



Multiple, Non-Energy Benefits of Residential Energy Upgrades

Agenda

I. Welcome and Introductions

II. Polling Questions

III. Rachel Cluett, ACEEE

IV. Keith Canfield, CCI

**V. Melanie Paskevich, NeighborWorks of
Western Vermont**

**Why did you
choose this
session?**

Polling Questions

What sector do you work in?

- Local government
- State government
- Federal government
- Nonprofit
- Utility
- Business

Polling Questions

How long have you been working in the field of residential energy efficiency?

- 0-1 years
- 2-5 years
- 6-10 years
- 11-20 years
- 21+ years

Polling Questions

What do you do?

- Fund energy efficiency programs
- Implement energy efficiency programs
- Work in homes to make more energy efficient
- Consult to energy efficiency programs
- Evaluate energy efficiency programs

Polling Questions

What is the biggest barrier to valuing NEBs?

- Difficulty measuring
- Defining comfort
- Utility cost effectiveness
- Customer awareness
- Clear marketing messages

Polling Questions

What offers the most potential for NEBs?

- Health
- Low fuel costs
- Real estate incorporating EE (in MLS, sales+)
- Baby Boomer retirement wave
- Resiliency rise in importance
- Smart homes & coming increase in NEB data

Visit the Residential Program Solution Center: energy.gov/rpsc

The image shows a screenshot of the Better Buildings Residential Program Solution Center website. The page features a navigation menu on the left with links such as 'Solution Center Home', 'About', 'Handbook Index', 'Quick Links', 'Proven Practices', 'Energy Data Facts', and 'Glossary'. A central graphic displays a compass on a computer keyboard. Below this, there is a section titled 'Explore the Solution Center' with icons for 'Market Position & Business Model', 'Program Design & Customer Experience', and 'Evaluation & Data Collection'. A 'RECENTLY UPDATED RESOURCES' section lists various articles and reports. A process flow diagram on the right illustrates four stages: Strategy Development (target icon), Planning (worker icon), Implementation (checkmarks icon), and Evaluation (magnifying glass icon).

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Better Buildings Residential Program Solution Center

EERE • BTD • Better Buildings Neighborhood Program • Solution Center Home

- Solution Center Home
- About
- Handbook Index
- Quick Links
- Proven Practices
- Energy Data Facts
- Glossary

BROWSE BY:

- Program Components
- Program Design Phases
- Content Types

Take a Tour of the Solution Center
Learn how to navigate the Solution Center and access examples, lessons, and other resources for residential energy efficiency programs.

Explore the Solution Center

- Market Position & Business Model
- Program Design & Customer Experience
- Evaluation & Data Collection

RECENTLY UPDATED RESOURCES

- Proven Practices: Energy Advisor Services
- What is Green Worth? Unveiling High-Performance Home Premiums in Washington, D.C.
- The Market Valuation of Energy Efficient and Green Certified Residential Homes
- EMV 2.0: Savings Measurement Software for Results in the Field
- Policy Approaches to Changing Production Incentive Programs: How Energy Efficiency Can Lower Program Costs

Put the widget on your website

Tell me more

Strategy Development

Planning

Implementation

Evaluation

Better Buildings®

U.S. DEPARTMENT OF ENERGY

Related Resources in the Residential Program Solution Center

Resources related to non-energy benefits:

- [Non-Energy Benefits Quick Link](#) provides easy access to resources about benefits beyond energy savings, such as health, job creation, economic development, avoided emissions, and more.
- **Tip for Success:** Leverage the many complementary benefits of energy efficiency programs to broaden your organization's reach and partnership opportunities.
- The [Marketing and Outreach – Make Design Decisions](#) handbook, “Develop Messages to Motivate Action” step discusses how your audience's top priority may not be energy efficiency.



- While you're there, see the latest [Proven Practices](#) post on [Evaluating Residential Program Success](#).

