Existing Residential Buildings

2025 Massachusetts General Requirements and Stretch Code Introduction









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 - The Berkshire Gas Company Liberty Utilities
 - Cape Light Compact
 National Grid
 - Eversource Energy Unitil
- The Sponsors of Mass Save work closely with the Massachusetts Department of Energy Resources to provide a wide range of services, incentives, trainings, and information promoting energy efficiency that help residents and businesses manage energy use and related costs.











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Presented by:



Moving Energy Efficiency Forward

We combine building science with technology to help utility companies, program implementers, and building performance professionals achieve energy savings.







Introduction

2025 Massachusetts Energy Code

Stretch Code Overview

Chapter 5 Existing Building – Overview

Prescriptive Path

HERS Index

Appendix RB Solar Ready – Existing Buildings

Summary

Mass Save Opportunities

Learning Objectives

Upon completion of this training sessions, participants will possess knowledge of how to apply the Energy and Stretch Code to residential buildings.

Differentiate between Small and Large Additions and their compliance pathways under the Stretch Code.

Identify the compliance pathways for Non-Stretch and Stretch Additions and Alterations, including Prescriptive, Passive House, and ERI.

Summarize the key requirements of Chapter 5 Existing Buildings and how it impacts compliance with the Stretch Code.

> Describe the key elements of Appendix RB Solar Ready and its role in compliance with the Stretch Code.



2025 Massachusetts Residential Energy Code

Base Code

2021 IECC w/MA Amendments; 780 CMR Chapter 11R (residential) & 780 CMR Chapter 13 (commercial) 780 CMR 10th Edition is the current MA Building Code

Stretch Code

2021 IECC w/MA Amendments; 225 CMR Chapter 22 (residential) & 225 CMR Chapter 23 (commercial)

Specialized Code

2021 IECC w/MA Amendments; 225 CMR Chapter 22 + Appendix RC (residential) & 225 CMR Chapter 23 + Appendix CC (commercial)

Source: MA DOER

Current Energy Code Options

The 2025 Massachusetts Energy Code



The 2021 IECC



INTERNATIONAL ENERGY CONSERVATION CODE*



Massachusetts Amendments

225 CMR 22.00: MASSACHUSETTS STRETCH CODE AND SPECIALIZED CODE FOR LOW-RISE RESIDENTIAL – 2025 RESIDENTIAL LOW RISE AMENDMENTS TO (ECC201) AND REC 2011

LOW-RISE AMENDMENTS TO IECC2021 AND IRC 2021 CHAPTER 11: ENERGY EFFICIENCY (Note: please see 225 CMR 23.00 for Commercial, Multi-family and all

(Note: please see 225 CMR 25.00 for Commercial, Multi-family and an other construction)

Chapter 1: [RE] SCOPE AND ADMINISTRATION

SECTION R103 CONSTRUCTION DOCUMENTS

R103.2 Revise Section R103.2 as follows:

R103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents hall be of sufficient clarity to indicate approved by the code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include the following as applicable:

- 1. Energy compliance path.
- Insulation materials and their R-values.
- Fenestration U-factors and solar heat gain coefficients (SHGC).
 Area-weighted U-factor and solar heat gain coefficients (SHGC) calculations.
- Area-weignied U-factor and solar neal gain coefficients (SHGC) calculations.
 Mechanical system design criteria.
- 6. Mechanical and service water-heating systems and equipment types, sizes and
- efficiencies.
- Equipment and system controls.
 Duct sealing, duct and pipe insulation and location.
- Drace scaling, order and pipe insuration and location
 Air scaling details.
- 10. EV Ready Space locations per R404.4.
- Solar-Ready Zone in accordance with Appendix RB, or Solar Zone Area when complying with Appendix RC for mixed-fuel buildings.

Chapter 2: [RE] DEFINITIONS

SECTION R202 GENERAL DEFINITIONS

R202 Add the following definitions:

ALL-ELECTRIC BUILDING. A building with no on-site combustion equipment for fossil fuel use or capacity including fossil fuel use in space heating, water heating, cooking, or drying

CLEAN BIOMASS HEATING SYSTEM, Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 85% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.08 lb. PM2-3/MMBu heat output.

2 Page



Green Communities Act

- Passed by the MA Legislature and signed into law in 2009
- Requires the Program Administrators to submit EE plans every 3 years – must be approved by the Dept. of Public Utilities
- Requires adoption of the International Energy Conservation Code and subsequent updating to the latest version within one year of its publication
- Created the Energy Efficiency Advisory Council of DOER
- Created the Green Communities Program
 - Provides \$20 million per year statewide in technical and financial help to municipalities to promote energy efficiency and the financing, siting and construction of renewable alternative energy facilities.
 - Municipalities must adopt the Stretch Energy Code and meet a variety of other energy efficiency policies.



