Energy Rating Index Performance Path

Fact Sheet Development

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Overview of the ERI Performance Path

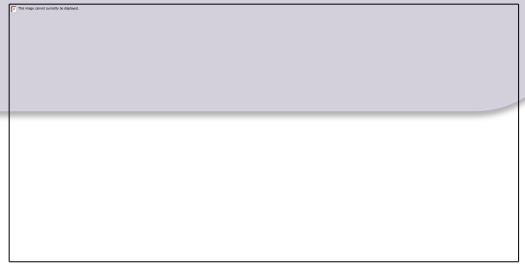
Mandatory Requirements

- 2015 IECC provisions including:
  - Section R402.4 Air Leakage
  - Section R403 Systems
  - Section R403.5 Service Hot Water Systems
  - Section R404 Electrical Power and Lighting Systems
- Building Envelope requirements of the 2009 IECC

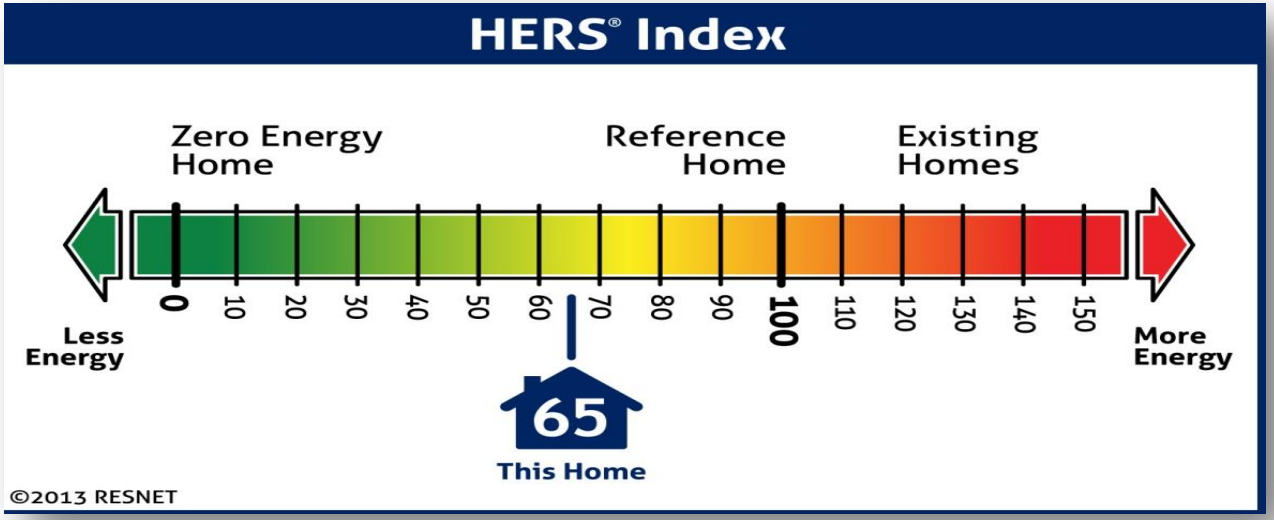
States and jurisdictions can specify which qualifying ERI method they will use

RESNET HERS Index is the existing compliance ERI method

- **Is nationally recognized**
- **Based on ANSI RESNET Standard 301-2014**
- **To date, over 1.5 million homes have been rated in the US under the RESNET standards**



What is a HERS Index and Score?



A scoring system established by RESNET based off of the 2006 IECC

The scale is based on a 100 – 0 index

A home based on the 2006 IECC scores a HERS Index of 100

A score of 0 is equivalent to a net zero home

What is included in an Energy Rating?

Energy ratings are based on a number of variables including the type and efficiency of each of the following:

- Equipment
- Appliance upgrades
- Exterior walls (both above and below grade)
- Floors over unconditioned spaces (such as garages or crawlspaces)
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC and water heating systems
- Air leakage of the home
- Leakage in the heating and cooling distribution system

ERI Fact Sheet Development

Goals of the Fact Sheets

- Address concerns over the ERI performance path and HERS Index
- Explore benefits of the ERI performance path as a code option
- Analyze the cost effectiveness of the ERI performance path
- Offer case studies and an implementation guide for the successful incorporation of the HERS Index in an energy code

Overview of the ERI Performance Path in the 2015 IECC

Fact Sheet 1

RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

Energy Rating Index Performance Path

Overview of the ERI Performance Path in the 2015 IECC

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 also requires builders to meet the mandatory code requirements of the IECC, including water heating piping provisions, and comply with the minimum insulation and window envelope prescriptive requirements of the 2009 IECC.

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.

Energy ratings are based on a number of variables, including equipment and appliance upgrades, as well as the type and efficiency of each of the following:

- Exterior walls (both above and below grade)
- Floors over unconditioned spaces (such as garages or crawlspaces)
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC and water heating systems
- Air leakage of the home
- Leakage in the heating and cooling distribution system.

HOW THE 2015 IECC ERI REQUIRED RATINGS WERE DETERMINED

The ERI score is defined as a numerical score where 100 is equivalent to the 2006 IECC and 0 is equivalent to a net-zero home. Each integer value on the scale represents a one percent change in the total energy use of the rated design relative to the total energy use of the ERI reference design. The ERI scores required in the 2015 IECC for each climate zone are included in Table 1.

The ERI scores required for the 2015 IECC are based on analysis performed by the Florida Solar Energy Center of HERS index scores for homes in 16 cities distributed across each climate zone.[1] The homes used in the analysis were one-story 2000 ft² and two-story 2400 ft² homes built using the 2012 IECC envelope and air leakage requirements and widely-available high-efficiency HVAC and water heating equipment.[2] Additionally, best-case orientation and architecture of prototype homes was assumed and an additional 10% savings was included in the calculation. The homes were modeled for various versions of the IECC which provided a range of HERS Index scores by climate zone.

Energy Ratings Index Performance Path

HOW DOES THE ERI PERFORMANCE PATH COMPARE TO THE 2009 IECC?

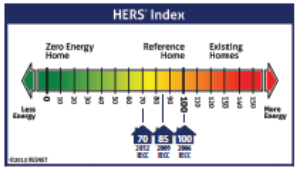
According to the U.S. Department of Energy, a home built to the 2009 IECC is expected to use 15 to 20 percent less total energy than a home following the 2006 IECC. As a result, a home built to comply with the minimum prescriptive requirements of the 2009 IECC would achieve a HERS score of approximately 85.

HOW DOES THE ERI PERFORMANCE PATH COMPARE TO THE 2012 IECC?

