



Renovation Nation: Granite Counters. Stainless Appliances, and ... Thick Insulation

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Home Renovations and Additions



- Historically not targeted by programs
- Opportunity for program sponsors looking for new source of savings
- Connecticut and Massachusetts have already developed new program pathways
- Two recent market characterization and potential savings evaluations were conducted in Massachusetts and Connecticut
- Goals of evaluation studies:
 - Estimate size of market
 - Scope
 - Savings potential
 - Key market barriers



- **Renovations are major remodeling or improvements that do not make the home bigger.** They do not include routine work, such as painting, decorating, fixing broken water pipes, landscaping, or projects limited to HVAC replacements.
- **Additions expand the conditioned square footage of a home.** Examples: finishing previously unconditioned space, expanding a home's footprint, or adding a new story.



Key Research Activities

		
Research Activity	Massachusetts	Connecticut
Develop program theory and logic model	✓	--
Online permit database review	56 (databases reviewed)	Applied MA methods to CT's 169 municipalities
General contractor web survey	77	73
HVAC contractor and program participant phone interviews	10 (contractors)	10 (program participants)
In-person focus groups with general contractors	24 participants (5 focus groups)	--
Web survey of homeowners	207	104
Energy model prototypes	72 prototypes	48 prototypes

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remodel
remove and replace
bath finish
convert basement
build out convert
bed room
addition buildout dry wall
add alter
reno
kitchen
renovation

- Regression modeling used to analyze permitted records
- Tested variety of variables that could be used in regression analysis - three stood out explaining 75% of variation.
- Unpermitted estimates – used results from contractor survey

3 Key Variables

Source (Census data)



Single-family home counts





Median household income



Population Density

- Developed 120 prototypic energy models (72 in Massachusetts, 48 in Connecticut).
- Used RESNET-approved energy modeling software to represent difference in project type, scope, heating fuel, and location across both states.
- Savings calculated from difference in energy consumption before (baseline) and after (upgrade scenario) a renovation or addition had taken place.

Findings: Market Sizing

	 Massachusetts (2019)	 Connecticut (2020)
Renovations	89,424	40,983
Additions	30,364	15,342
Both Renovations and Additions	12,828	6,405
Total # of Projects	132,616	62,731
% of Single-family homes in the state	7.5%	6.5%
% of Renovations permitted	88%	79%
% of Additions permitted	97%	94%

- Massachusetts R&A market **18X** larger than single-family new construction market (about 7,200 homes)
- Connecticut R&A market **27X** larger than single-family new construction market (about 2,466 homes)

Findings: Permitted vs Non-permitted Projects



Massachusetts

88% of renovations and 97% of their addition projects included permits





Connecticut



79% of renovations and 94% of addition projects included permits

Reason for not pulling permits	Massachusetts (n=22)	Connecticut (n=27)
Did not think one was required	86%	67%
Homeowner did not want to	9%	41%
Too much time/effort	5%	11%
Subcontractor did not want to	--	4%
Other reason	5%	4%

Findings: Project Scope

Project Scope Findings	 Massachusetts	 Connecticut
Renovation Size	Mean: 887 square feet Range: 50 – 2,400 square feet	Mean: 590 square feet Range: 50 – 2,400 square feet
Addition Size	Mean: 808 square feet Range: 100 – 2,500 square feet	Mean: 369 square feet Range: 50 – 2,000 square feet
Most common renovation types	Bathroom (44%), Kitchen (41%)	Kitchen (31%), Bathroom (26%)
Most common addition types	Finishing and conditioning basement, building new section of the house, finishing and conditioning an attic space or bonus room over garage	Finishing and conditioning basement, building new section of the house, finishing and conditioning porch or sunroom
Most common affected measures	Heating and cooling equipment, insulation, lighting, windows	Heating and cooling equipment, water heating equipment, insulation, windows

Findings: Savings Potential

	 Massachusetts	 Connecticut
Average Per Home Savings from Modeled Prototypes	19.0 MMBtus	21.2 MMBtus
Statewide Savings	1,055,955 MMBtus	825,096 MMBtus

- Potential saving are over **3X** larger than RNC initiative in both states
- Reducing heating consumption represents most of the potential savings (79% in Massachusetts, 81% in Connecticut)

Conclusions

- R&A market represents a huge potential for savings
- Non-permitted projects represent a minority of renovation projects in each state
- Figuring out an appropriate baseline is a potential challenge
- Program awareness and limited customer prioritization of energy efficiency are potential barriers

Questions?

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