Residential Network

Better Buildings Residential Network: Connects energy efficiency programs and partners to share best practices and learn from one another to increase the number of homes that are energy efficient.

Membership: Open to organizations committed to accelerating the pace of home energy upgrades.

Benefits:

- Recognition: Media, materials
- Weekly Peer Exchange Calls
- Tools, templates, & resources
- Voluntary member initiatives
- Newsletter updates on trends
- Speaking opportunities
- Sample tweet, newsletter article announcing membership

Commitment: Provide DOE with one, annual number of residential upgrades, and information about associated benefits.



American Council for an Energy-Efficient Economy

Multiple Benefits of Residential Retrofits

Rachel Cluett

Senior Research Analyst, Buildings Program

American Council for an Energy-Efficient Economy

Why quantify non-energy benefits?

- Program planning
 - Cost benefit analysis for comparison with other programs in a portfolio
- Regulatory requirements
 - Represent the value of programs to regulators
- Program marketing
 - Help program participants understand the range of benefits from upgrades

Program planning and regulatory requirements: do the benefits outweigh the costs?

	Participant Cost Test	RIM Test	Utility Cost Test	TRC Test	Societal Cost Test
Energy Efficiency Program Benefits:					
Avoided Energy Costs	---	Yes	Yes	Yes	Yes
Avoided Capacity Costs	---	Yes	Yes	Yes	Yes
Avoided Transmission and Distribution Costs	---	Yes	Yes	Yes	Yes
Wholesale Market Price Suppression Effects	---	Yes	Yes	Yes	Yes
Avoided Cost of Environmental Compliance	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (utility)	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (participant)	Yes	---	---	Yes*	Yes*
Non-Energy Benefits (societal)	---	---	---	---	Yes
Customer Bill Savings	Yes	---	---	---	---
Energy Efficiency Program Costs:					
Program Administrator Costs	---	Yes	Yes	Yes	Yes
EE Measure Cost: Program Financial Incentive	---	Yes	Yes	Yes	Yes
EE Measure Cost: Participant Contribution	Yes	---	---	Yes	Yes
Lost Revenues to the Utility	---	Yes	---	---	---

Source: Resource Value Framework, NESP 2014

An imbalanced cost effectiveness test doesn't accurately assess whether programs are in the public interest

Participant costs

- \$ contribution to energy efficiency project



Participant benefits

- Energy savings
- Water and sewer savings
- Reduced operations and maintenance costs
- Increased tenant comfort
- Reduced vacancy rate

What are the benefits?

Category	Benefit
Readily quantified and monetized benefits	
Resource	Reduction in water and sewer costs
Highly important to participants, quantified by some studies	
Operations	Increased home durability, less maintenance
	Reduced equipment and appliance maintenance
Comfort	Higher comfort levels
	Noise: quieter indoor environment
Safety	Improved safety (fewer fires, reduced CO poisoning)
Home improvements	Increased housing property value
Potentially significant, but less readily quantified	
Health	Reduced illness, fewer sick days
	Improvements in indoor air quality

How are benefits quantified?

- Occupant surveys
- Algorithms from literature (resource benefits)
- Adapt values from other programs

Value of benefits measured in existing studies

Benefit	Value range (% of utility bill savings)
Reduction in water and sewer costs	5–60%
Increased home durability, less maintenance	7%
Reduced equipment and appliance maintenance	2–26%
Higher comfort levels	2–25%
Noise: quieter indoor environment	5–15%
Improved safety (fewer fires, reduced CO poisoning)	1–12%
Increased housing property value	2–20%, or quantified as a one-time value
Reduced illness, fewer sick days	0–36%

Resources

Russell, Baatz, Cluett and Amann. **Recognizing the Value of Energy Efficiency's Multiple Benefits.** Dec 2, 2015. <http://aceee.org/research-report/ie1502>

Cluett and Amann. **Multiple Benefits of Multifamily Energy Efficiency for Cost-Effectiveness Screening.** June 16, 2015. <http://aceee.org/multiple-benefits-multifamily-energy-efficiency>