The 2012 IECC is expected to decrease energy consumption in homes by 30 percent when compared to the 2006 IECC. As a result, a home built to comply with the minimum prescriptive requirements of the 2012 IECC would achieve a HERS score of approximately 70.

HOW DOES THE ERI PERFORMANCE PATH COMPARE TO OTHER STANDARDS?

A study performed by the Leading Builders of America and the National Association of Home Builders Research Center found the corresponding HERS index scores for Energy STAR, a level of 50% beyond the 2006 IECC and a level 60% beyond the 2006 IECC to be 70, 56 and 47, respectively.



WHO IS USING THE HERS

Across the nation, state and loc... HERS Index Score target as a performance compliance option to their building energy code. To date, code jurisdictions in the states of Arkansas, Colorado, Idaho, Kansas, New Mexico, New York and Massachusetts have incorporated a HERS Index Score option into their residential energy codes.[4]

Table 2 depicts the current average HERS index rating for each climate zone based on the number of homes receiving HERS ratings from March 2012 to March 2014

Table 2: Average HERS Index by Climate Zone

Climate Zone	Number of Homes Rated	Average HERS Index
1A	1442	68
1B	5	58
2A	60857	65
2B	5080	62
3A	40590	66
3B	7040	63
3C	18	78
4A	49073	64
4B	1720	56
4C	754	61
5A	52706	62
Design 5B	14706	61
6A	8744	56
6B	690	59
7A	82	56
7B	213	62
8B	2	52

1 http://www.resnet.us/uploads/documents/FSEC-CR-1941-13_R01.pdf
2 SEER 14 air conditioners in the South, SEER 14.5 in the north, 96% AFUE furnaces in the North (5-8), 90% AFUE furnaces in climate zones 3-4, 87 HSPF, and point-of-use gas or ENERGY STAR electric water heaters.
3 http://www.imt.org/uploads/resources/files/Fact_Sheet_on_ERI_Proposal.pdf
4 For a listing of jurisdictions that have incorporated a HERS Index Score into their energy code see http://resnet.us/professional/main/Hers_index_and_energy_codes.

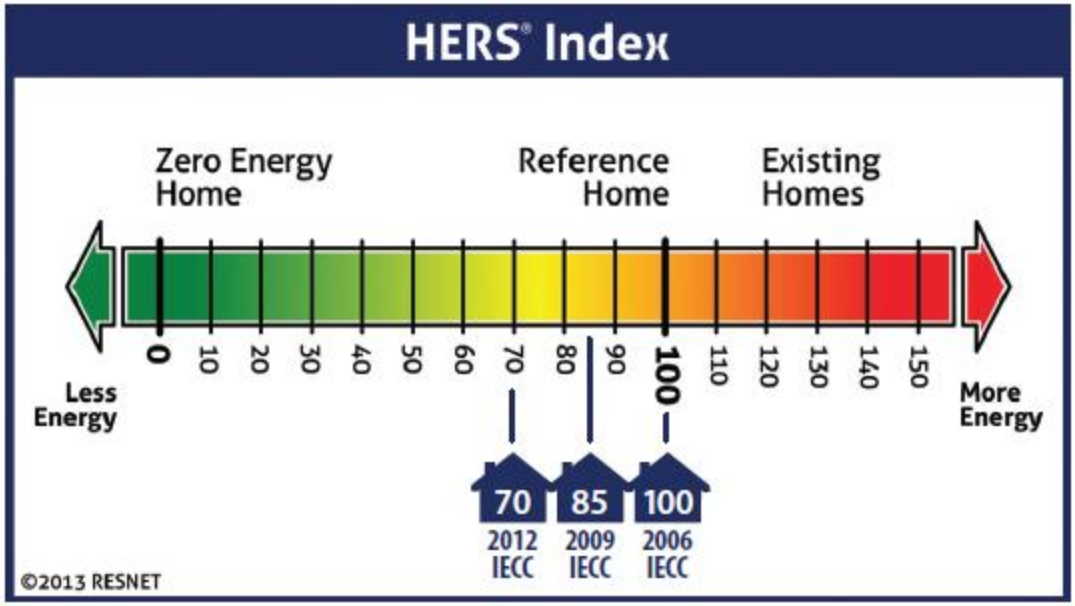
RESNET

Developed by Britt/Makela Group (britmakela.com)

The ERI score is defined as a numerical score where 100 is equivalent to the 2006 IECC and 0 is equivalent to a net-zero home. Each integer value on the scale represents a one percent change in the total energy use of the rated design relative to the total energy use of the ERI reference design.

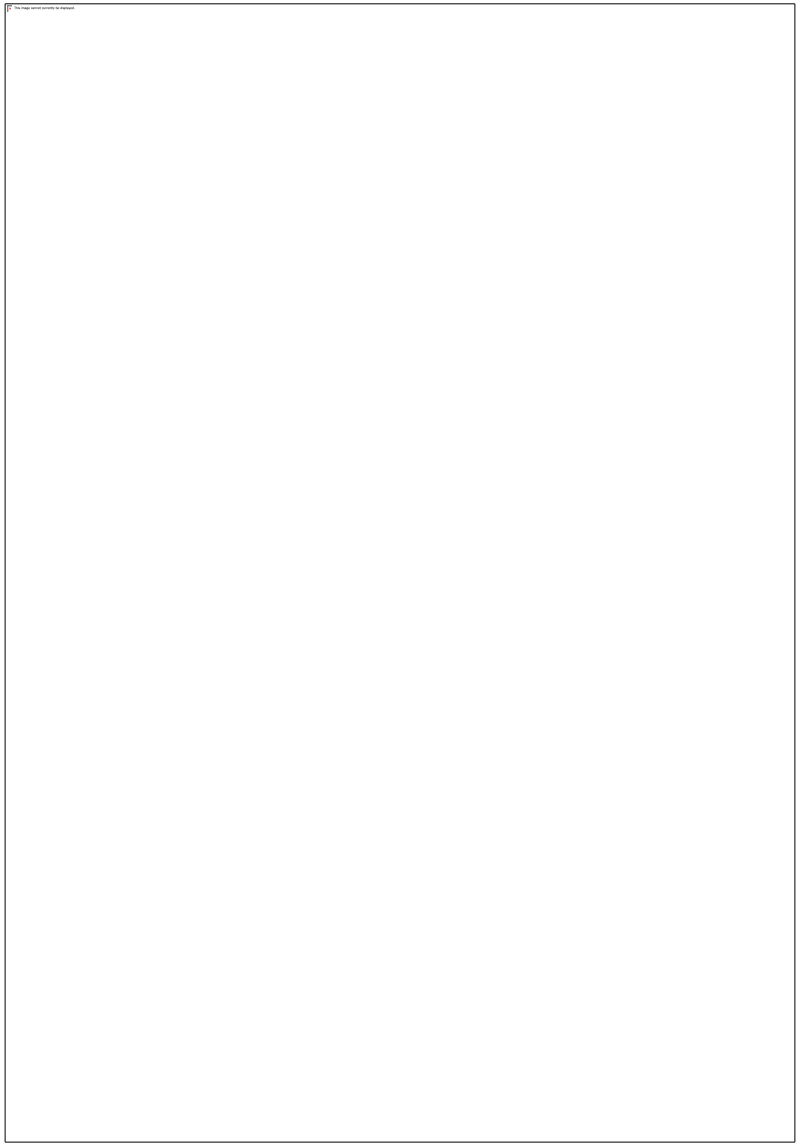
2015 IECC Target ERI by Climate Zone
Climate Zones 1-2: 52
Climate Zone 3: 51
Climate Zone 4: 54
Climate Zone 5: 55
Climate Zones 6: 54
Climate Zones 7-8: 53

