



Energy Rating Index Performance Path

CASE STUDIES: Incorporating the HERS Index into an Energy Code

The Energy Rating Index (ERI) performance path gives builders yet another option for complying with the International Energy Conservation Code (IECC). In addition to the prescriptive and performance paths of previous versions of the IECC, builders now have the option of meeting a target ERI score through a wide range of performance options to demonstrate compliance.

The ERI performance path allows a state or jurisdiction adopting the IECC to specify which qualifying Energy Rating Index method it will use. RESNET's Home Energy Rating System (HERS) index, based on ANSI RESNET Standard 301-2014, is the existing compliant ERI method and is nationally recognized for inspecting and calculating a home's energy performance. To date, over 1.5 million homes have been rated in the U.S. under the RESNET standards and in 2013, half of all new homes were rated and issued a HERS Index Score.

Nationwide, seven states have incorporated a HERS Index Score option into their residential building energy codes thus far: Arkansas, Colorado, Idaho, Kansas, Massachusetts, New York and New Mexico.¹ The HERS programs in these states and jurisdictions serve as examples of the successful implementation of an ERI performance requirement. For instance, Massachusetts integrated the HERS Index into their Stretch Energy Code, or above code residential program. Since the stretch code was enacted, 142 jurisdictions throughout Massachusetts have adopted the code, resulting in the rating of over 7,000 homes using the HERS Index. New Mexico also adopted the HERS Index statewide as a compliance option to the 2009 IECC and several jurisdictions are now requiring new residential construction to receive a HERS rating. The City of Santa Fe, for example, requires HERS ratings for all residential construction as part of the Santa Fe Residential Green Building Code. To date, approximately 900 homes have been built under this requirement.

The HERS programs in both Massachusetts and the City of Santa Fe are excellent models for other states and jurisdictions to follow when adopting the HERS Index as a method to comply with an energy code. Each program is highlighted below.

MASSACHUSETTS STRETCH ENERGY CODE— HERS Rating Option

In 2009, through the urging of the Department of Energy Resources and various local jurisdictions, Massachusetts adopted the HERS performance path as a code compliance option under its Stretch Energy Code.² The stretch code is included in the Massachusetts code as Appendix 115AA³ and although it is based on the 2009 IECC, it requires approximately 20% greater building energy efficiency.⁴

The stretch code requires new residential buildings 3-stories or less, including multi-family units, to meet an energy performance standard using the HERS Index based on house size:

Homes 3,000 ft² or larger

—HERS Index of less than or equal to 65

Homes smaller than 3,000 ft²

—HERS Index of less than or equal to 70

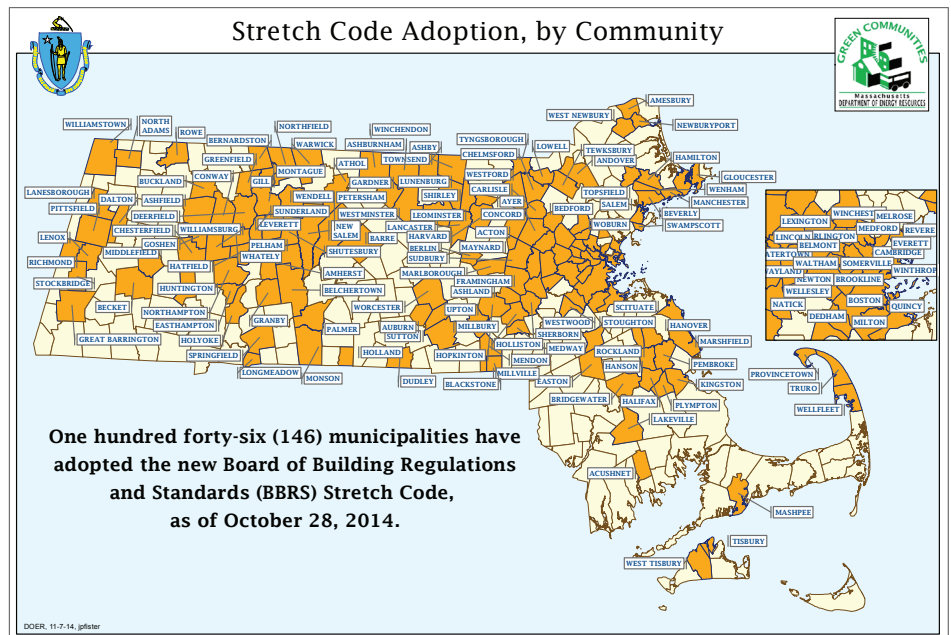
Existing home alterations, renovations and repairs that choose to use the performance option must achieve the following HERS rating requirements:

Existing homes 2,000 ft² or larger

—HERS Index of less than or equal to 80

Existing homes less than 2,000 ft²

—HERS Index of less than or equal to 85





The stretch code has been widely accepted throughout Massachusetts. Jurisdictions may choose to enforce the base code or adopt the stretch code as the mandatory energy code. To date, 142 jurisdictions have adopted the stretch code, resulting in the rating of over 7,000 homes using the HERS Index. The average score of all of the homes is currently 59.

Utilities are also encouraging the adoption of the stretch code. Initially, the Department of Energy Resources provided full support, including training and education, for the HERS program. However, due to the success and widespread adoption of the stretch code, utilities are now leading training programs and providing education to building officials and decision makers throughout the state.

THE CITY OF SANTA FE RESIDENTIAL GREEN BUILDING CODE—HERS Rating Requirements

The City of Santa Fe has taken similar strides in increasing energy efficiency by incorporating the HERS Index Score into the Santa Fe Residential Green Building Code. The program began in 2006 when Santa Fe mandated that all new residential construction receive a HERS rating. The initial program, however, did not require homes to achieve a particular score and it wasn't until January 1, 2008, that all new residential single family homes were required to meet specific target HERS scores as outlined in the green code.

Santa Fe's HERS index threshold was built on the levels set in the National Green Builder Standard and is based on the size of the home being rated. Homes that are 3,000 square feet or less are required to achieve a HERS Index of 70 or better.⁵ The required scores are then tiered based on square footage, with homes greater than 10,000 square feet required to have a HERS rating of 0 or better.⁶

Required HERS Score by House Size

0 to 3000 ft ²	70	6801 to 7400 ft ²	30
3001 to 3500 ft ²	65	7401 to 8000 ft ²	25
3501 to 4000 ft ²	60	8001 to 8500 ft ²	20
4001 to 4500 ft ²	55	8501 to 9000 ft ²	15
4501 to 5000 ft ²	50	9001 to 9500 ft ²	10
5001 to 5600 ft ²	45	9501 to 10,000 ft ²	5
5601 to 6200 ft ²	40	10,001 ft ² +	0
6201 to 6800 ft ²	35		

Homes receive a HERS score in two phases. A preliminary HERS index is prepared based on the building plans and is submitted along with Santa Fe's residential checklist to obtain a building permit. A final HERS rating is prepared once the home

City of Newton —First Among Many

The city of Newton was the first jurisdiction in Massachusetts to adopt the HERS stretch code as a part of its energy code.



Leading by example, the city has been highly successful in incorporating the code; to date, over 230 homes have been HERS rated under the stretch code.

Newton's HERS stretch code is mandatory and was shepherded in by a building commissioner who emphasized the importance of such a program. As such, there were very few issues with its inception and implementation.

According to a local building official, the success of Newton's stretch code can be attributed to the decision to adopt the code in its entirety at the very start of the statewide program. By appealing to the sense of civic duty, as well as the enthusiasm regarding the stretch code in the town leadership, Newton was in an excellent position to act as the leader within Massachusetts.

For projects that either require or opt into the HERS performance path, local HERS raters have stepped up and have taken the lead in performing HERS audits, both alleviating some of the workload in the building department as well as maintaining the high level of standards Newton homeowners have come to expect.

Due to the aggressive nature of the program, over 61% of the homes rated since the beginning of the program have received HERS scores better than the state average.

Furthermore, over 72% of the homes rated have scored better than the national HERS average.



Energy Ratings Index Performance Path



is nearly complete and all assumptions in the preliminary HERS index have been verified. The final HERS index score must be submitted before a Certificate of Occupancy can be issued.