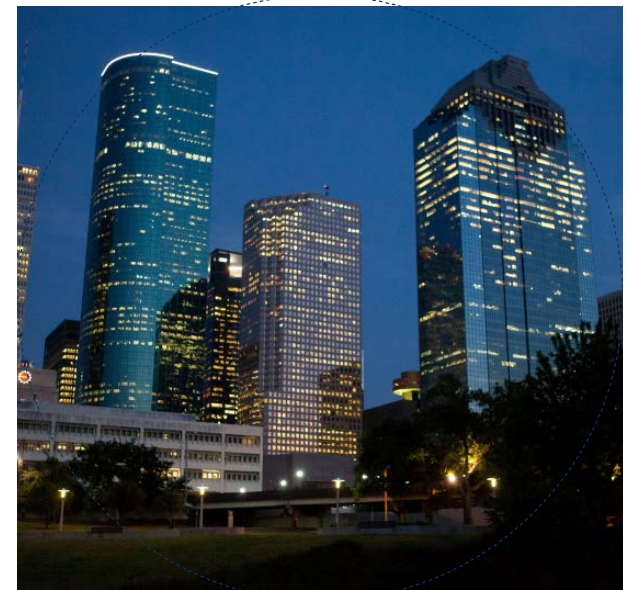
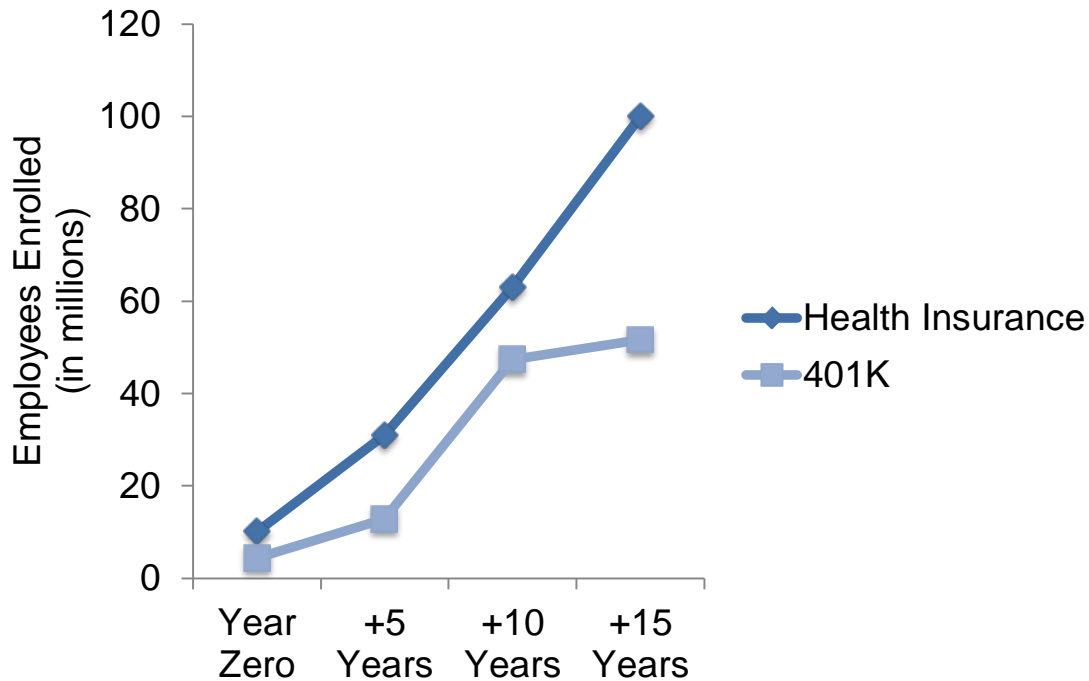
National Efficiency Screening Project. 2014. **The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening.** Washington, DC. National Home Performance Council. <http://www.homeperformance.org/policy-research/advocacy/about-resource-value-framework>



