upgrade Chapters 13 and 51 to the latest IECC 2015 and ASHRAE 90.1-2013 energy standards. For residential buildings, the stretch energy code also requires building owners to perform an Energy Rating Index (ERI) analysis using one of the approved pathways. Large area buildings over 100,000 square feet, as well as new supermarkets, laboratories, and conditioned warehouses over 40,000 square feet must now demonstrate energy use per square foot of at least 10% below the energy requirements of ANSI/ASHRAE/IESNA 90.1—2013 APPENDIX G Performance Rating Method on either a site or source energy basis. All other buildings are required to follow either Chapter 13 or Chapter 51 as applicable based on the use and occupancy of the building.

Why did the Commonwealth add the stretch energy code option to the state building code?

In Massachusetts, cities and towns are legally required to follow the state building and energy codes. Local codes are not permitted. However, as concerns mount about rising energy costs, climate change, and national dependence on foreign energy sources, many municipalities have asked the state for a stronger state energy code or the right to adopt stronger codes at the local level. 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.

Why did Cambridge adopt the code?

The City Council approved the Cambridge Climate Protection Plan in 2002, which establishes goals to reduce greenhouse gas emissions that cause climate change. In Cambridge, over 80% of greenhouse gases emitted result from energy use in buildings. A stronger energy code requires buildings to be more energy efficient, thereby reducing the amount of electricity, natural gas, and fuel oil used and the emission of greenhouse gases.

In recent years, energy costs have risen significantly for residents and commercial property owners. While it usually makes financial sense for a property owner to take steps to improve the energy efficiency of homes and buildings, these improvements often do not go forward for a wide array of reasons. Standards are an effective means of spurring the consideration and implementation of energy efficiency measures, reducing costs for current and future owners and renters, and mitigating energy costs for residents and the costs of doing business.

How was it adopted by Cambridge?

In accordance with the BBRs rules, the adoption of the stretch energy code was considered at a public hearing and adopted by the City Council on December 21, 2009.

When did the stretch energy code go into effect?

The BBRs regulations require a six-month concurrency period between adoption and implementation. The City Council adopted the stretch energy code on December 21, 2009, and the code subsequently went into effect on July 1, 2010. Amendments to the stretch energy code made by the BBRs came into effect on August 12, 2016. All building permits and related construction and other documents filed after January 1, 2017 must comply with the amended provisions as described in Chapter 115 Appendix AA.

If the state is making the statewide energy code more stringent, why did Cambridge adopt the stretch energy code?

The state's base code is a minimum standard. Technology is readily available to achieve significantly greater levels of efficiency. The stretch energy code is more efficient than the state's base code, so implementing it saves energy and further reduces greenhouse gas emissions. Codes also "even the playing field" for property owners and developers. Some choose to take advantage of short-term savings by avoiding initial costs or passing on building operating costs to renters and lessees. If codes set a low standard, owners and developers that implement energy efficiency measures that have initially higher costs but later payoff with operating savings are put at a disadvantage relative to others. Third party verification is also now required for all residential construction projects, which provides building owners and contractors with a way to ensure quality control of energy efficiency installations and ease the administration of the code for City inspectors.

What are the key requirements to the stretch energy code?

For building permits filed after January 1, 2017, all new construction, renovations, repairs, and alterations of residential buildings of four stories or fewer with one or more dwelling units are subject to the provisions outlined in Chapter 51 of the MSBC. Per Chapter 51 Section N1106.1, it is now required to conduct an Energy Rating Index (ERI) analysis or other approved alternative energy performance rating method. The following thresholds have been approved to meet the minimum standards:

1. Energy Star Version 3.1 Path

Projects are required to use the Home Energy Rating System (HERS) and achieve a maximum index that varies depending on building size, shape, and type of construction. For detailed guidelines on compliance with the Energy Star Version 3.1, see the [Energy Star website](#).

2. Passive House Institute US (PHIUS) Path

The specific heat demand (modeled using PHIUS-approved software) must be less than 10 kBTU/ft²/yr. For detailed guidelines on compliance with the Passive House standard, see the [PHIUS website](#).

The new amendment also allows for increased HERS values in the event that there are sufficient onsite renewable energy systems, as shown in Table N.1106.4.1:

Table N1106.4.1: Maximum HERS Index Scores with Onsite Renewable Energy Systems

| Renewable Energy Source | Maximum HERS Index | |
|--|--------------------|------------------------------------|
| | New Construction | Whole House Renovations; Additions |
| None | 55 | 65 |
| Solar PV > 2.5 kW; or Renewable primary heating system | 60 | 70 |
| Solar PV & thermal DHW; or Renewable primary heating & solar thermal DHW | 62 | 72 |
| Solar PV & Renewable primary heating & solar thermal DHW | 67 | 77 |

What is a HERS rating?

HERS is the acronym for Home Energy Rating System. It is a scoring system established by the [Residential Energy Services Network \(RESNET\)](#), a national non-profit organization recognized as a national standard by such organizations as the Federal IRS, EPA, and the Mortgage industry. The scoring index is a scale from 0 up to around 200, with 100 representing the score for a 2006 International Energy Conservation Code (IECC) standard new home of the same size and type compared to the new home being evaluated. A score of zero would represent a home that uses zero net energy (e.g., a zero net energy home). Each 1 point decrease in the HERS index corresponds approximately to a 1% reduction in energy consumption. For example, a home that achieves a HERS rating of 85 would be 15% more energy efficient than the standard new code built home in 2006. Older, unimproved homes typically have ratings well over 100. The lower the score, the more efficient it is. The score is determined by energy modeling of the building’s structure and systems by a certified HERS rater.