The 2025 Massachusetts Energy Code



Stretch Code

Municipal Opt-In Specialized Stretch Code

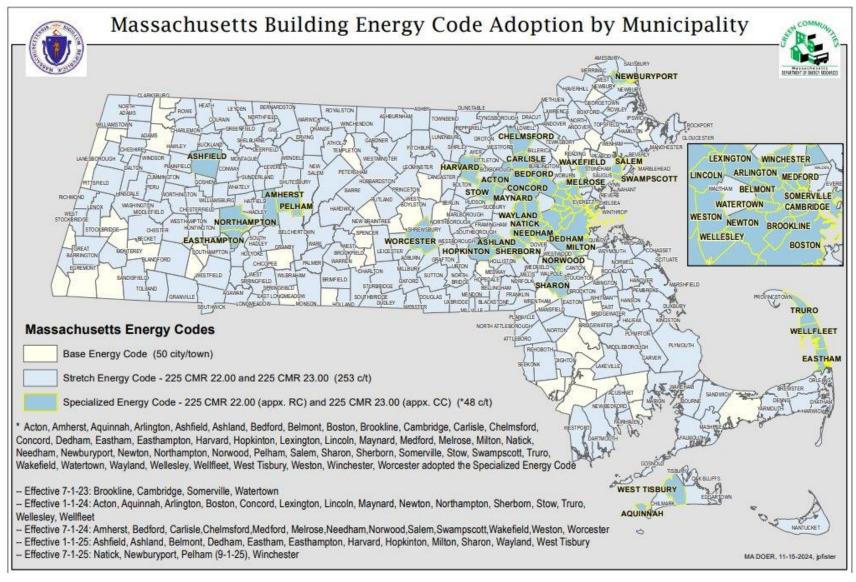
MA Stretch Energy Code

The residential Stretch Energy Code...

- Is developed by the MA Department of Energy Resources (DOER)
- Results in greater energy savings
 than the Base Energy Code
- Requires new homes and large additions and alterations to receive a HERS Rating
- Requires compliance with 2021 IECC "mandatory" provisions (Passive House excluded)
- Is found in 225 CMR 22.00 and 225 CMR 23.00
- Is adopted at the level of the local jurisdiction



Stretch Code Communities



Poll Question #1

Which of the following best describes your field of work?

- A. Builder
- B. Architect
- C. Code Official
- D. HERS Rater
- E. Passive House Consultant





2025 Residential Energy and Stretch Code

Existing Building - Overview

The Base Code and (Most) Stretch Code Additions

Chapter 1 [RE] Scope and Administration

> Chapter 2 [RE] Definitions

Chapter 3 [RE] General Requirements

Chapter 4 [RE] Residential Energy Efficiency

General

Building Thermal Envelope

Systems

Electric Power & Lighting

Chapter 5 [RE] Existing Buildings



Historic Buildings

R501.6 Energy code does not apply *provided*:

- A report is submitted to the code official demonstrating that compliance with a provision would threaten, degrade or destroy the historic form, fabric or function of the building
- The report must be signed by one of the following:
 - o Owner
 - Registered design professional
 - Rep of the State Historic Preservation Office or historic preservation AHJ