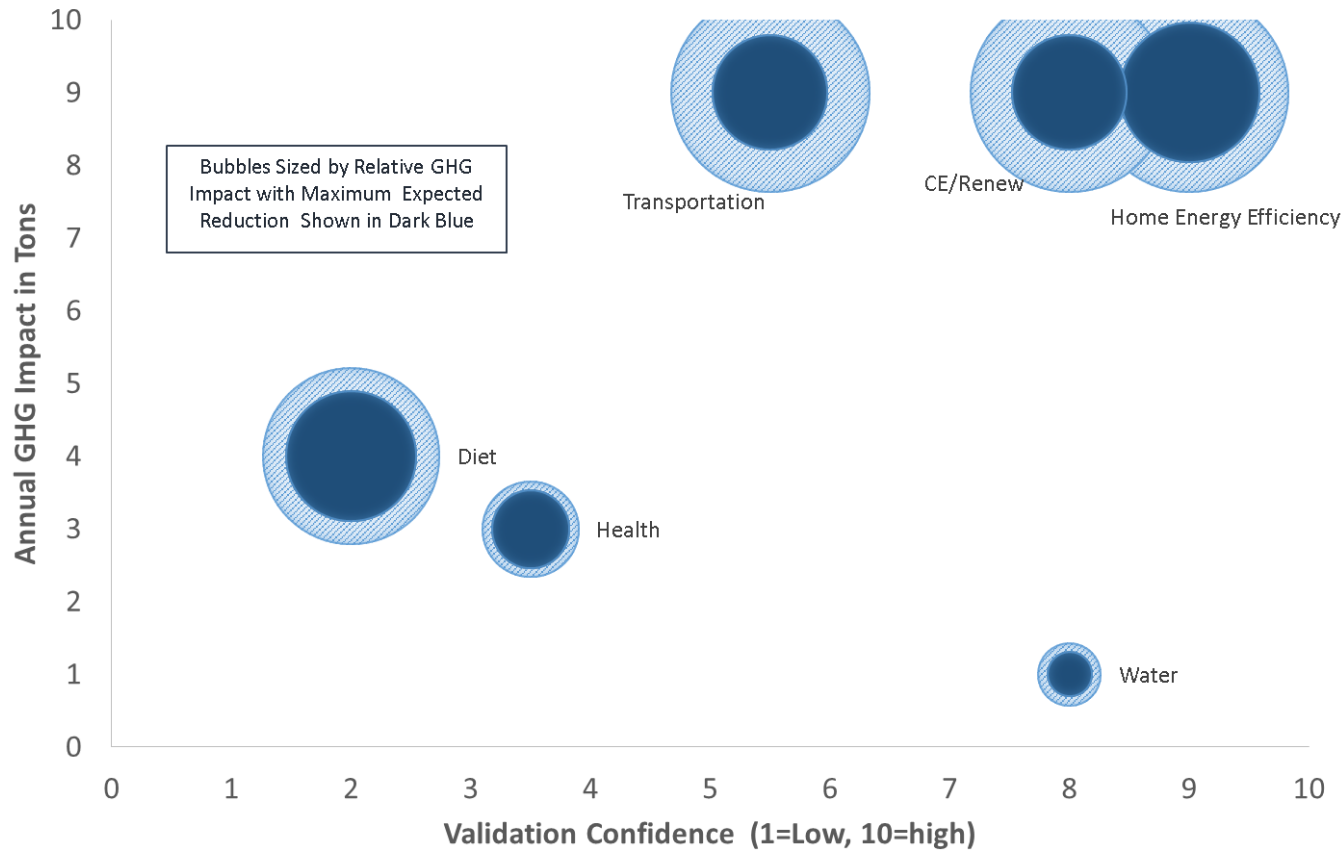
Clinton Climate Initiative



Reaching Scale in the Workplace



COMPARISON OF GHG IMPACT POTENTIAL FOR AVERAGE US HOUSEHOLD (2011)



HEAL Employee Impact

Employee Survey Results

Did you find participation in the HEAL program to be beneficial to you or your family?



