

# HERS Ratings in the Retrofit Market

*A Massachusetts Case Study*



- 2005 - 2010 US housing declined from 1.6 million to 330,000 units
  - Decreased more than 80% that is only now slowly showing signs of improvement.
- New construction and real estate markets struggle causing an increase in renovations and retrofits helping homeowners meet their housing and energy efficiency needs.
- Planning for and measuring of energy benefits pose unique challenges to both HERS raters and Program Administrators (PA's)

# Today's Presentation – Takeaways

- Review the lessons learned from a variety of Massachusetts utility sponsored programs dealing with single family, duplex, and triple decker retrofit
- Discuss how to address retrofit project modeling challenges to leverage incentive programs
- Gain a thorough understanding of the many challenges in existing housing stock



# Pilots, Demonstration Projects and Programs

## Energy Efficiency:

- Pilots – Preliminary release of a program that may be subject to further revision before it is released as a final version after evaluation.
- Demonstration Projects – Allows for creating best practices for repeatable process in selecting appropriate measures and cost.
- Programs – A strategic and systematic program that continuously assesses and reduces the energy required to produce a product or provide a service.

# Green Triple Decker Demonstration Project



# What is a Triple Decker?

- Inception

- The triple-decker home is a predominant and appealing housing type found throughout many of City neighborhoods through the Commonwealth. The majority of triple-decker buildings were built between 1890 and 1920, are often higher energy:
  - Under-insulated
  - Lack high performing windows and doors,
  - Inefficient heating systems
  - High energy costs for owners and tenants.



# Green Triple Decker Program (GTDP)

- The Partnership
  - ICF working as the administrative vendor for The City of Boston's Redevelopment Authority (BRA), NSTAR and National Grid developed a strategy to improve the energy efficiency of Boston's triple-deckers.
- The Goal
  - Lower energy costs for occupants while tackling the municipal greenhouse gas emission target.

- The Green Triple Deck Program demonstrates potential for energy efficiency improvements in Boston’s “triple-decker” homes.
- Incentives available up to \$30,000
  - Must meet or exceed a HERS index of 65
- Property owner must provide the remaining funding required to complete the retrofit



# Major Renovation Pilot Program





# Major Renovations Pilot Program

- Inception
  - The Joint Management Committee's (JMC) Major Renovations Pilot Program, provides homeowners that are building an addition (500 square feet or more) the opportunity to increase the energy performance of their existing home.
- The Partnership
  - NSTAR Electric, Western MA Electric Company, National Grid and the Cape Light Compact

- Incentives up to \$2,000 to for insulation and air sealing
- Technical assistance, plans analysis, free CFLs and HERS rater subsidy
- Leveraged trade allies including HERS Raters, architects, insulation, remodeling and home building contractors
- Additional outreach was conducted utilizing extensive email lists, working with local chapters of trade organizations
  - NARI and local HBA chapter presentations were conducted at quarterly dinner meetings and educational events.
- Trainings and counter days at lumber yards were successful in targeting contractors
  - Strong network of trade allies resulting in a strong participation pipeline



# Why these pilots/projects were needed?

Feedback from participant evaluations of the Massachusetts Residential New Construction Program the following was identified:

- Gaps in the program offering with no overlap, whole house approach
- Some builders projects “didn’t fit” into either the new homes or existing home energy service program offerings
- Could not address all program requirements (TBC/TERC)
- Could not address all areas of the home due to funding constraints, code, historic restrictions, etc.

# Failure to launch

- Both took months to launch due to:
  - How do you calculate savings?
    - HERS Index vs. Massachusetts Baseline Home
  - Utilities had a hard time treating these as demonstration projects
    - Utilities ended up claiming actual energy savings
  - HERS Standards changed
    - Codes and reference home changed
  - Codes changed – 2009 IECC and Stretch Code