What training do HERS raters undergo?

HERS raters are typically experienced building design professionals who additionally undergo an intensive one to two-week training course and must rate 5 homes under the supervision of an existing certified HERS rater to be certified by RESNET. They must also be part of a HERS rating agency or organization that provides quality assurance, liability insurance and ensures that raters meet ongoing continuing education requirements.

How do I find a HERS rater?

Eversource and the Cambridge Energy Alliance can assist contractors and owners in finding a HERS rater. They are also listed on the [RESNET website](#).

Do I have to achieve a HERS rating if my project is only a renovation of an existing building?

The new amendment to Chapter 115 Appendix AA passed on August 12, 2016 requires that all alterations, renovations, additions, or repairs of existing buildings meet Chapter 51 Sections N1100.1 through N1111.2 of the MSBC. Per these sections, it is required that projects meet the energy thresholds of an approved ERI method. For those electing to follow the Energy Star Version 3.1 program, it is required to achieve the necessary HERS rating as described in the [program guidelines](#).

What kinds of projects trigger the stretch energy code?

Applicability of the stretch energy code to renovation projects is limited to the extent of the work. For example, if windows are being replaced, then the windows must meet the code's standards and any exposed wall cavity must be filled with insulation to the required level. The remainder of the building would not be required to be upgraded. Similarly, if a ceiling or wall cavity is opened, then the required level of insulation must be installed, but the remainder of the building's ceiling and wall cavities are not required to be upgraded with insulation. If you are replacing your boiler, you would be required to install one that meets the stretch code standard, but you would not be required to upgrade the buildings insulation. Also, certain work is exempt, including re-roofing, installation of storm windows, and alterations involving less than 50% of light fixtures in a space. Exemptions to the new standards can be found in [Chapter 51 Section R105.2](#).

If I'm doing a small remodeling project, like a kitchen or bathroom renovation, will I have to meet the stretch energy code?

If the work would normally trigger the base energy code, then it would trigger the stretch energy code; however, only those elements that are being changed would have to meet the code requirements.

Do existing buildings or historic buildings need to be upgraded to comply with the stretch code appendix?

The stretch energy code does not change the sections of the state base building code that apply to existing buildings and historic buildings. 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 and the stretch appendix to the energy code.

As a residential property owner, how do I comply with the stretch energy code?

The project must follow the requirements in Chapter 51 Sections 1100-1112 of the MSBC. This includes an approved ERI analysis, such as Energy Star Certified Homes (Version 3.1) or the Passive House energy standards. In addition to the ERI analysis, these programs also have requirements pertaining to building envelope efficiency, standards for cooling and heating equipment, allowable leakage rates for ductwork, and standards for windows, water heaters, lighting appliances, and thermostats. Energy Star rated equipment, appliances, windows, and lighting that meet the standards are also discussed. Further details of these programs can be found on the [Energy Star](#) and the [Passive House Institute US](#) websites.

What are the prescriptive measures that can satisfy the stretch energy code?

A prescriptive-only path is no longer offered. For all residential projects, the performance-based measures consist of the guidelines described in Section N1106, while additional prescriptive requirements can be found in sections N1100-N1111.

What low-cost interventions can I do to meet the stretch energy code?

If minor improvements are required by the new energy code, it may be possible to meet the code by adding insulation and performing air sealing measures such as applying caulk and adding storm windows. For more extensive reductions, equipment upgrades as well as the aforementioned tasks may be required, the cost of which can be quickly paid back in energy savings.

Does the stretch code save me money on utilities?

Yes. The stretch energy code is designed to tighten the building envelope and utilize efficient lighting, appliances, and equipment. The cost of heating, cooling, and electricity will thus decrease.

What is the anticipated cost to the property owner of complying with the code?

In almost all cases, expected energy savings from complying with the stretch energy code will exceed the cost. New construction projects that are designed to meet the HERS rating targets can do so cost effectively, as many builders have already demonstrated through the voluntary Energy Star Homes program. In the case of building renovations there are more design constraints, but lower standards to meet. Typical projects involve adding insulation and air sealing and will see relatively rapid paybacks. If major equipment upgrades are selected, then the payback could be longer. However, for renovations, equipment such as boilers and furnaces would not be required to be replaced, although the owner may have other reasons to do so. The City has conducted energy modeling for a typical Cambridge triple decker to assess the cost of complying with the stretch energy code. See the discussion below.

How does my contractor know how to meet the stretch energy code?

The state has held trainings for contractors and City inspectors. Trade groups have also held their own trainings. The City's Inspectional Services Department provides information to all permit seekers about the need to comply with the stretch energy code.

What kinds of technical and financial help are available to property owners and contractors?

In addition to the trainings that have been offered by the state, owners and contractors have access to the energy efficiency services, including financial incentives and loan programs, accessible through NSTAR and the Cambridge Energy Alliance.

How is the stretch energy code enforced?

The City's Inspectional Services Department is responsible for enforcement of the stretch energy code in the same manner that it currently enforces the existing building and energy codes.

*Cambridge Community Development Department
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