YES **89%**

Do you feel you have more information about energy use in your home than you did before your participation in the HEAL program?



YES **86%**

Would you have made energy efficient improvements to your home this year before participating in the HEAL program?



NO **66%**

Cost of providing similar disposable income increase through wages...

Equivalent to the after-tax impact of a... **1.44%** salary increase

for an employee making \$40K

Cost to employer (for salary increase of 1.44%) **\$644.33** 1 year

including employer paid tax contributions (FUTA, SUTA, SS, Medicare)

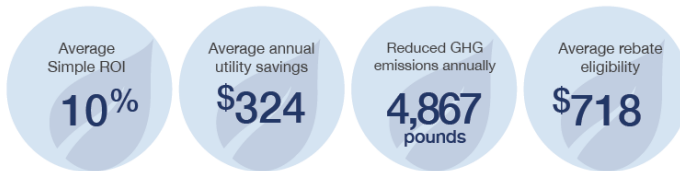
10-year cost to employer **\$6,443.30** 10 years

XXX Employees believe employers that offer HEAL...

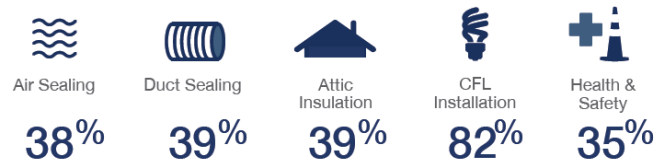




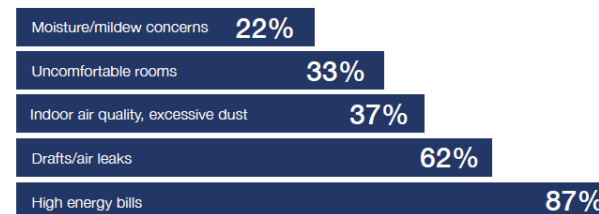
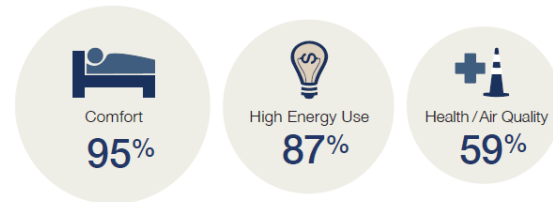
Energy, Environment & Financial Impacts of Recommendations



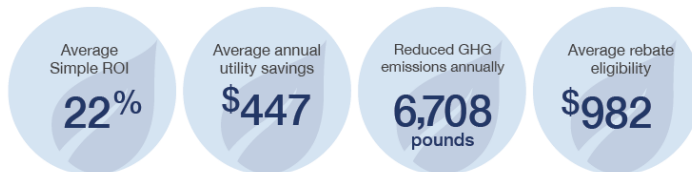
Most Frequent Recommendations



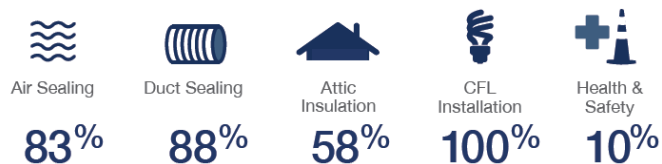
Top Employee Concerns



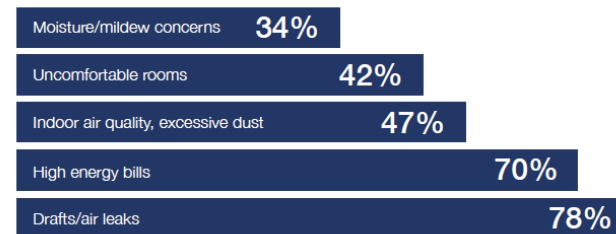
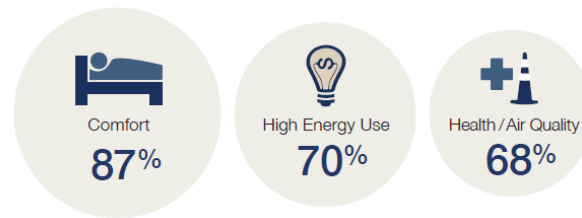
Energy, Environment & Financial Impacts of Recommendations