2015 IECC target ERI scores range from 51 – 55 based on climate zone



Who is Using the HERS Index?

- To date, jurisdictions in seven states have incorporated a HERS Index Score option into their residential code:
  - Arkansas
  - Colorado
  - Idaho
  - Kansas
  - New Mexico
  - New York
  - Massachusetts



Over 240,000 homes between 8 climate zones have been rated using the HERS Index and have a weighted average score of 63.55.

Benefits of the Energy Rating Index Score Option

Fact Sheet 2

From a Builder's Perspective

- Lower First Costs
- Building Innovation
- Increased Flexibility in Compliance

From a Consumer's Perspective

- Utility Bill Savings
- Resale Value
- Comparison Shopping for Beyond Code Minimum Homes

From a Code Official's Perspective

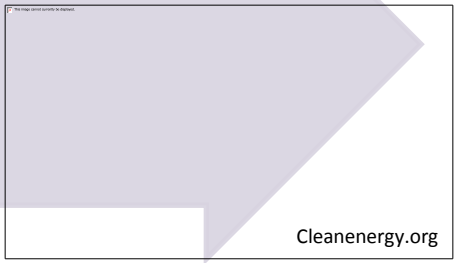
- Reduction in Compliance Verification Time
- Quality Assurance
- Building Performance

From a Code Jurisdiction's Perspective

- National Standard based on US DOE/US EPA Best Practices
- Improved Review and Approval Process and Time
- 3rd Party Certified Inspections Demonstrating Compliance
- Certification Testing to Obtain Final HERS Score
- Ability to Adopt/Promote Whole House Performance Standards

From an Environmental Perspective

- Decreased Emissions
- Reduced Energy Bills



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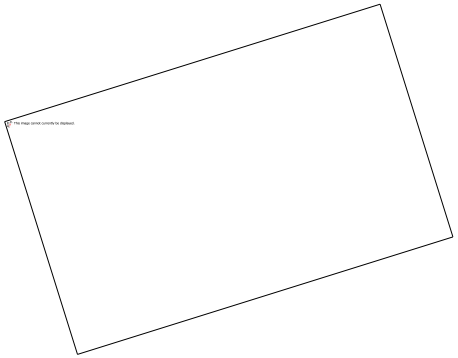
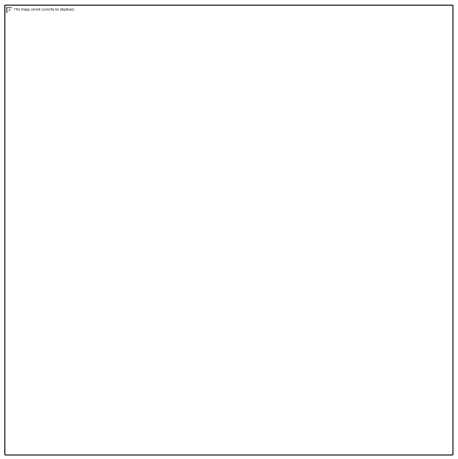
From the Market's Perspective

- Market Competition and Innovation
- Integrated Market
- Increased Sales
- Generate Job Opportunities
- Future Programs





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Frequently Asked Questions

Fact Sheet 3


Encourage Discussion
Address Concerns
Provide Clarity

Cost Effectiveness of Using the ERI to Comply with the 2015 IECC

Fact Sheet 4

A study by the Florida Solar Energy Center compared homes configured to comply with the ERI performance path provisions of the 2015 IECC to homes configured to comply with the 2012 IECC.

The study found that in all cases, compliance with the ERI performance path of the 2015 IECC is cost-effective

Annual savings of the 2015 IECC ERI performance path, averaged across climate zones, is $468

Life-cycle cost savings, averaged across climate zones, is $12,784 for the 2015 IECC ERI performance path

Incremental improvement costs of improving 2012 IECC homes to comply with 2015 IECC ERI criteria were determined using methodology for evaluating cost effectiveness of retrofits for DOE's Building America program

Most Common Efficiency Improvements

- 100% High-Efficiency Lighting
- Higher Efficiency Heating, Cooling and Water Heating Equipment
- Duct Systems Inspected and Tested to Meet Improved Performance
- Enhanced Envelope Efficiencies
- Energy Star Refrigerators, Dishwashers and Clothes Washers