A report, similar to the one below, that reflects the final HERS score is posted in the window of the rated home prior to the issuance of a Certificate of Occupancy and may only be removed by the first occupant.

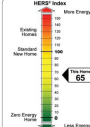
GREEN BUILDING CODE FACTS		
for the residence located at:		
This building achieved Build Green Santa Fe:	SILVER	
This building achieved a confirmed Home Energy Rating System (HERS) Index of:	65	
Certified Energy Rater _____ Date _____		Insert HERS Company Logo Here
Points Received in Each Category		
Category	Minimum Required Points	Points Achieved
Lot Design, Preparation, and Development	16	40
Resource Efficiency	60	70
Energy Efficiency	70	90
Water Efficiency	45	55
Indoor Environmental Quality	54	75
Operation, Maintenance, and Homeowner Education	14	25
Additional Points- any Section	90	(included above)
TOTAL POINTS	349	355

Figure 1 Sample HERS Rating Report

trombe walls and adobe. In addition, HERS raters must correctly perform a blower door and duct blaster test as part of the required field test.

The HERS requirement in the Santa Fe's green code applies to all new single-family units, both attached and detached, including guest houses. To date, over 900 homes have been HERS rated under the requirement to achieve a HERS rating of 70 or better.

BEST PRACTICES AND LESSONS LEARNED

Santa Fe's inventive approach to incorporating the HERS index into a mandatory green building code has fostered a number of best practices for other cities and jurisdictions to follow. Requiring that all new construction receive a HERS rating during the initial stages of the program worked well to familiarize builders with the process of obtaining a target HERS score. Since there was initially no set HERS score, builders could learn through trial and error how to achieve low ratings and Santa

Fe could establish a realistic set of scores for the jurisdiction based on feedback from the builders. Additionally, the City of Santa Fe sent building department personnel to HERS trainings to ensure awareness of the program. As a result, the building community throughout Santa Fe understands and supports the local HERS program.

The HERS program in Santa Fe is set up to focus primarily on elements of the building envelope. As such, builders are more aware of the role the building envelope has in efficiency. Construction practices reflect an emphasis on air barriers and other elements included on the required Thermal Bypass Checklist. The quality of construction has increased as well. The HERS program has encouraged competition amongst builders; many builders challenge themselves and others to score the lowest HERS rating for each home size. The competitive environment has encouraged the use of new energy efficient products and technologies.

Furthermore, building inspectors and HERS raters work together to achieve maximum efficiency in new residential construction. Building inspectors are required to inspect for compliance with provisions of the Santa Fe Residential Green Code that are also included as part of a HERS rating. Although building inspectors are not focused solely on the energy efficiency portion of the code, this allows for a second set of eyes on building components such as insulation and air sealing. HERS raters also work closely with one another to ensure consistency and credibility within the Santa Fe HERS community.

The City of Santa Fe has had great success with implementing the HERS index into the residential energy code. However, the city has had to overcome a number of roadblocks as well. Since the credibility of raters is often an issue with HERS programs, Santa Fe requires additional training for HERS raters to ensure quality assurance is maintained. The city has also struggled with having an adequate number of HERS raters to keep up with the growing demand for new homes.

- 1 For a complete list of jurisdictions that have incorporated the RESNET HERS Index Score into their building energy codes, see http://www.resnet.us/professional/main/Hers_index_and_energy_codes.
- 2 Prior to statewide adoption, the residential stretch code was a voluntary program closely tied to the ENERGY STAR for Homes program developed by the federal EPA and Department of Energy.
- 3 8th EDITION, 780 CMR, Appendix 115.AA – formally 7TH EDITION CODE, APPENDIX 120.AA <http://www.mass.gov/eopss/docs/dps/8th-edition/115-appendices.pdf>
- 4 As of July 1, 2014, the standard "non-stretch" provisions of the Massachusetts' energy code will be based on the 2012 IECC. The stretch code will continue to be based on the 2009 IECC with amendments until the stretch code is updated.
- 5 It is estimated that the initial first cost increase of a home built to a HERS score of 70 is 2-4% over a home that was not building to the HERS requirements.
- 6 <http://www.resnet.us/blog/santa-fe-and-taos-new-mexico-adopts-resnet-hers-index/>