Most Frequent Recommendations



Top Employee Concerns



Employer
1: City

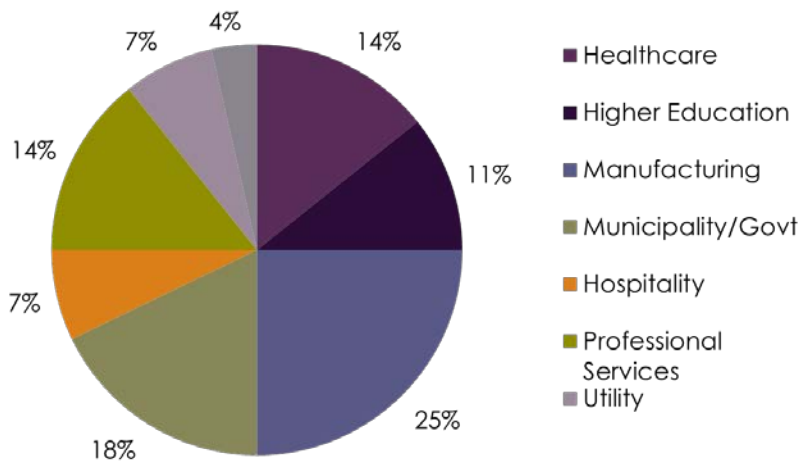
	Those receiving assessments	Those progressing to retrofit
 Average Number of Recommendations	3.1	2.4
 Average Cost	\$5,816	\$3,948
 Average Rebate	\$718	\$742
 Average Net Cost	\$5,099	\$3,206
 Annual Savings	\$324	\$344

	Percentage Financed through CU	69%
	Average Loan	\$2,081

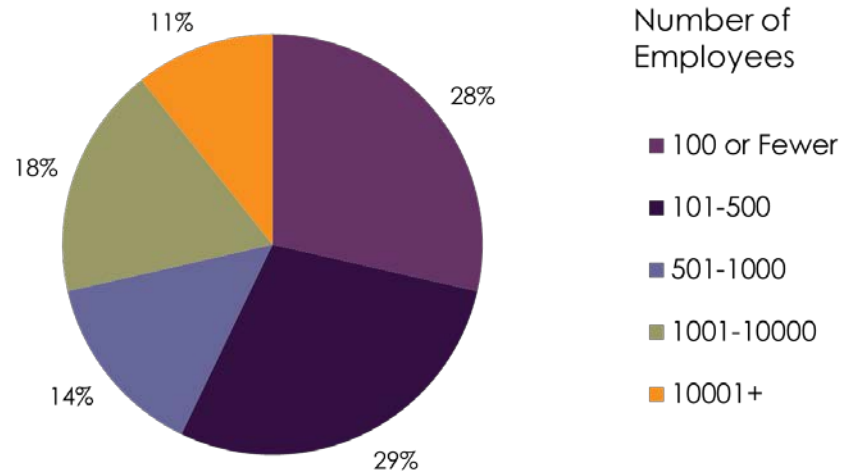
Employer
2: Health
Care

	Those receiving assessments	Those progressing to retrofit
 Average Number of Recommendations	3.6	3.7
 Average Cost	\$3,001	\$3,180
 Average Rebate	\$984	\$1,065
 Average Net Cost	\$2,017	\$2,081
 Annual Savings	\$447	\$427
 Average Payback (in years)	4.51	4.87

**Employers Offering HEAL Benefit
(by Industry Sector)**



**Employers Offering HEAL Benefit
(by Total Employment)**



Potential Impact of Offering Home Energy Efficiency: Firm with 25,000 Employees



Reduction in Utility
Expenses
(over 10 Years)