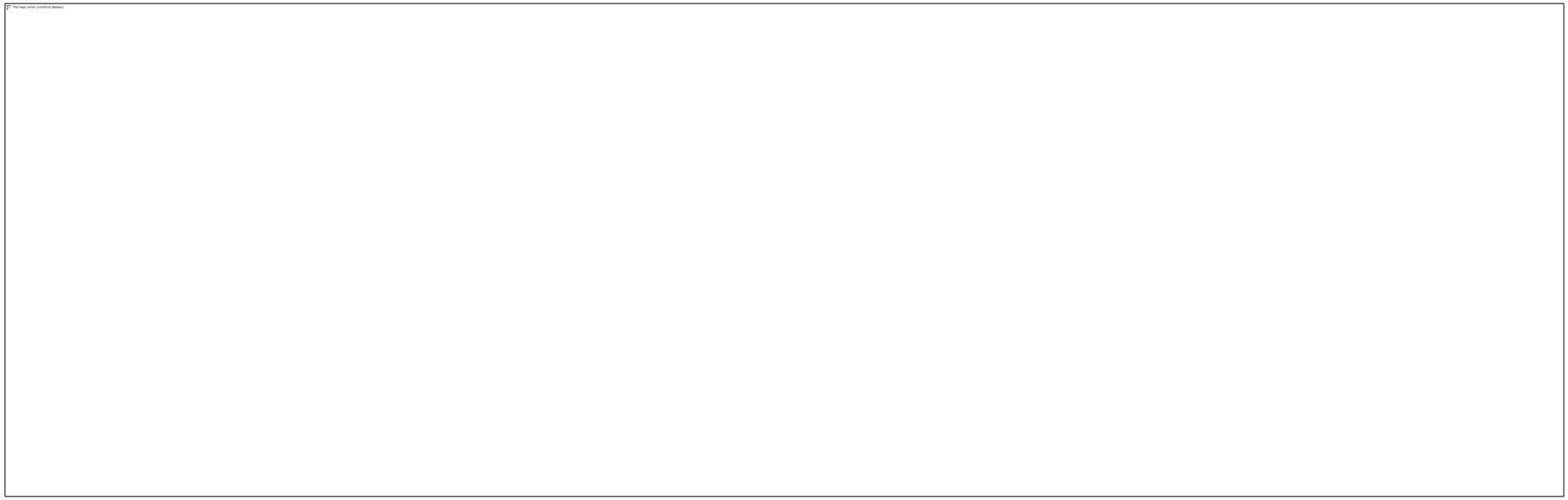
Life-Cycle-Cost Analysis

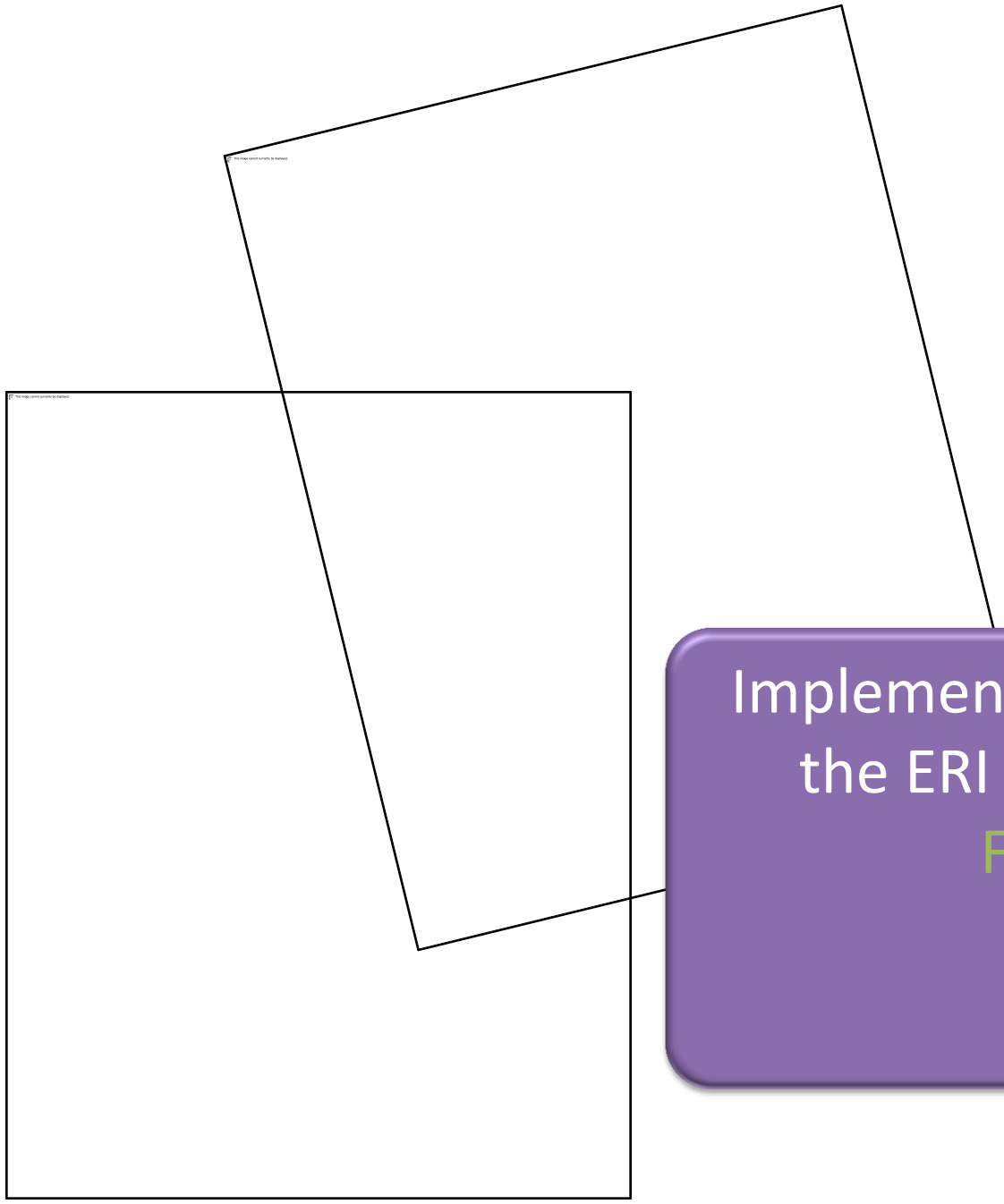
- Based on 30 year life-cycle-cost analysis
- Section 4.6 of ANSI/RESNET 301-2014
- Includes replacement costs and maintenance fraction

Economic Parameters

- 25% income tax rate
- 4% property tax rate
- Property assessment ratio of 80%
- Most recently published energy prices

The following table summarizes the cost-effectiveness analysis of new homes configured to comply with the ERI performance path provisions of the 2015 IECC compared to homes configured to comply with the 2012 IECC