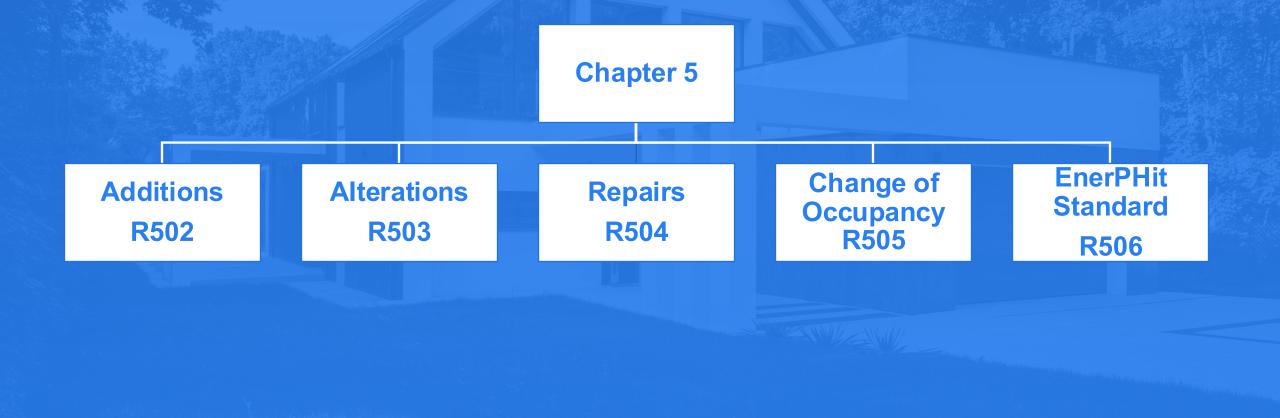


Source: Mass Save

Chapter 5 of the MA Amended 2021 IECC



The provisions for existing buildings are found in MA Amended 2021 IECC Chapter 5



Chapter 5 – Existing Building(s)

Definitions

Additions: An extensions or increase in the conditioned space floor area, number of stories or height of a building or structure.

<u>Alterations:</u> Any construction, retrofit or renovation to an existing structure other than repairs or additions.

Repairs: The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

Changes of occupancy or use: Spaces undergoing a change in occupancy that would result in an increase in demand for either fossil fuels or electrical energy.



Compliance Paths – Existing Buildings

Additions & Change of Use

- Prescriptive Compliance or
- Comply with Table R406.5 HERS Index (Mandatory greater than 1000sqft or 100% of Existing Floor Area)

Alterations

- Prescriptive compliance or
- Comply with Table R406.5 HERS Index for Level 3 alteration greater than 1000sqft

Alterations Continued

• Exceptions: storm windows, roof recover, construction where roof, wall or floor cavities not exposed, etc.

Repairs (exempt)

• Including glass-only replacements, roof repairs, lighting replacement within existing luminaires



Existing Buildings

R501.1.1 General

- Unaltered portions of the existing building or system shall not be required to comply
- This code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use of an existing building *provided it was legal when it was built*

R501.2 Compliance

- Additions shall not create an unsafe or hazardous condition or overload existing building systems.
- An addition shall be deemed to comply with this code:
 - $\circ\;$ where the addition alone complies,
 - where the existing building and addition comply with this code as a single building, or
 - where the building dwelling unit with the addition achieves a certified HERS rating in accordance with Table R406.5.
- Additions shall be in accordance with Section R502.1.1, R502.2 or R502.3.

The Stretch Code and Existing Buildings



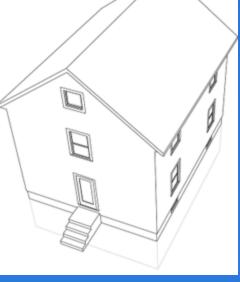


Exception: Additions that add existing basement or attic spaces to the conditioned floor area of an existing dwelling unit due to changing the thermal boundary but not changing the building footprint or roofline do not require a HERS rating.

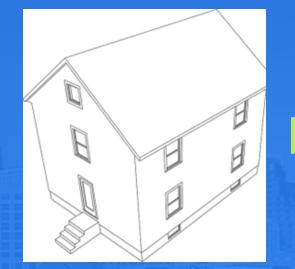
Projects That DO NOT Trigger a HERS Rating



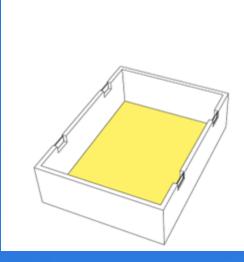
An existing house with an unconditioned basement will be remodeled. The basement is 1,200 ft² and will be insulated and fully conditioned.



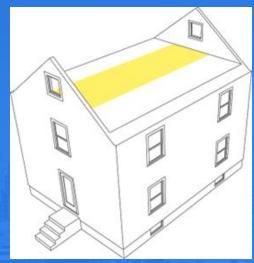
Source: MA DOER







Source: MA DOER



Source: MA DOER

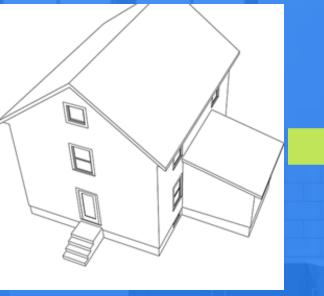
An existing attic space, 1200 ft², will be finished and insulated so that it is part of the conditioned building envelope. No changes to the roof will be made to "grow" the space.