\$26
Million



Stimulation of Home
Performance and
Construction Sectors

\$23
Million



Improved Health
Outcomes for
Participants

\$5
Million



Estimated Increase in
Home Value

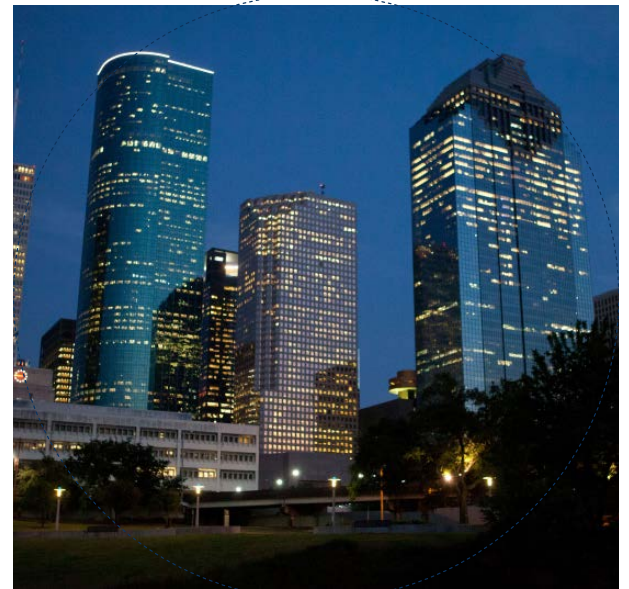
\$20
Million

Key Findings from HEAL

- Delivering information, financing/Incentives and infrastructure needs, backed by a strong quality assurance plan, creates an action vector
- Program uptake and participation rates can be 3-10 times higher than those found in the general utility program population
- Employees appreciate the employer's facilitation role and tend to view the employer more favorably and as being more sustainably oriented
- Co-benefits appear to be substantial, and accrue to multiple stakeholder groups

Thank You

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Non-Energy Benefits of Residential Energy Upgrades





NeighborWorks of Western VT

- **Nonprofit** housing organization
- One-stop-shop
- Provide all the answers and support homebuyers and owners need
- Keep customer's best interest front and center
- **Realty, Lending, Financial Counseling and Education, Home Repair, HEAT Squad**
- Part of a national nonprofit network, *NeighborWorks America*





Meet the HEAT Squad

- Providing **support** to improve efficiency of homes/businesses, regardless of income since 2010
- **Reduced cost audits**, same day audit reports, objective advice, help with contractors, in-house financing
- Available in five counties, half of Vermont
- Completed almost **4,000 audits and 1,500 projects**
- Partners: Efficiency VT, Green Mountain Power, Local Contractors, Energy Committees and Champions





Residential Non-Energy Benefits



1. Your Health and Safety
2. Protect Your Investment
3. Support Your Community





Your Health and Safety

- Reduce incidence of rodents and pests

Our house and cellar are toasty warm and the amazing thing is- we have not seen a single mouse. Thank you.

-Lee & Jane

- Lower outside noise
- Eliminate moisture/mildew/mold (asthma)
- Address dangerous gas leaks and carbon monoxide issues
- Verify building tightness limit, not too tight
- *Have a safer home for you and your family*



Protect Your Investment

- Reduce occurrence of damaging ice dams
- Eliminate moisture from entering building
- Protect the structure and increase the longevity of the building
- Lower maintenance expenses (painting, roofing, siding, etc.)
- Increase value of the home





Support Your Community

***“Make a Difference in Your Community.
Your improvements support your local
economy with local jobs for local folks.”***



- Job creation
- Personal empowerment
- Energy independence
- Support the local economy



Head Scratcher:

How do we effectively market to homeowners about this....



**INCREASED
COMFORT**

With warm weather and low fuel prices, how can we quantify increased comfort?



Thank You

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