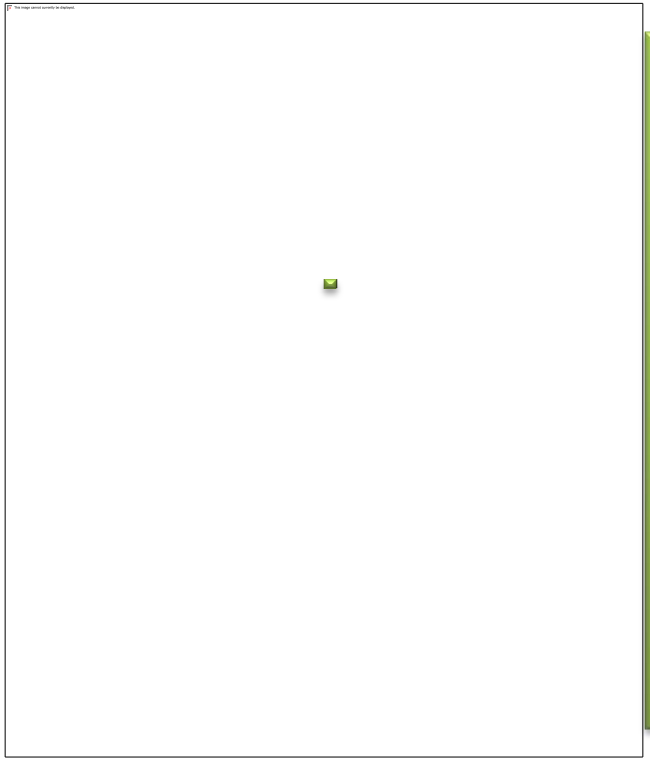




Implementation Guidelines for the ERI Performance Path

Fact Sheet 5

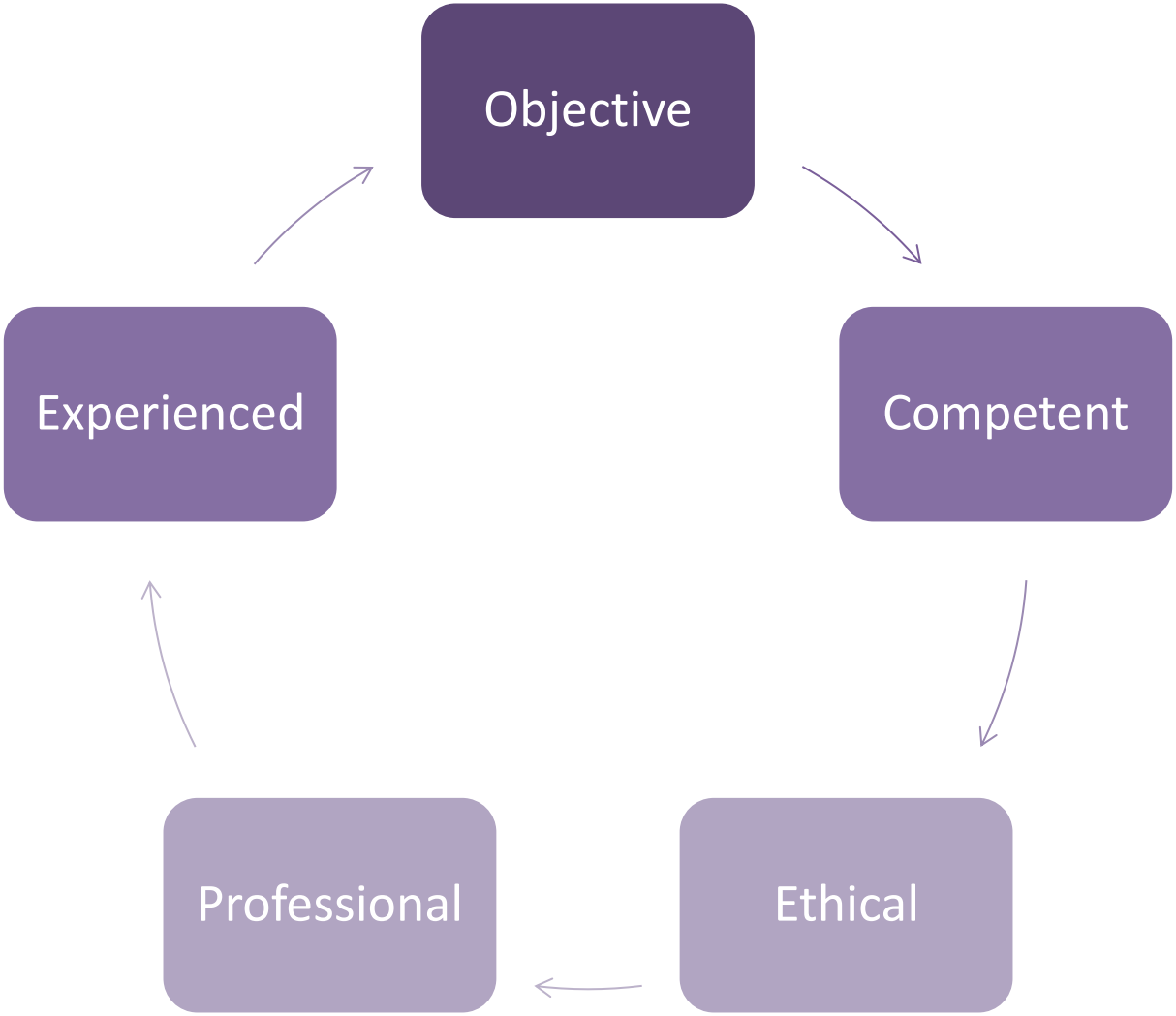
The ERI compliance path, implemented through the HERS rating process, provides independent, third-party analysis and review of the energy using features of a house.



The process includes:

- Initial analysis and energy rating of the proposed home
- Review for compliance with the energy code
- The inspection and testing of energy using features in the home to ensure that they perform as proposed
- Completing a final energy rating of the home once completed

✓ The thoroughness of the HERS rating process reduces the need for the jurisdiction to conduct plan review and specific inspections focused on compliance with the energy code


Objective
Competent
Ethical
Professional
Experienced

HERS Raters must be experienced and educated in conducting, supervising and evaluating a HERS rating

The following RESNET HERS certifications demonstrate competency in this field:

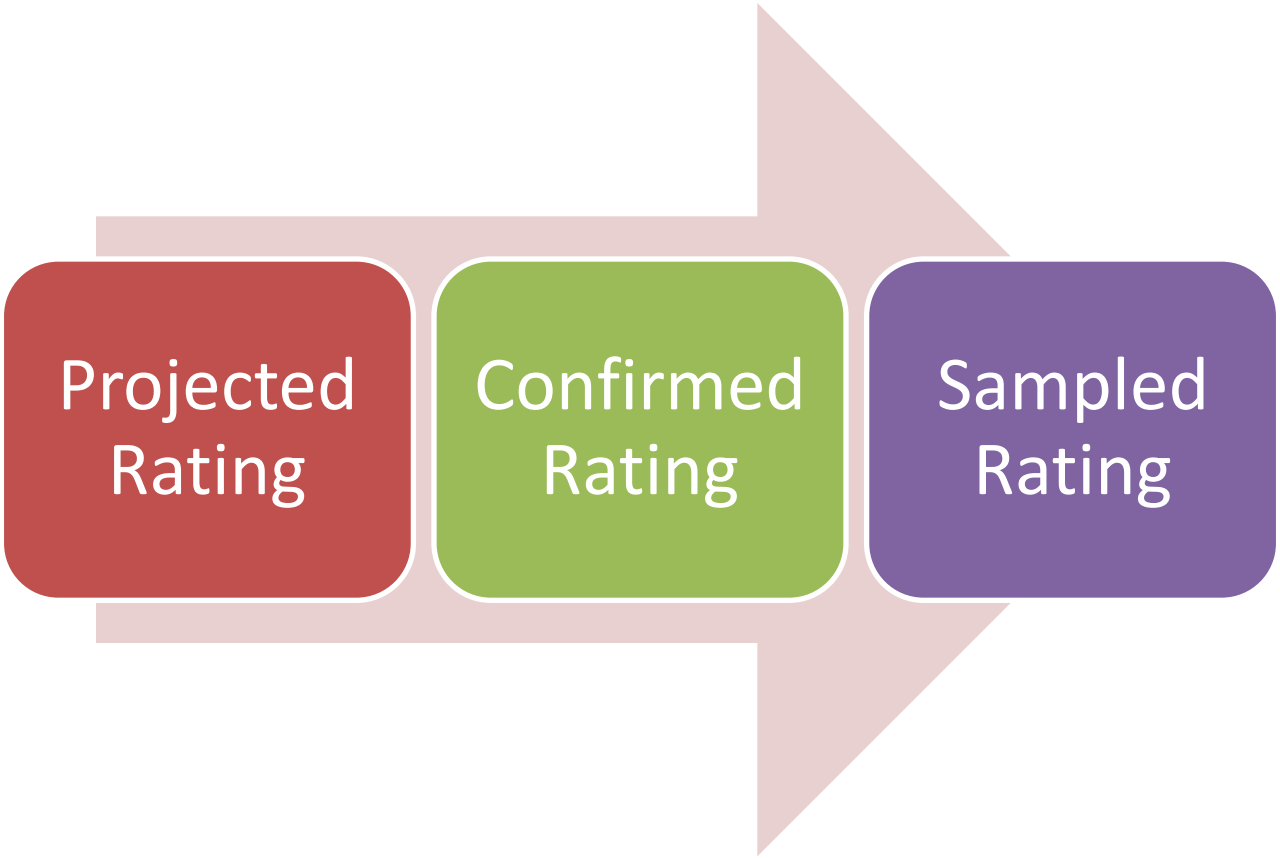
- Home Energy Rater Certification
- Rating Field Inspector Certification (can only provide the infield testing and inspection but not certified to provide an ERI)

It is recommended that HERS Raters demonstrate knowledge of the provisions of the IECC by holding the ICC IECC Residential Energy Inspector/Plan Examiner certification

The Approved Rating Software Tool that is defined in ANSI/RESNET 301-2014 will generate reports and must have the following information:

- Property location, including city, state, zip code, street address or community/subdivision name and lot number and Plan Name for the rated home
- Name and contact information (phone number and email address) of the Certified Rater conducting the rating
- Name, mailing address and telephone number of the Approved Rating Quality Assurance (Q/A) Provider under whose auspices the Rater is certified
- Date the Rating was conducted
- Name of the Approved Software Rating Tool (including version number) used to determine the Rating
- In addition, the rating report must have the following statement in no less than 10 point font:

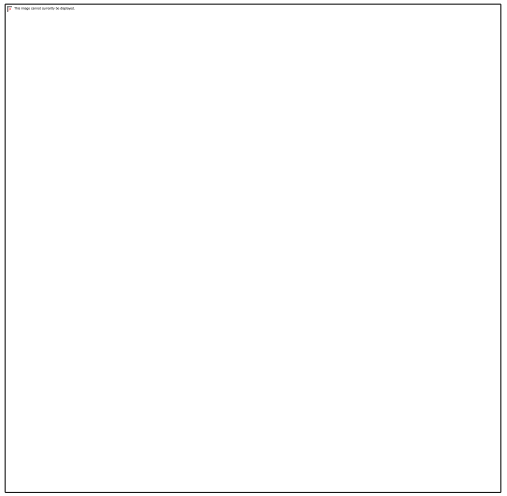
"The Home Energy Rating Standard Disclosure for this home is available from the Rating Provider."


Projected Rating
Confirmed Rating
Sampled Rating

Provide documentation that 2015 IECC requirements have been met:

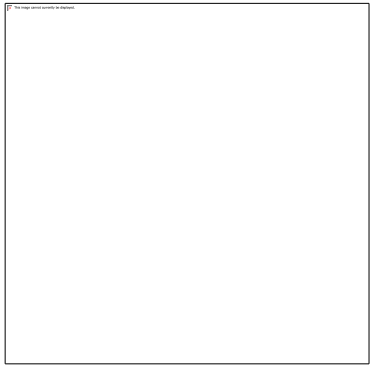
- ✓ Building Envelope
- ✓ HVAC
- ✓ Water Heating
- ✓ Lighting

Provide documentation that building envelope meets the minimum insulation and glazing requirements as defined in the 2009 IECC



One home, or 10% of each HERS Rater's annual total of homes, whichever is greater, must be reviewed by a Quality Assurance Designee

Homeowners should be informed that their home may be selected for a QA review and building officials should be notified of review



Case Studies

Massachusetts

Stretch Energy Code

- HERS performance path compliance option
- Included in MA code as Appendix 115AA
- Based on 2009 IECC but requires 20% greater efficiency