Projects That DO Trigger a HERS Rating

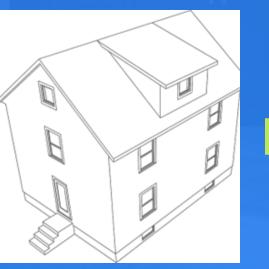


If an addition is added to the house with a full basement connecting to the existing basement, and the new larger basement is conditioned, the project will require a HERS rating.

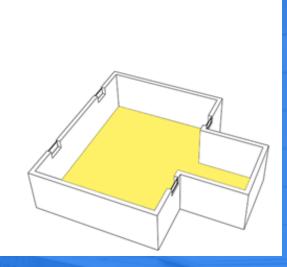
If a dormer is added to the existing roof, thereby increasing the occupiable SF of the existing attic, and the attic is insulated and finished to become part of the conditioned building envelope, this WILL trigger a HERS rating.



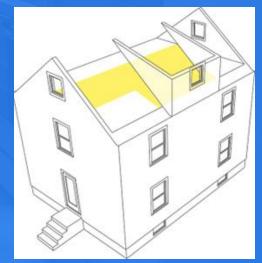
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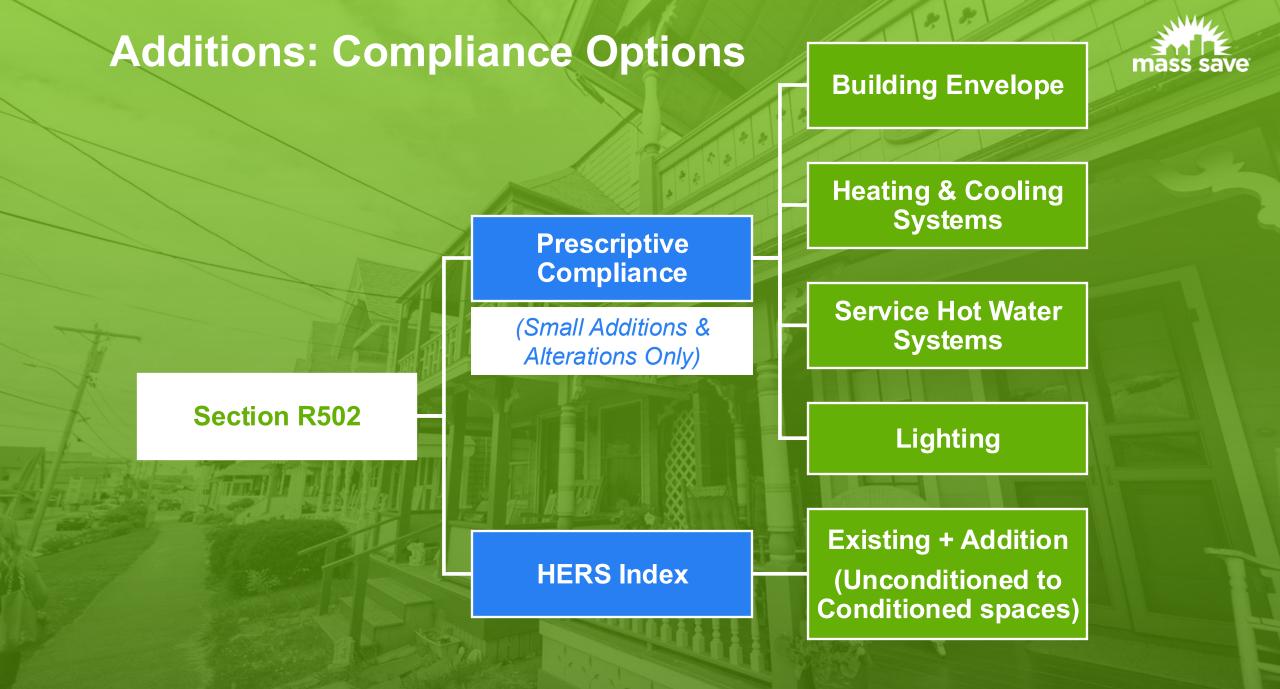


Table R406.5 Maximum Energy Rating Index

Clean Energy Application	New Construction – Permits after July 1, 2024	New Construction – With R406.5.2 embodied carbon credit	Accessory Dwelling Units	Major Alterations, Additions, and Changes of Use
Mixed-Fuel Building	42	45	52	65
Solar Electric Generation*	42	45	55	70
All-Electric Building	45	48	55	70
Solar Electric* and All-Electric Building	45	48	58	75

*Solar Electric Generation = Solar photovoltaic array rated at 4kW

a. Maximum HERS rating prior to onsite renewable electric generation in accordance with Section R406.5

b. The building shall meet the mandatory requirements of Section R406.2.

c. Alterations, Additions or Change of use covered by Section R502.1.1 or R503.1.5 are subject to this maximum HERS rating, except for Historic Buildings which may opt to follow R503.1.1 for alterations.