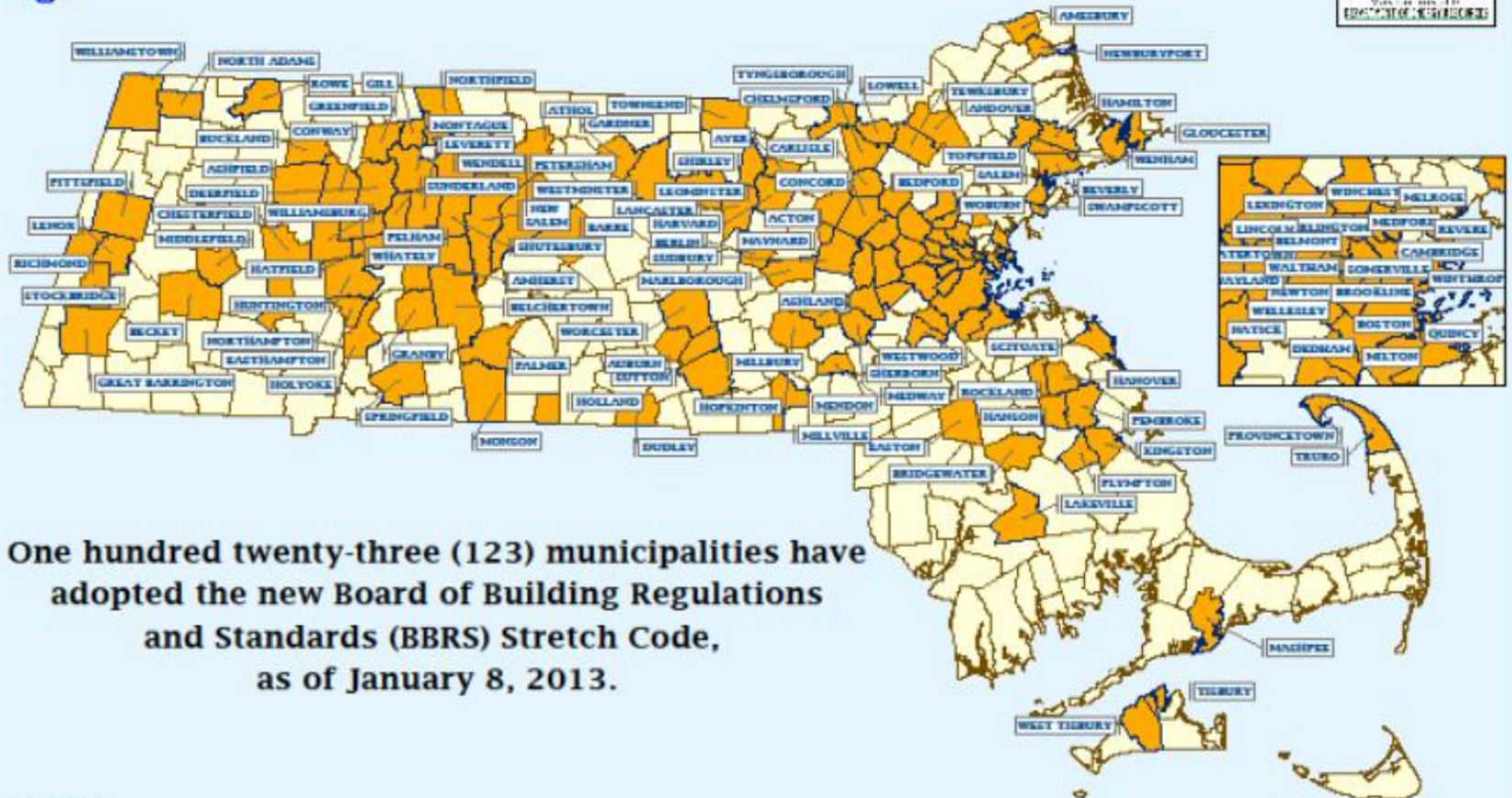
# What is the Stretch Code?

- Amendment to the statewide building code
- Base energy code was/is IECC 2009/12
- Stretch Code (started during rollout)
  - Residential Construction:
    - 15-20% more energy efficient
  - Commercial:
    - 20% more energy efficient
- The current Stretch Code is similar to the 2012 IECC





## Stretch Code Adoption, by Community



**One hundred twenty-three (123) municipalities have adopted the new Board of Building Regulations and Standards (BBRS) Stretch Code, as of January 8, 2013.**