Required HERS Index scores based on house size

New residential buildings 3-stories or less, including multi-family units

Homes 3,000 ft² or larger

HERS Index of less than or equal to 65

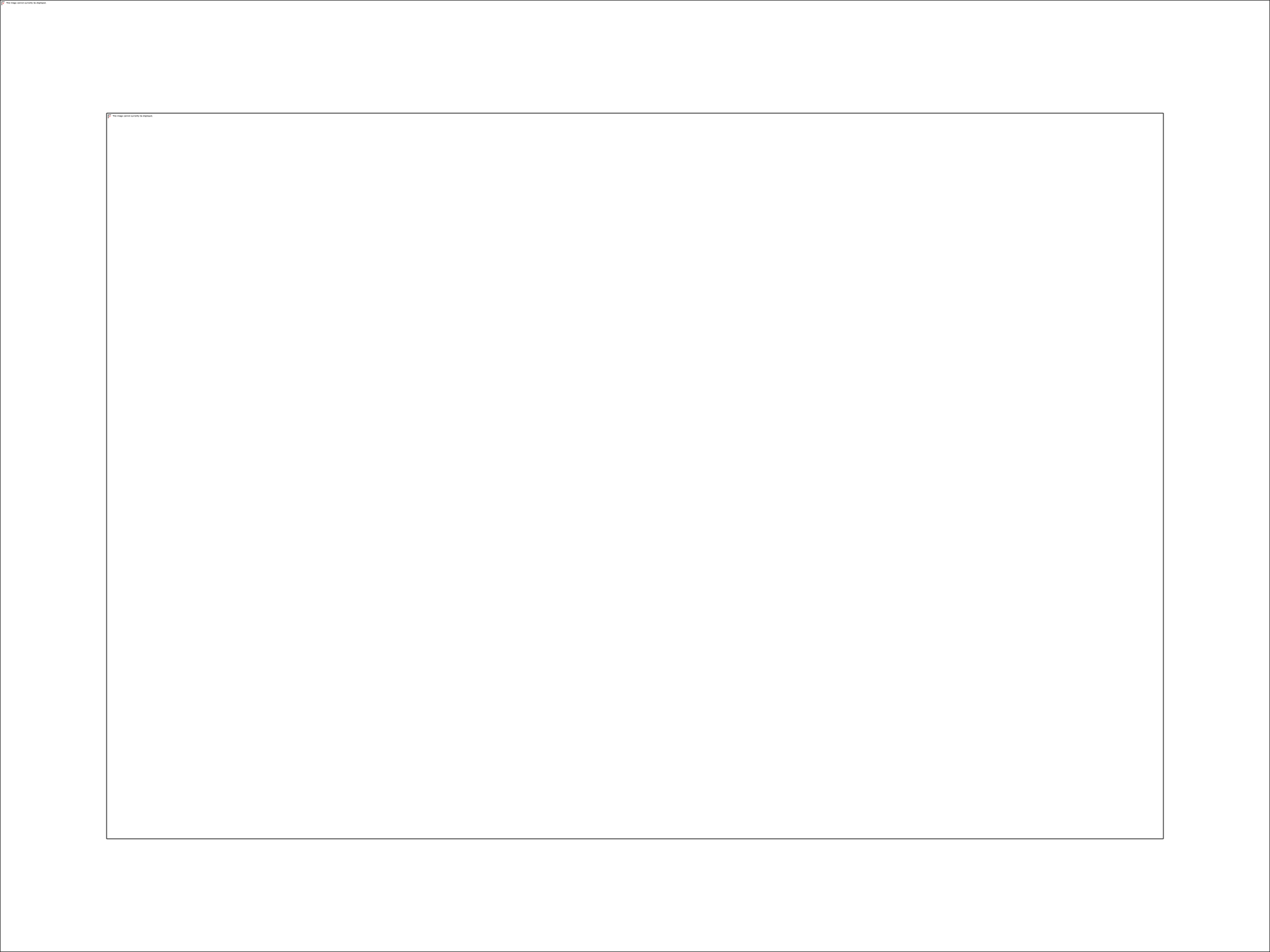
Homes less than 3,000 ft²

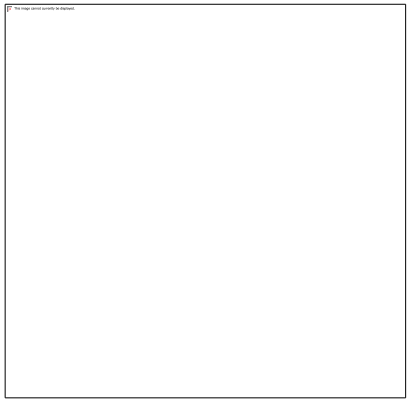
HERS Index of less than or equal to 70

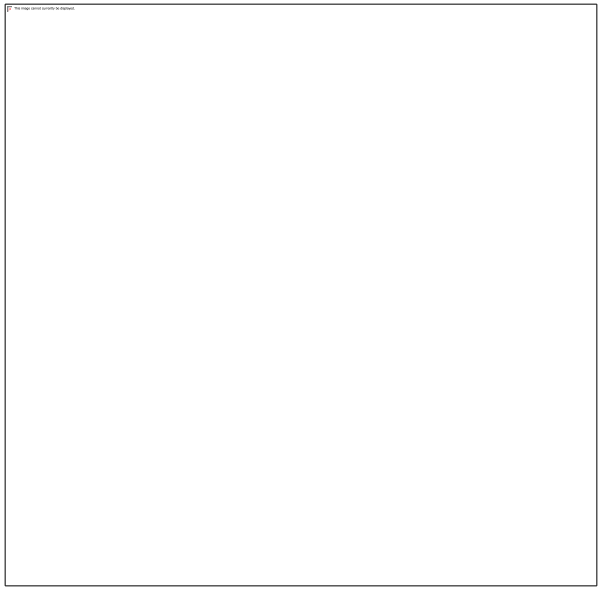
Existing home alterations, renovations and repairs that choose to use the performance option must achieve the following HERS rating requirements:

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







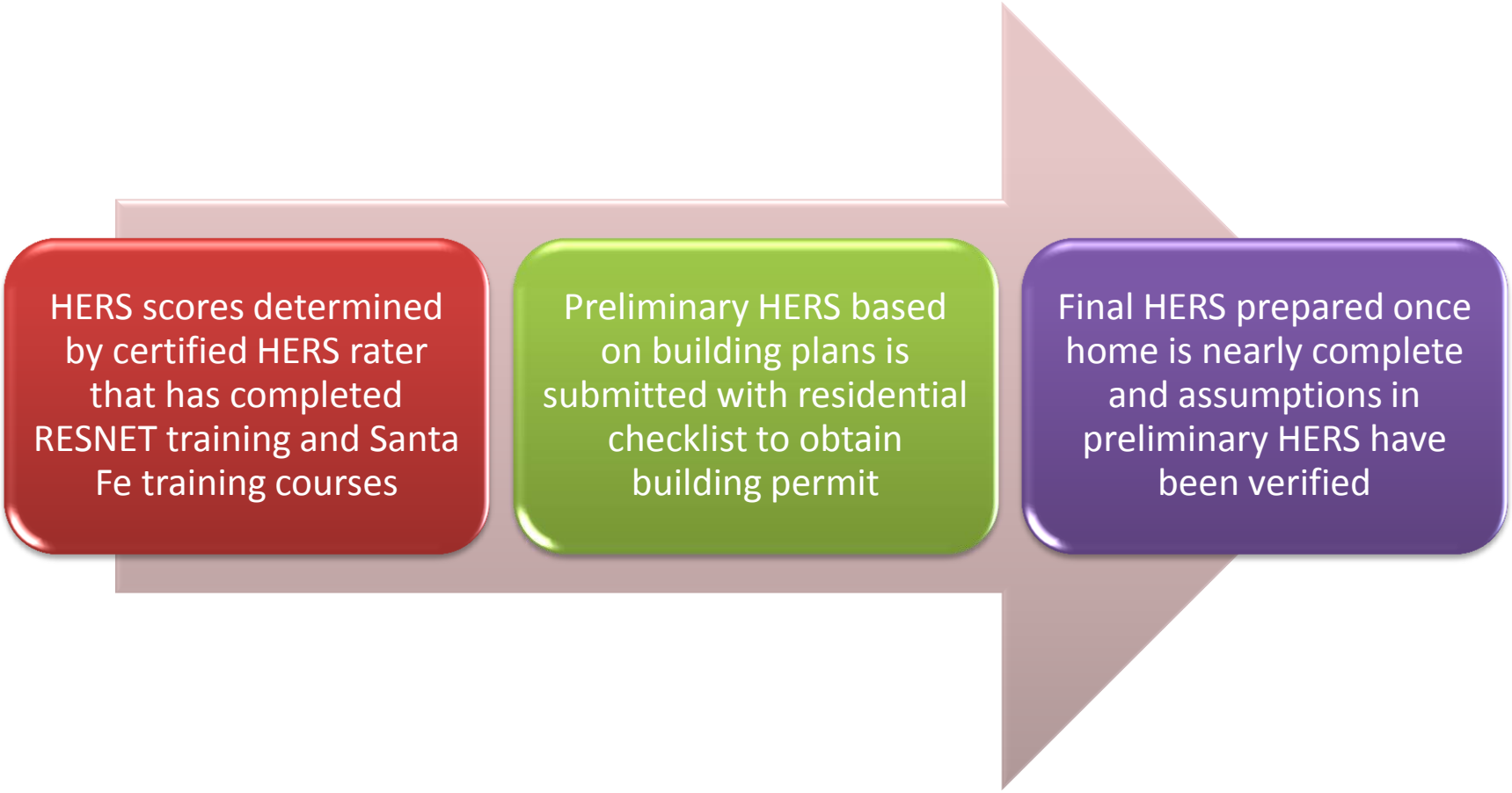
Since the beginning of the program

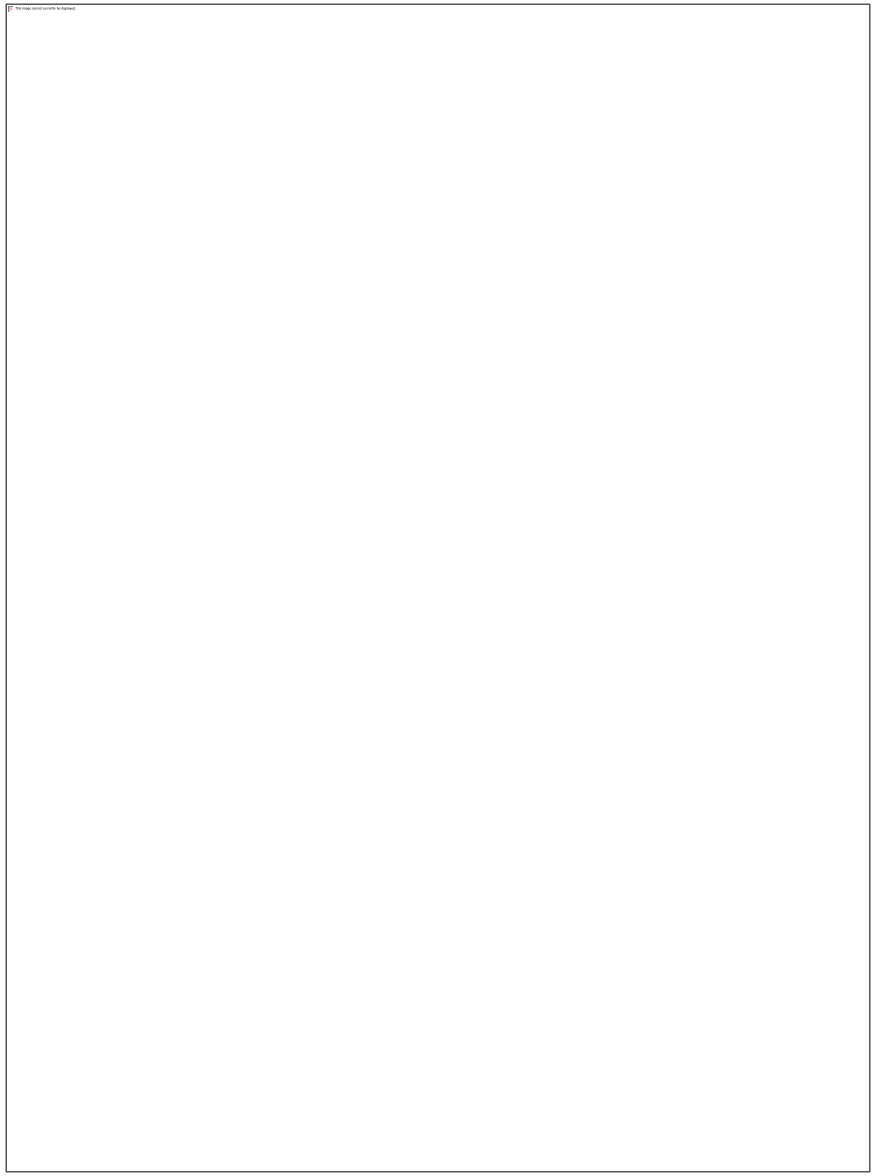
- 61% of homes rated received HERS scores better than state average
- 72% of homes rated received HERS scores better than national average

City of Santa Fe

Residential Green Building Code

- Required HERS scores built on levels set in National Green Building Code
- Applies to all new single family homes, attached and detached
- Homes 3,000ft² or less required to achieve HERS score of 70 or less
- HERS scores for homes greater than 3,000 ft² tiered based on home size


HERS scores determined by certified HERS rater that has completed RESNET training and Santa Fe training courses
Preliminary HERS based on building plans is submitted with residential checklist to obtain building permit
Final HERS prepared once home is nearly complete and assumptions in preliminary HERS have been verified



A report 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

Santa Fe Best Practices

Best practices have led to:

- A realistic set of scores for the jurisdiction
- An increase in quality of construction
- Construction practices that reflect unique needs of the city
- An increase in support for the program from the building community
- Competition among builders
- An increased in use of energy efficient products and technologies

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