R406.5.1 Trade-Off for Clean Energy Systems



Solar Electric Generation

Solar photovoltaic array rated at 4kW or higher shall offset 3 HERS points for new ADUs and 5 HERS points for alterations, Change of use to Residential R-use occupancies or for fully attached additions. Accessory Dwelling Units (ADUs) following Section R406 or existing buildings and additions following IECC chapter 5[RE] may use clean energy tradeoffs to increase the maximum allowable HERS rating



All Electric Buildings

Shall offset 3 HERS points for each dwelling unit in new construction, including new ADUs, and 5 HERS points for alterations, change of use to Residential R-use occupancies and fully attached additions.

Poll Question #2

True or False. The new residential stretch code took effect on January 1, 2023.

- A. True
- B. False





Prescriptive Compliance

"Small" Stretch Code Additions and Alterations

- The Prescriptive Path is only available for Base Code projects and Stretch Code additions and alterations that are ≤ 1,000 sq ft or 100% of existing building area
- The provisions for these projects come from the 2021 IECC with Massachusetts amendments
- Significant increases in R-values for above-grade walls



Changes to Prescriptive Values for Climate Zone 5

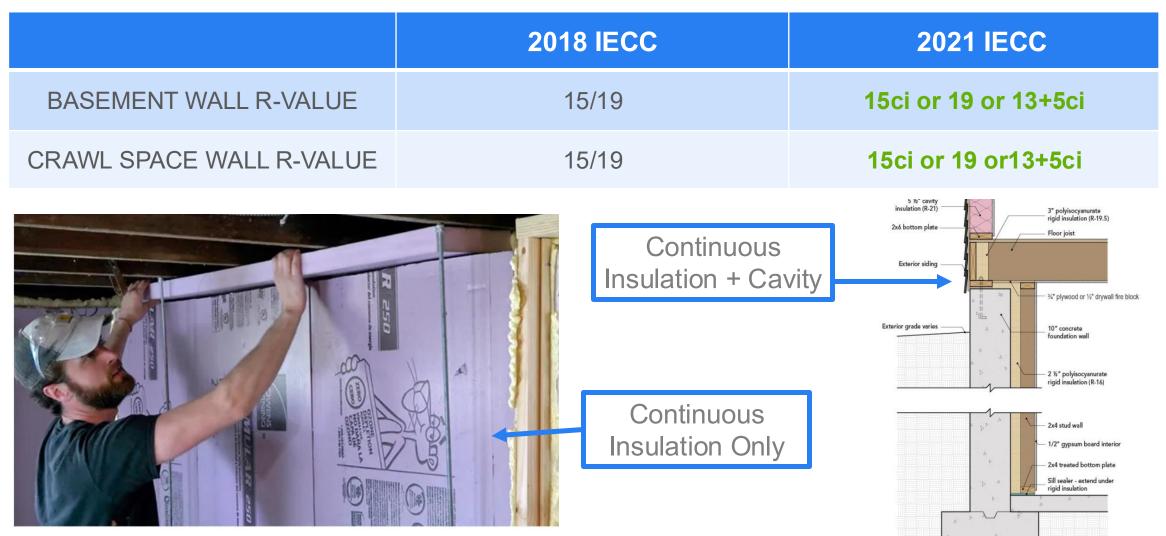
	2018 IECC	MA Amended 2021 IECC
FENESTRATION U-FACTOR	0.30	0.30
SKYLIGHT U-FACTOR	0.55	0.55
GLAZED FENESTRATION SHGC	NR	NR
CEILING R-VALUE	49	49
WOOD FRAME WALL R-VALUE	20 or 13+5	30 or 20+5ci or 13+10ci or 0+20ci
MASS WALL R-VALUE	13/17	13/17
FLOOR R-VALUE	30	30
BASEMENT WALL R-VALUE	15/19	15ci or 19 or 13+5ci
SLAB R-VALUE & DEPTH	10, 2ft.	10ci and 4'
CRAWL SPACE WALL R-VALUE	15/19	15ci or 19 or13+5ci

	2018 IECC	2021 IECC
WOOD FRAME WALL R-VALUE	20 or 13+5	30 or 20+5ci or 13+10ci or 0+20ci
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Double 2x4 Wall