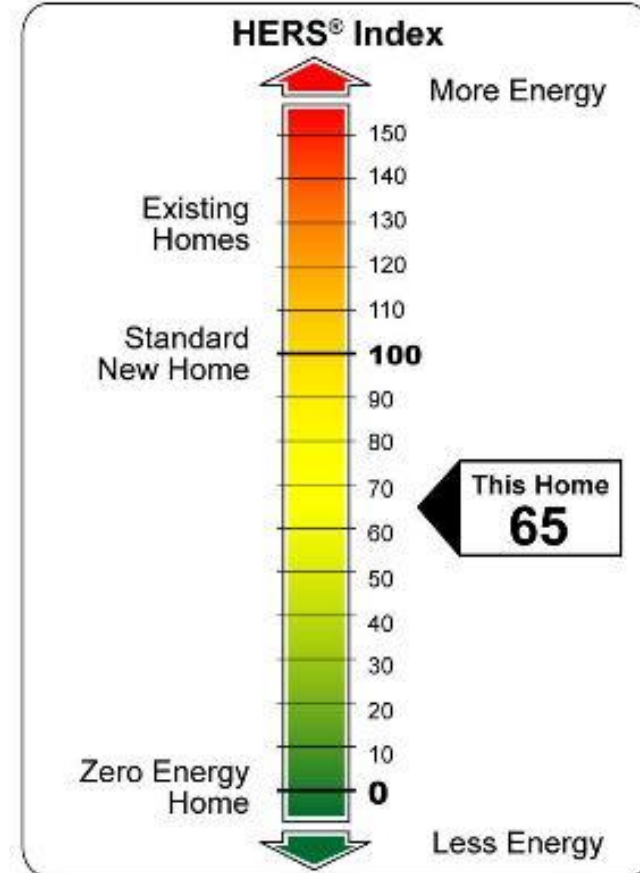
# *Implementation*





# Program Requirements

- Target goals:
  - Green Triple Decker Pilot
    - HERS Index of 65
  - Major Renovations
    - Prescriptive path
    - Whole house
      - Existing unrenovated areas
      - Existing gutted areas
      - Additions



# Incentives

- Green Triple Decker Pilot
  - \$10k per unit
  - Equipment incentives
  - No rater fee
- Major Renovations
  - Up to \$2k insulation
    - Based on industry averages
  - Air sealing \$1 per cfm
    - No CRF
  - Equipment incentives
  - Rater incentive



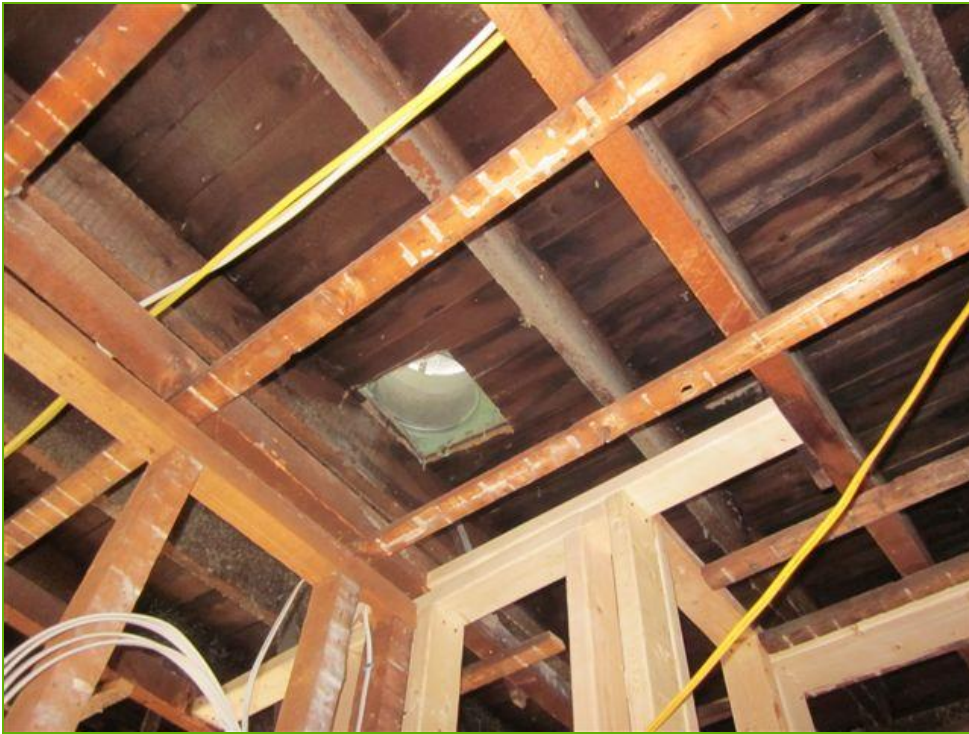
# Rater Tasks

- Mix of HERS and BPI standards
  - HERS Standards
  - Combustion safety
  - Distribution system efficiencies
  - Air flow testing