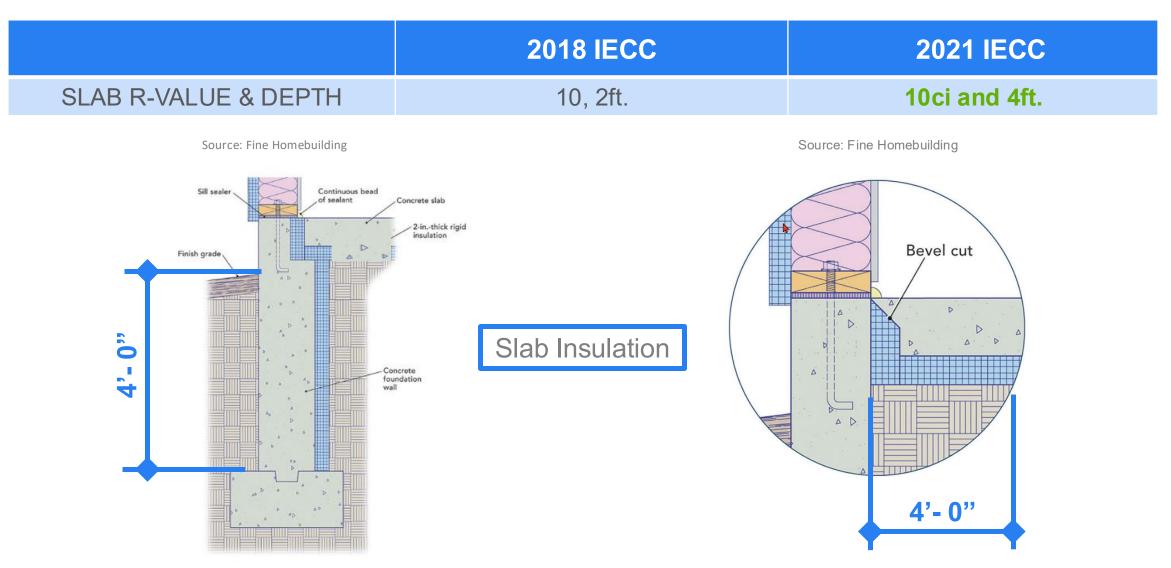
Insulated Cavity + Continuous Insulation





Source: Fine Homebuilding Magazine

Source: Fine Homebuilding



Poll Question #3

Additions of what size require a HERS Rating?

- A. 1000 square feet
- B. 500 square feet
- C. Over 1000 square feet
- D. None





HERS Index

A.A.A

HERS Index

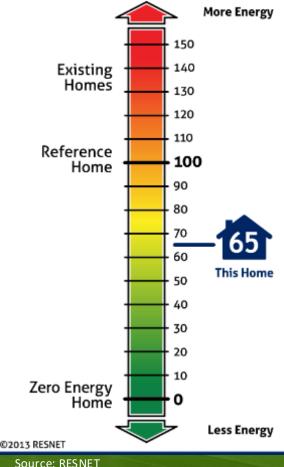


A certified Home Energy Rater assesses the energy efficiency of a home, assigning it a relative performance score. The lower the number, the more energy efficient the home. A typical home built to 2006 energy efficiency standards scores 100 on the HERS[®] Index.

- A home with a HERS[®] Index Score of 70 is 30% more energy efficient than a standard new home
- A home with a HERS[®] Index Score of 130 is 30% less energy efficient than a standard home

Some variables included in a HERS Rating:

- All exterior walls (both above and below grade)
- Floors over unconditioned spaces (like garages or cellars)
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC systems, water heating system, and your thermostat



R406.6.2 Documentation for Permit Application Energy Rating Index

Prior to the issuance of a **building permit**:

- A HERS compliance report which includes a HERS index score of 65 or lower, or otherwise complies via renewable trade-offs
- A description of energy features
- A statement that the rating index score is "**based on plans**"