# HERS Rating Issues

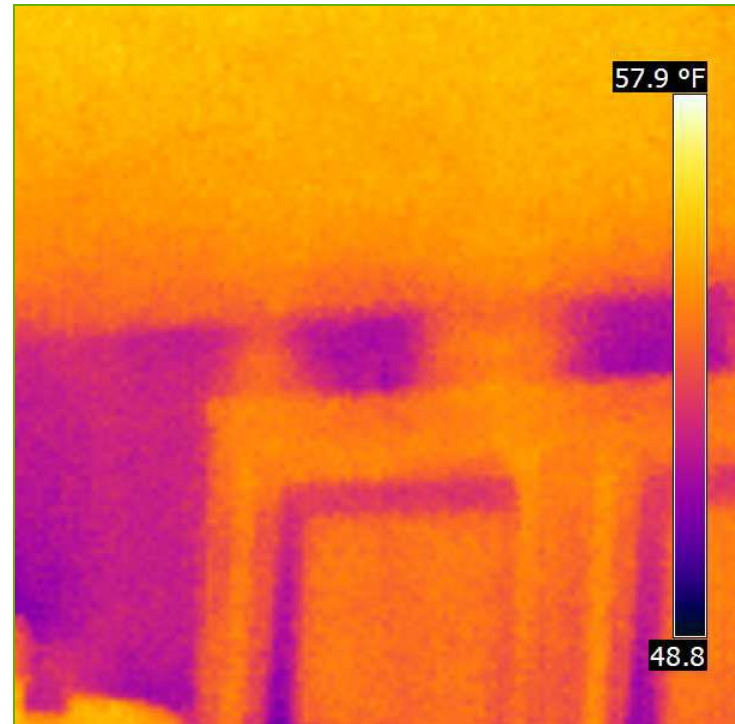
- Attics
  - Insulated sheathing





# HERS Rating Issues

- Walls:
  - Old homes— can't use default library entries
    - IR camera
    - Boroscope
    - Test holes
  - Insulated sheathing



# HERS Rating Issues

- Air infiltration – can't reach factors
  - Guessimating predicted air infiltration
- Old appliances



- Basements
  - Insulating basement walls





- Attics
  - Flat attics





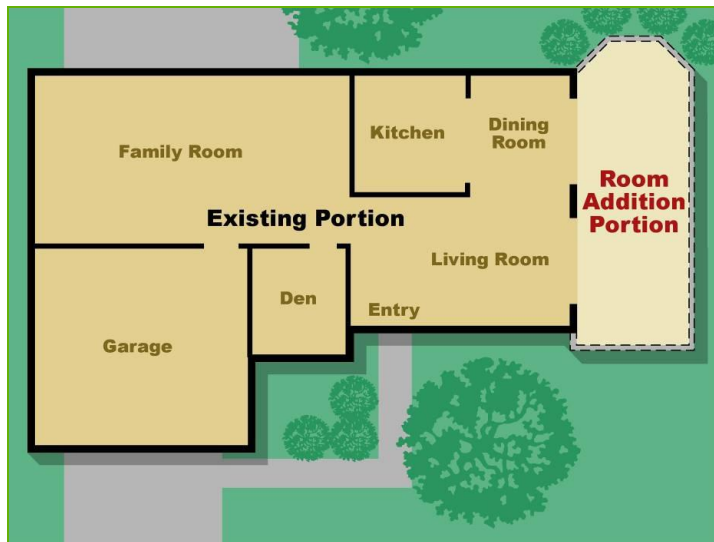
# Retrofit Issues

- Walls:
  - Insulated sheathing – moisture issues
  - Balloon framing



# Calculating Energy Savings

- Creating the reference home
  - Additions
  - Gutted Areas
  - Existing un-renovated areas



# Challenges

- Occupied Homes
- Homes entering mid-stream
- Multiple mid-point inspections
- Safety issues
- Working with homeowners
- Financing issues
- Time overruns
- Contractor issues



# Lesson Learned and Best Practices



# Program Post Mortem

- Even with launching delays participation increased for their project life
- Evaluation of the Green Triple Decker Program showed cost effectiveness (with lower incentives) and that the overall program design was strong
  - Program isn't continuing as funding has been removed
- The Major Reno Pilot was also cost effective
  - Moved to the Home Energy Services Program (Existing homes programs) in 2013.



# Questions?

Contact Info:

Michael K. Berry, Manager

ICF International

[Michael.Berry@icfi.com](mailto:Michael.Berry@icfi.com)

Greg Krantz

ICF International

[Gregory.Krantz@icfi.com](mailto:Gregory.Krantz@icfi.com)