R406.6.2 Documentation for Permit Application Energy Rating Index



sed on Plans			Home: Builder:
HERS® Index Score: 655 Your home's HERS score is a relative performance score. The lower the numbe the more energy efficient the home. To learn more, visit www.hersindex.com		Annual Savings	
Your Home's Estimated Energy Use:			This home meets or exceeds the
Heating Cooling Hot Water Lights/Appliances Service Charges Generation (a.g. Solar) Total:	Use (MBtu) 69.3 0.1 3.8 21.1 0.0 94.3	Annual Cost \$1,491 \$5 \$145 \$803 \$84 \$0 \$2,527	criteria of the following:
HERS' Index	Home Feature Summ	aryı	Rating Completed by:
tenterp	Fiome type: Indet Communite	Single family detached lank	Energy Ration PSD Test Ration RESHET ID: 2633471
	Conditioned Hoer Area Number of Detroams Ritmay Heads & System Primary Cooking System Heatury Water Heating House Tudinism Versitation	2.200 M ² 5 Boler - Natural Gail - 782 AUUE An Canditioner - Dectric - 13 UEUE Reprisental Italie Houses - Bachic - A Every Practice 2462 CH400 (Sale ACH60) all CFM, BCCM - 2011tttt, 20 Watts - Tal soft Ordy.	Reting Company: Performance Systems Developmen 950 Danby Road Hacs NY, 14850 Rating Provider: Herfamance Systems Developmen 124 Binding Steel, Irbaca NY 14850 807-277-6240
and and a set	Durf Unikage in Outside Above Grade Weltz Celling Window Type Houndaton welts	Editard Only 150 CTM & 2496 (197, 100 Ph 6-25 Acts, 5-54 U-Vitar 0.29, 5462 (10.25 WM	
national we under	Franked Rook	8.5	PSD Text Rater, Centified Energy Rater Date: 3/25/25 at 1529 AM

ESTIPIG:





IECC 2021 Proposed Home Summary



Organization

Inspection Status Results are projected

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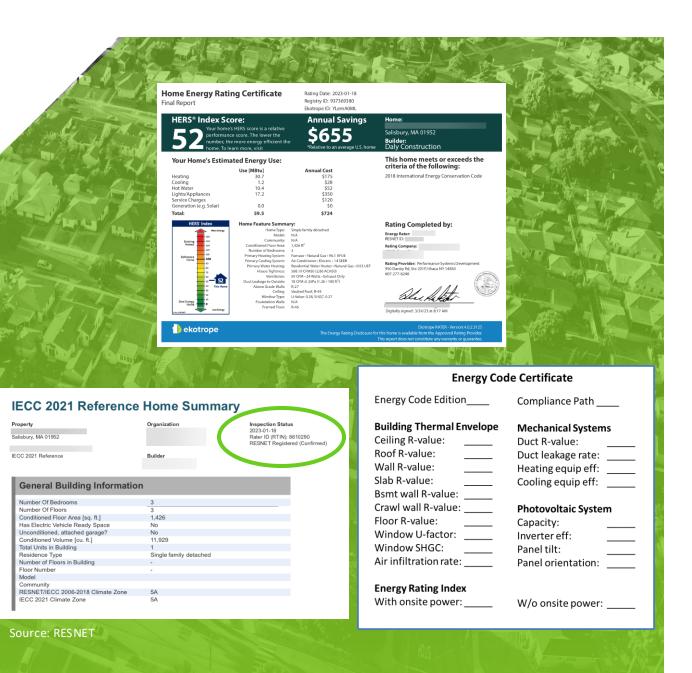


Source: RESNET

MA Residential Amendments

The following are recommended documents for issuance of a *certificate of occupancy:*

- 1. A copy of the final certificate indicating that the HERS rating index score for each unit is verified to be 65 or less or otherwise complies via renewable trade-offs,
- 2. IECC 2021 Reference Home Summary – provided by the HERS Rater
- 3. An *Energy Code Certificate*, for each unit listing the final HERS index score of the dwelling unit to be posted on site adjacent to the electric panel.





R506 EnerPHit Standard Compliance Pathway

R506 EnerPHit Standard

- Available for existing building retrofit projects
- Certified through Passive House
 Institute (PHI)
- Pre-certified to the EnerPHit Retrofit Plan Standard



Certified Retrofit

Passive House Institute

classic | plus | premium |

Source: PHI

R506.2 Documentation



Documentation Building Permit

Prior to the issuance of a building permit, the following items must be provided to the Building Official:

- A. A PHPP compliance report with results from the approved Passive House certification software which demonstrates project compliance with current PHI performance requirements;
- B. A statement from the PHI-accredited Certifier that the approved Passive House certification software results and compliance report accurately reflect the plans submitted;
- C. Evidence of project registration from a PHI-accredited Certifier **OR**
- D. A Design State Conditional Assurance Letter from a PHIaccredited Certifier.

Documentation Final Certificate of Occupancy

Prior to the issuance of a final certificate of occupancy, the following items must be provided to the building official:

- A. A Design State Conditional Assurance Letter from a PHIaccredited Certifier.
- B. An updated compliance report with results from the approved Passive House certification software which reflects "as-built" conditions and test results (blower door and ventilation results) that demonstrates project compliance with PHI performance requirements;
- C. A copy of both the air leakage test results and report on the commission settings and performance of the building's ventilation system;
- D. A statement from the Certified Passive House Consultant or Certified Passive House Designer that the project test results meet the model performance requirements, all the mandatory limits and any other mandatory requirements <u>OR</u>
- E. A Final Certification Letter from a PHI-accredited Certifier.



Appendix RB: Solar-Ready Provisions

Existing Buildings

RB 101 Scope

RB101.1 General. These provisions shall be applicable for new construction, **except additions 1,000 sq ft and under.**

Exceptions

- Buildings and dwelling units complying with Appendix RC
 - Section RC102 (Zero energy pathway)
 - Section RC105 (Solar-roof zone)





Appendix RB: Solar-Ready Provisions

New in MA Amended 2021 IECC:

- Applies to Group R (in addition to one- and two-family dwellings and townhouses)
- Zone setbacks from obstructions
- Capped roof penetration sleeve for flat roofs



Existing Buildings Summary

- For additions or increases in size of over 1000 square feet or 100% of the existing square footage, a HERS Rating is required as per Table R406.5.
- For "small" additions or alterations, the guidelines in chapter 5 for existing buildings should be followed.
- Solar Ready applies only to additions over 1000 square feet.
- Historical buildings can still apply for exemptions if the work would affect the historical nature of the building.



Mass Save Incentive Programs



Residential Rebates and Incentives

Rebates for appliances, heating systems and more.

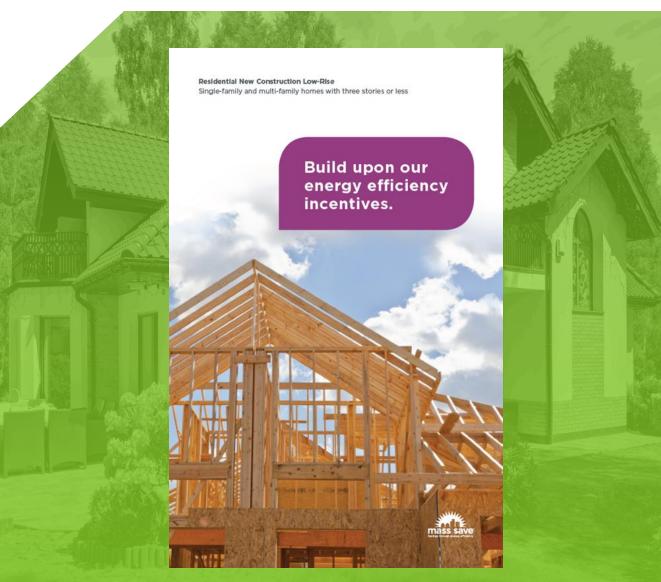


www.masssave.com/en/residential/rebates-and-incentives

Low Rise/Repair & Additions

Incentives for energy efficient building and renovating:

- Single Family Homes
- Multi-Family 3 stories and residential-metered heat
- New Construction
- Major Renovations and Large Additions
- Residential Energy Code
- Residential HVAC and DHW
 Systems only
- On-site testing and verification completed by program-approved HERS Raters
- Incentives for commercially metered buildings/units are not available



Details at: www.masssave.com/en/saving/residentialrebates/new-construction

Low-Rise/Repairs & Additions



Incentives for energy efficient building and renovating

Benefits of Working with a HERS Rater

Diagnostic testing

- Blower door and duct leakage tests (pre- and post-tests, ideally)
 - Help with Code compliance documents
- Infrared testing
- Ventilation commissioning
- Quantify savings

Plan analysis

- Drives deeper energy savings
- Improves occupant comfort

Technical guidance and expertise

- Create a comprehensive plan for energy efficiency
- Can act as a liaison between homeowner, builder, architect, and trades

Access to Mass Save incentives

Can be paid to builder or homeowner



Low-Rise/Repairs & Additions Incentives for energy efficient building and renovating

Renovations and Additions

Gut Renovations and Additions

- Renovations are ideally at least 50% gut projects
- Substantial HVAC changes
- Clear project scope
- Small jobs like kitchen/bath remodels are not a good fit
- Additions should be at least
 500 SF

Participants include Builders, Developers & Homeowners

Program-approved HERS Rating companies

Access to Mass Save 0% interestHEAT LoanUp to 7 years and \$25,000

Process Similar to LR with addition of Preliminary Inspection



Questions about the energy code?



Energy Code Support Hotline:

855-757-9717



Energy Code Support Email:

energycodesma@psdconsulting.com

Thanks!

Massachusetts Energy Code Technical Support Program







EVERSURCE



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